



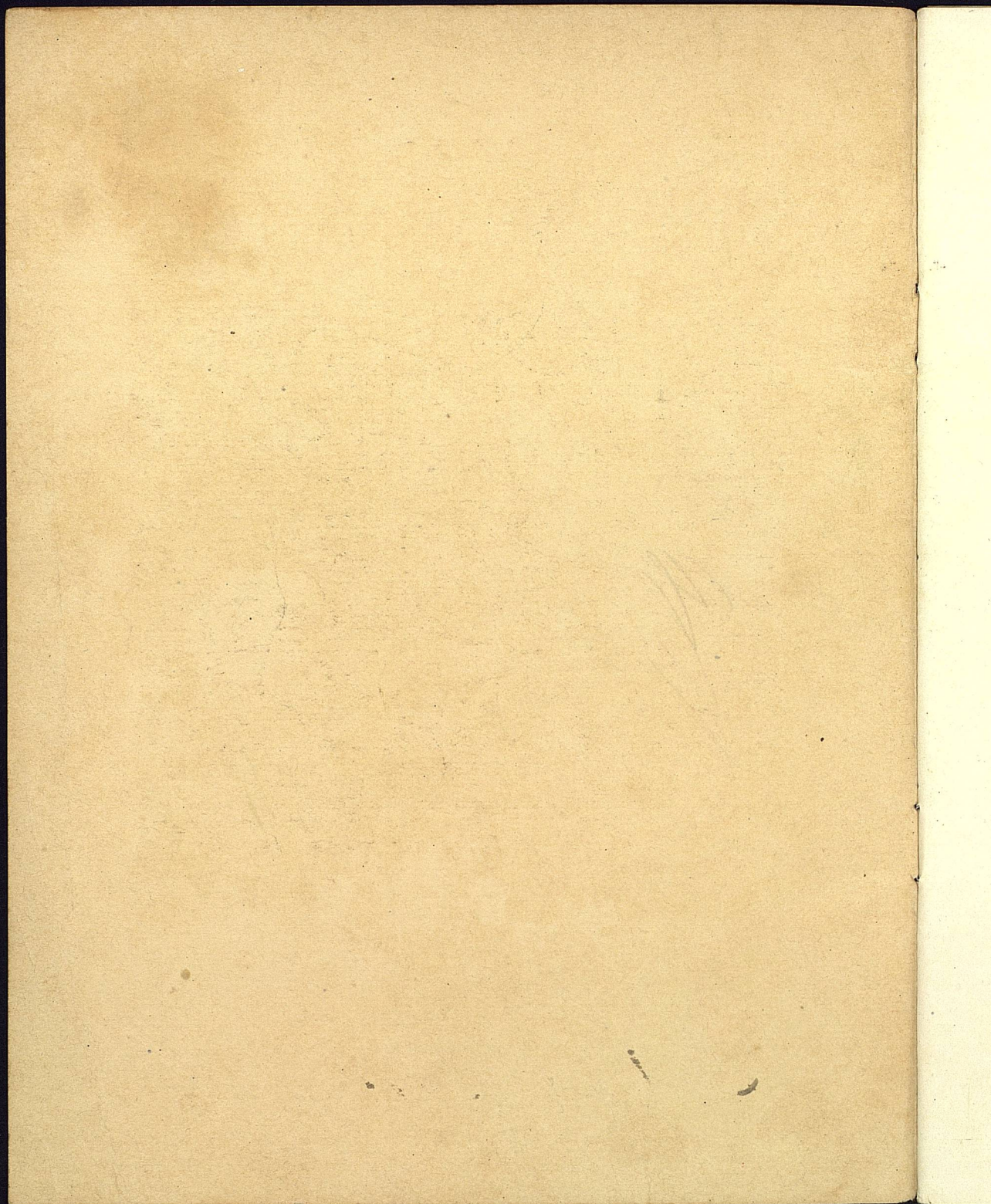
STARS

FLINT & WALLING MFG. CO.

KENDALLVILLE, IND.

U. S. A.

BACK GEARED



Catalogue No. 57

STAR WINDMILLS



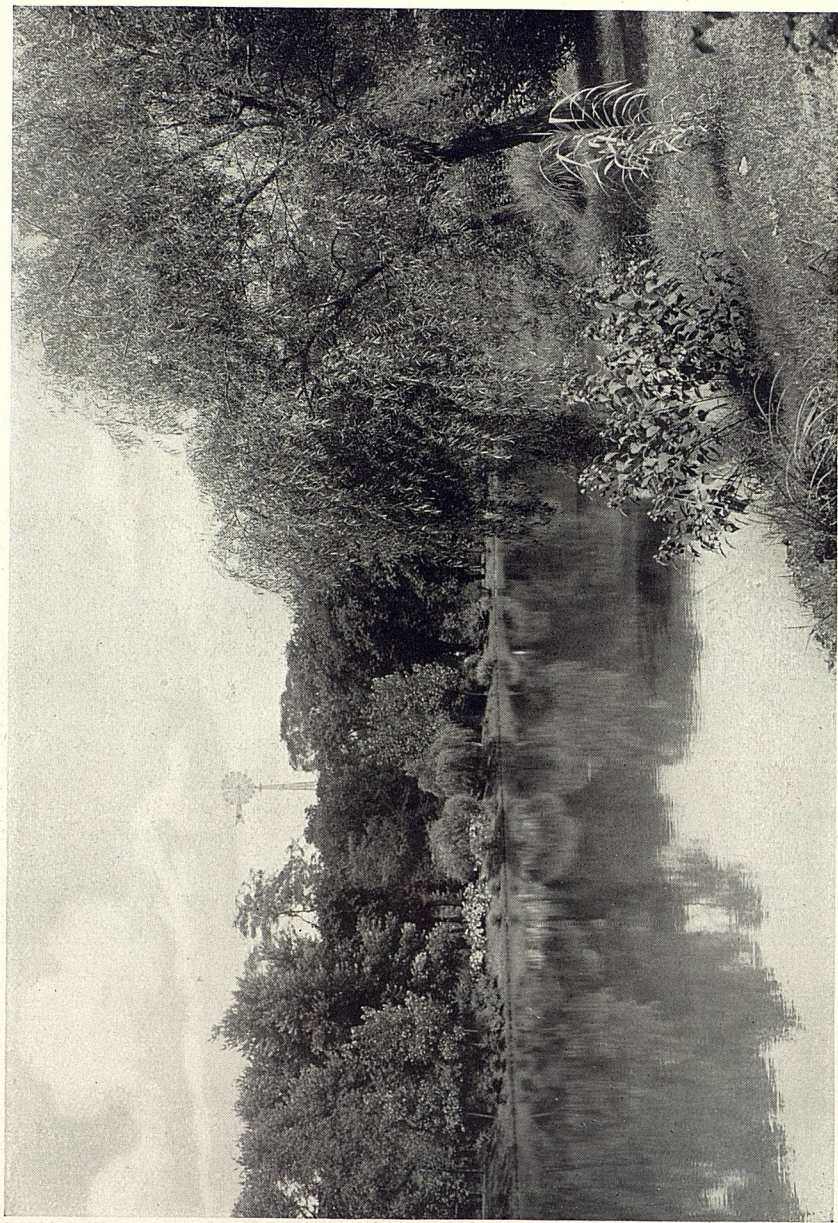
1908

FLINT & WALLING MFG. CO.

KENDALLVILLE, INDIANA

U. S. A.

*Sold By B. M. Brightwell
Greeland
Mich*



Among the Trees in Springtime

Michael Vinson 2011

59
F796
S795
1908



STOCK ALWAYS THRIVE
WHEN SUPPLIED WITH
PLENTY OF FRESH WATER
pumped by STAR WINDMILLS

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FLINT & WALLING MFG. CO.
Kendallville, Indiana

Michael Vinson 2011

**Dependability
First Point to
Consider**

Just what each part of the windmill is and how it does its work are very important things to know, but about the first thing you would consider would be whether you could be certain that the windmill would go right ahead with its work without any bother to you, pump water when you wanted it to pump, and stop pumping when it ought to stop. Without doubt, dependability is the greatest thing in a windmill. It means joy to the owner every time he casts his eyes over the tower and revolving sails; joy that knows no limit. The windmill for you is the one that is made of the stuff that will last and always be dependable and good: the one that you can depend on to do the things required of it with the least possible attention from you.

**Will the Windmill
be Durable**

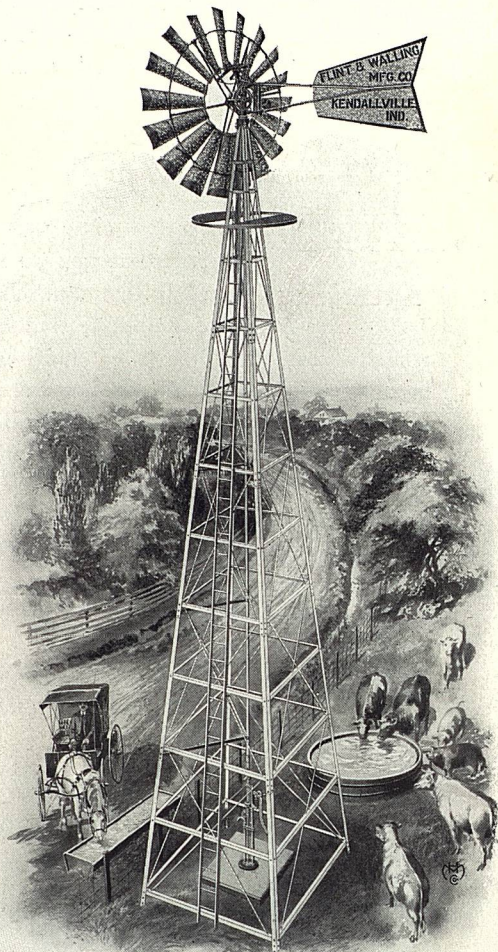
Dependability takes in the other qualities of a windmill—mechanically correct, workmanship excellent, combined with simplicity and strength—but you would especially consider its *durability*. The mill might start out dependable enough, but you would want it to stay dependable. You certainly wouldn't take a

Dayton, Ohio.

Gentlemen:—I have now two Star Mills in operation on my farms and they are entirely satisfactory. One of these mills for the twelve years of its working life has not cost twelve cents for repairs. The other has been up only two years. I believe the Star to be the best mill in Ohio.

Yours faithfully,

H. C. Jameson,
Pastor, Grace M. E. Church.



A Familiar Farm Scene

mill at any price if you thought that within a short time you would have to begin making daily trips to the top of the tower with a monkey wrench in an effort to get the pesky thing to work. What you would look for and insist on having would be the mill that would run all right this year and the next, and as many more years as the best windmill should.

**Windmill Should
be Attractive**

Last but not least, you would want a windmill that would be an ornament to your property, because in these days of attention to the looks of things, as well as their uses, there is positively no excuse for an ugly looking windmill. Beauty in design and mechanical perfection go hand in hand, and it is essential that

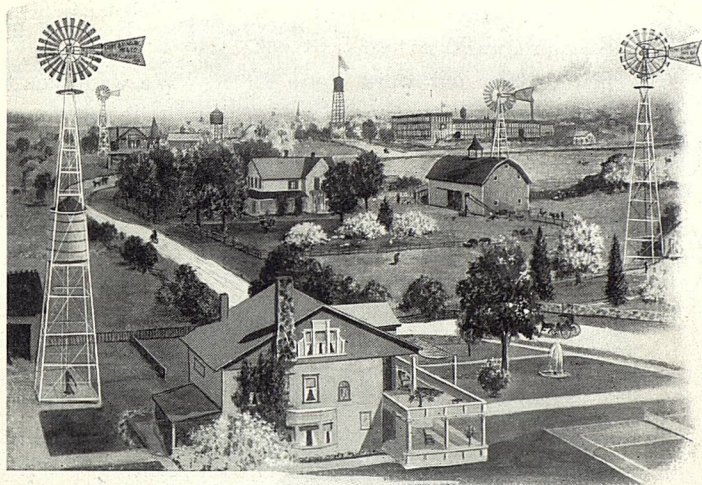
they should. This is a combined feature that adds greatly to the appearance and value of a country home.

Danbury, Conn.
Gentlemen:—I have used one of your Star Windmills for the past three seasons and am perfectly satisfied with it. It is always ready and does its work in a smooth and reliable manner and never gets out of order. A good deal of time has been spared to myself by installing one of your Star Mills and I shall always recommend it to anyone interested in windmills, as I believe it to be superior in every way.

Yours very truly,
Ferdinand Minck.

The windmill should be made a thing of beauty, as it occupies a very important position. Its revolving wheel is usually the first thing one sees as he approaches, and the last glimpse of the departing visitor is the ray of sunlight flashed to him from the sails. The

first and last impressions are given him by the mill. A windmill should be built on artistic as well as useful lines to be in keeping with fine buildings and improvements. If the buildings are less pretentious, the artistic character of the mill is even more important, as it helps to bring up the general tone.

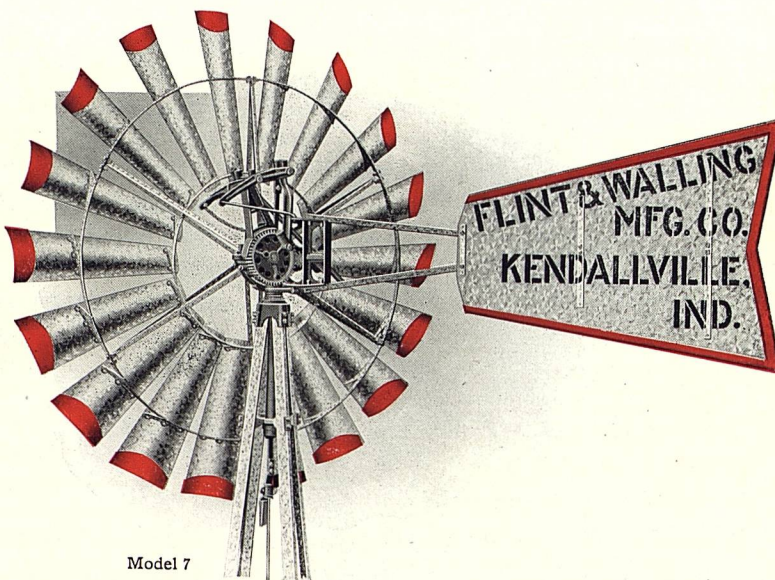


Community of Star Windmills

**The Star Windmill
Makes 'Em Sit Up
and Take Notice**

what we know, namely, that the New Star Windmill, Model 7, is the best example in the world of these three qualities of windmill construction. The perfection to which these qualities have been brought in the New Star excites the admiration of all who appreciate well designed, carefully built and practical machinery. But we don't want

The three important points then that you should look for in a windmill are Dependability, Durability, and Beauty. It is the purpose of this booklet to help convince you of



Model 7

you to take our word alone for it. We want you to carefully read this booklet, then see the New Star Windmill for yourself, see it if possible in operation on your neighbor's farm, and study it thoroughly that you may be convinced it is the mill that you should have. There are Star Windmills in nearly every community of the Old World and New. If there are no Star's in yours, that may not be the community's fault, but it certainly is its misfortune. Anyhow, some nearby dealer can show you a Star Windmill and will be glad to do so.

**A Modern and
Extensive Factory**

We have been building windmills for a third of a century, and in that time have scattered Star's all over the civilized world. We have the largest and best equipped exclusive windmill plant in the United States. The Star Windmill is built complete in all its details in our own plant.

Every idea in the line of windmill improvement that has presented itself in that third of a century has been thoroughly tried out on the testing grounds at our factory. Nothing has ever been permitted to go into a mill until it had demonstrated its practicability and usefulness to the unanimous satisfaction of our experts. Even when approved at the factory, a change or added feature has not been made permanent until its value has been confirmed by actual



Our Extensive Plant

use of the mill on the farm. In consequence of this policy, Star Windmills have been improved from year to year, but always along lines that we know to be practicable.

**You Buy Windmill,
Not Trouble**

You buy no experiments when you buy a Star. You get the best combination of windmill principles known to windmill science. The best proofs of this fact are the mills in use. Their owners everywhere will tell you that they are "long" on satisfaction, and "short" on trouble. We wish you would make

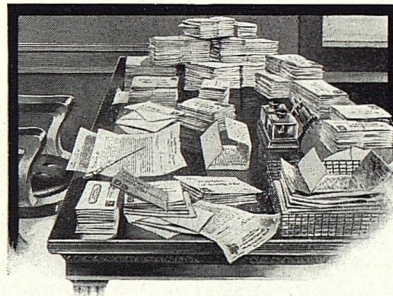
Steele, N. D.

Gentlemen:—I have used a Star Steel Windmill over a year and it gives excellent satisfaction. I am never out of water. One of my neighbors says it is the stoutest and easiest running mill he ever saw. I would recommend the Star Mill to anyone.

Yours respectfully,
Samuel Wampler.

The original letters, and scores like them, are on file in our office.

inquiry, if possible. But if you don't know a Star owner, read the testimonials you will find scattered through this booklet.



A Bunch of Testimonials

**Perfection of
Parts Star's First
Principle**

Excellence of material will not make up for roughly made pieces, or a slovenly assembling of the mill. Notwithstanding the fact that a windmill is out in all kinds of weather and is attacked by every gale, it must work with the smooth-

ness and regularity of fine machinery, or it will soon wear out and break. The observance of this principle is one thing that especially distinguishes the Star. You will notice this the more you examine the mill.

Moffitt, Ohio.

Gentlemen:—I purchased one of your Star Windmills about four years ago and placed it at my feed lots with a 300-barrel supply tank and have ample water supply for five hundred head of cattle. After careful consideration, I am thoroughly convinced that the Star is a superior mill. I thought well enough of the Star Mill that I bought two more of them last fall. Anyone wanting a mill will make no mistake in buying the Star.

Yours very truly,
Jasper Dukes.

**Sewing Machine
Accuracy in Wind-
mill Construction**

You may wonder somewhat at this. At first thought it might seem hardly necessary to make a windmill as accurate as a sewing machine. But we have found by long experience that it is just this accuracy that makes a machine that does the work, does it without monkey wrench help and profanity. It satisfies Star owners, keeps complaints away from our office, and makes the Star more popular every year. It is only natural that the unceasing work by our experts along the lines of practicable improvement and attractiveness in the most modern windmill plant in the country has given the Star leadership in the three great qualities: Dependability, Durability and Beauty.

It is built like a fine machine. It is a fine machine. Even if you have no special knowledge of machinery, you will be struck with the evidence of care with which each part has been turned out, and the accuracy with which all parts are fitted together.

**This Booklet Gives
New Light
on Windmill
Construction**

We shall now explain the various parts and the reasons for them just the same as we would if you should come to our factory to look over the windmill. We should welcome you if you come, and go all over the big plant with you to let you see just how the Star mill is made, from the raw material to the finished product. It would be worth your while. But if you cannot come, we come to you by way of this booklet, which you should carefully read as it will interest you, and throw some new light on windmill construction.

**New Star
Galvanized Steel
Windmill, Model 7**

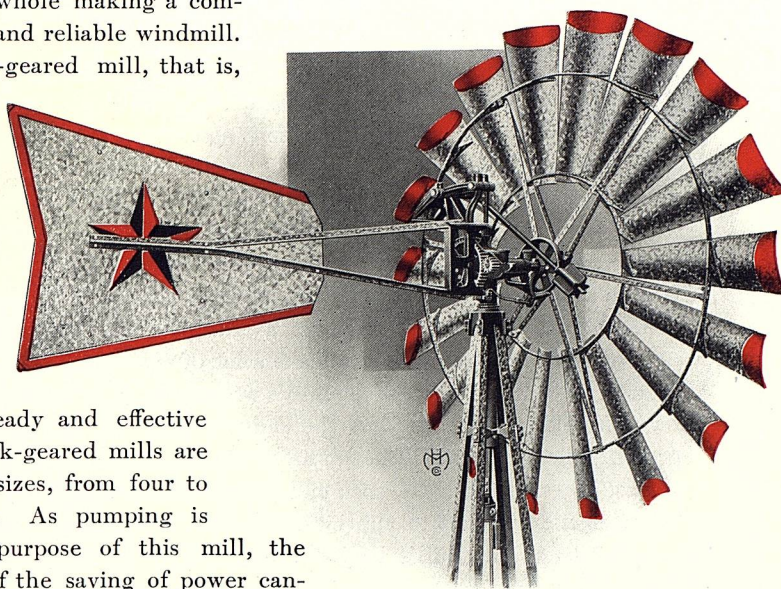
breeze, the whole making a compact, strong and reliable windmill.

It is a back-gear mill, that is, the wheel makes from $2\frac{1}{2}$ to 4 revolutions, according to size of mill, to one stroke of the pump.

This gives a powerful, steady and effective stroke. Back-gear mills are built in all sizes, from four to sixteen feet. As pumping is the whole purpose of this mill, the importance of the saving of power cannot be over-estimated. The work of the mill would be very unsatisfactory if half to three-fourths of the power had to be expended in the operation of the machinery. We want your special attention on this point because the Star's use of all its power is the very heart of its success.

**Star Lift Puts
Power Just Where
it is Needed**

There is no better example of direct transmission of power than embodied in the mechanism of the New Star mill, illustrated on page 12. The upper end of pitman or connecting rod being offset as shown, and this working closely side by side with the plunger, is the best solution yet found for applying the power received from the wheel to the lifting of the mill's load. Any windmill can gather power, but the question is how to get all the power together into actual use. This improved lifting device of the Star is a distinct achievement in conserving windmill power, as it puts all of

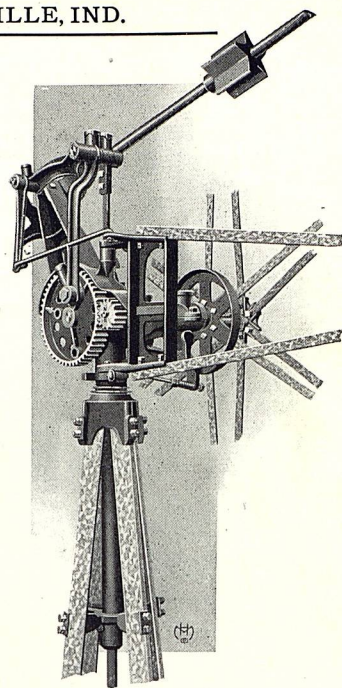


Model 7

the power into the work of pumping, because it takes it directly to the point of the plunger's attachment, the point where the mill receives the entire weight of its load.

Board and Rock Demonstration

This principle cannot be better demonstrated than with a board, one end of which is weighted down, and on the other end is placed a rock representing the mill's load. You would find that you could lift the load much more easily at the rock's end than at the middle of the board. If you lifted at the rock's end, you would lift only the rock and part of the weight of the board; by lifting in the middle you not only lift the rock and the board, but you throw a lot of power against the end weighted to the ground, which means a lot of wasted power. The board represents the mill's walking beam, shown on page 13; the rock at the end of the board represents the load the mill has to lift, and the muscle you have to exert to lift the rock and board represents the power the mill has to apply through the pitman to the lifting of the mill's load. The upper end of



Mechanism of Star Windmill

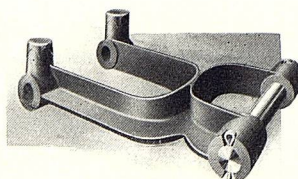
Pope Valley, Cal.
Gentlemen:—Have been using one of your Star Windmills for nearly two years and am very much pleased with it. Although only an 8-foot wheel, it does more work than a 12-foot mill of another make which I had used previously. The Star gives me perfect satisfaction. My well is thirty feet deep and the mill pumps the water uphill about one hundred and sixty feet. Wishing you success with your mill, I remain,

Yours truly,

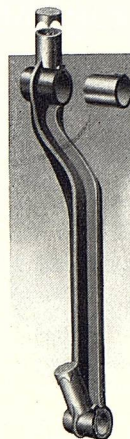
Jasper Martinelle.

the pitman is connected to the walking beam, to the end at right in cut; this end of the walking beam is free and the other end is hinged to the mill frame. The Star never lifts at the middle, but at the end, therefore it obtains the effect of a center draft, thus preventing so much lost power unavoidable in other ideas. Side by side the pitman and plunger work, the pitman concentrating all the force of the mill right at the point where it does the most good, no matter what the length of the stroke. The length of the Star's stroke is changed by inserting the wrist pin, which passes through the lower end of the pitman into another hole in large gear wheel, the one that will give the desired stroke. The advantage of this method over a change of stroke

in the walking beam, or otherwise, will be readily perceived. You will, therefore, see in the Star a pumping motion strong enough and convincing enough to satisfy you that the mill is capable of doing any amount of work for any length of time. There is strength in every line of the Star's walking beam, which is of double ended shape, having a bearing on either side of its work. The pins are made of cold-rolled polished steel and have no set-screws, nuts or keys to work loose.



Walking Beam



Pitman

Pitman Has Removable Bab-bitt Bearings

The new pitman on the Star is provided with removable and interchangeable bab-bitt bushings or bearings. You don't have to remove the pitman from mill when the bearings become worn and it is necessary to supply new ones. All you have to do is to detach the pitman at the end where bearing is to be changed, drive out the old one, as shown in the foregoing illustration, and drive in the new. Naturally the bearing in lower end of the pitman will wear the most, and being interchangeable it can be placed in the upper end of the pitman, and the upper bearing placed in the lower end, thus giving you practically a new set of bearings, affording much longer service than with stationary bearings as in the old way. Both the upper and lower ends of this pitman are provided with large self-feeding oil wells.

As so much burden falls on this piece of machinery, its up-to-date construction gives it the greatest possible strength and durability.

Pin that Hinges Walking Beam is Securely Fastened

The main frame of the New Star Mill is of the split or two part design, the upper part of which is shown on page 14. As the main or pivot stem is screwed into frame above the center of the wind wheel, there can be no rocking motion of the mill; this prevents loosening of the stem. The fastening of

Rogers City, Mich.

Gentlemen:—To say I am well pleased with my Star Windmill is putting it in a mild form. I cannot speak too highly of it. It gives perfect satisfaction. Seven Star Mills have been sold here since mine was put up about a year ago. The people here are now convinced that the Star is the best. The time and labor I have saved in not having to pump water for the stock has enabled me to pay for the mill. I can cheerfully recommend it and in closing will say that I am a happy man ever since I own a Star Windmill. Yours respectfully,

Frank Bruder.

the cold-rolled steel fulcrum pin which hinges the walking beam to this upper frame is a striking example of our improvement over the set-screw method. This pin, which is slotted for bolt to pass through, is held from turning or working endwise by the hub of frame being split and clamped tightly together by a double nutted bolt; this holds the pin perfectly rigid. This method does away with set-screws so liable to work loose and cause damage.

Only One Set-Screw on Entire Mill

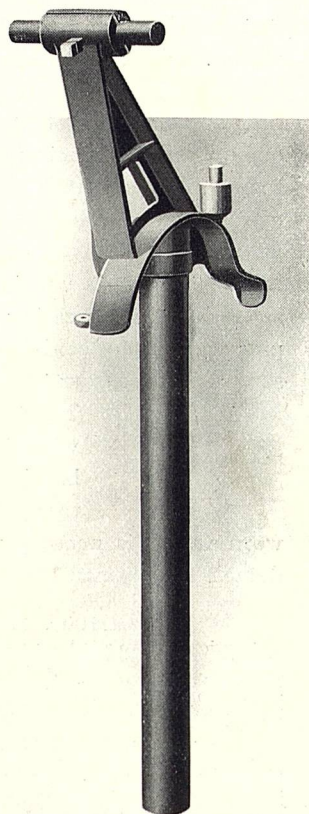
It is well to mention right here that there is only one set-screw used in the machinery of the New Star, the one that sets the governor weight on its rod to regulate the speed of the mill. When this weight is once adjusted, you will probably let the governor alone for a long time, so this one set-screw will not give you any trouble. This freedom from set-screws is an important point in Star simplicity.

Perfect Alignment for the Working Parts

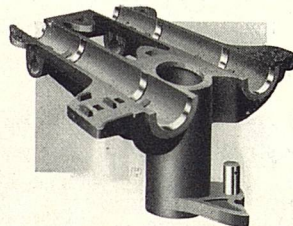
Below is shown the lower part of frame which is the support of the mill. It is properly proportioned for its work and very substantial. We want you to note particularly that the bearing ribs of the frame are bored to a true circle and absolutely parallel, at the same time; this is done on our specially designed machine, which insures perfect alignment for working parts.

Star's Bearings Can be Easily Changed

When the bearings on the New Star Mill become worn, you can replace them in a few minutes' time without anybody's help, without any expense, and without taking a single part of the mill down. This is because the Star is fitted with removable and interchangeable bearings. By that we mean the

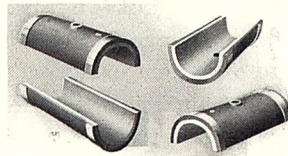


Upper Frame

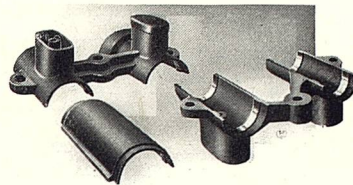


Lower Frame

shafts run in babbitted bushings or boxes, made in upper and lower halves exactly alike, and backed up by iron shells. A high grade babbitt metal is cast in the shell; these bearings are turned to a true circle to fit perfectly into the bearing ribs on main frame which, as we have already told you, are milled to a true circle. The upper caps of journal are made in the same manner, and the caps are provided with self-feeding oil cups of extra large capacity. The constant working of the mill will, in course of time, wear out the lower half bushing; all that is necessary for you to do is to loosen a couple of bolts, slide the upper bushing into the place of the lower one, reverse the lower bushing to the upper bushing's place, again tighten the bolts and the bearings are as good as new.



Babbitted Bushings



Caps

Means Two Sets of Bearings with Each Star Mill

You thus see that when your mill comes to you, you have practically two sets of bearings, and that you need not bother about bearing trouble for a long time. These removable and interchangeable bearings constitute one of the Star's newest and strongest features. Nothing just like them has ever been used on a windmill; that is to say, the perfection to which these bearings have been brought has never been equalled.

Shafts Bear Equally at All Points

When the Star Windmill is assembled, each shaft bears equally ounce for ounce upon its bearings. It may give you some idea of the extreme accuracy with which these bearings are fitted to know that only $\frac{1}{16}$ of an inch play is allowed the shaft. This accuracy means that in the Star there is no more wear at one point than at another, and as the wear is equally distributed the mill is good for the longest possible service.

The Brake of Best Windmill Practise

The Star's new brake is another example of gain in strength and certain and effective service by the use of simple levers. It deserves especial mention as it is the brake of best windmill practise. When the mill is pulled out of gear, the brake shoe is thrown against and fits perfectly the beveled wheel on the

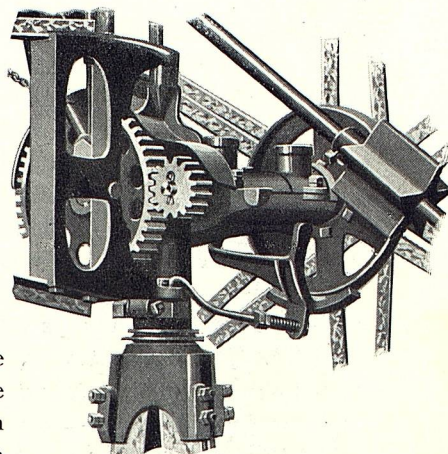
wheel shaft just inside the wind wheel, by a lever connected with the brake hinge. There are no bands or complications, the brake being applied in the most direct way possible. It is positive in holding mill and at the same time relieves the mill of the jar so common when going out of gear.

Force of Star's Governor Always Remains the Same

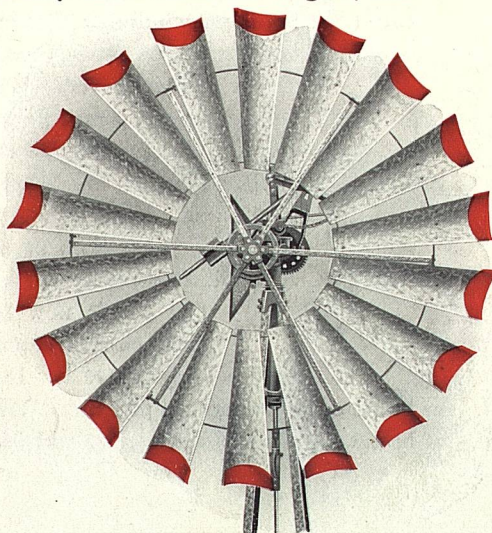
The Star Windmill is governed by means of weight and levers whose force always remains the same, unlike a spring-governed mill which weakens with usage. Spring construction invariably causes trouble, and of a most exasperating kind, because every time the spring is tensioned it loses a portion of its force. Many experiments have been made in windmill governors, but long use of the Star's weight and lever principle has convinced us that it cannot be improved upon. It always does its work to perfection because the weight and levers do not lessen with usage, as the force of gravity remains the same at all times and under all conditions. In a high wind the Star will automatically throw itself out of gear, and the brake being tightly set, the wheel ceases to revolve until the wind drops to the velocity where the mill may safely work; it then automatically goes into gear and to work without any attention whatever.

Star Wheel Has Great Capacity for Gathering Wind Power

this power are, therefore, of great importance. Of little use would our devices be for applying this power if



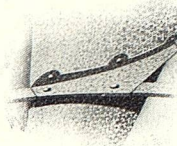
Star's New Brake



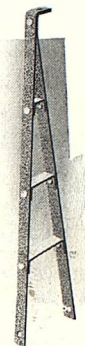
Star Steel Wheel

we had not a wheel that could supply it. The Star steel wheel is in thorough keeping with the construction of the pumping parts. The fans of the wheel are large and made of heavy, high-grade sheet steel; they are so concaved and set on such an angle as to give them the greatest strength and most effective wind-gathering surface. A small flat steel fan or sail is to be avoided, as it is not only weak in itself, but not as capable of gathering the force from the wind as a large curved sail.

The fan brackets are made of heavy sheet steel, each in one piece, and a special press forms them into shape to perfectly fit the fans. These brackets are securely riveted to the fans and wheel rims. The cut of sectional view of fan shows this rigid bracket connection. The arms or spokes of the wheel are made of high grade steel, well braced as cut shows. They are bolted to the hub and rims of wheel. When the segments are bolted together they form a wheel that is perfectly rigid, as it constitutes a truss-like construc-



Bracket Connection



Wheel Arm

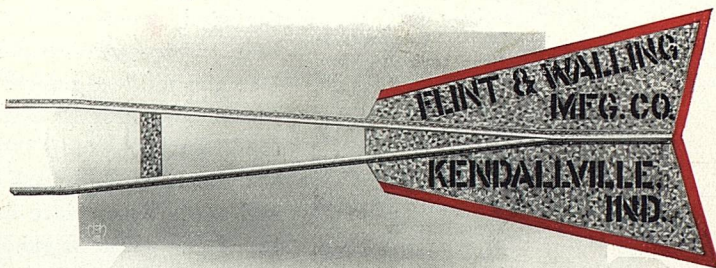
Flushing, Mich.
Gentlemen:—I bought one of your Star Windmills four years ago and it has always worked well. I have never paid out a cent for repairs. It handles itself in a storm in nice shape, as it will not pump when the wind blows a gale and so the wind cannot tear it to pieces.

Yours truly,
John Koester.

tion. All the bolts are double nutted, which locks the nuts and prevents parts working loose.

A good windmill is steered into the wind and kept there by a vane or rudder. The size and strength of the rudder will do much to determine the kind of work the mill does.

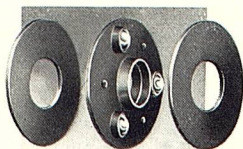
Just as much care is bestowed on the Star rudder as any other part. It is properly proportioned for the size of the mill it is to guide, and made of heavy sheet steel reinforced with heavy bars riveted across its width; the edges are wire bound. It connects with the mill by a double backbone instead of a single stem as is often used. This is another feature of the Star's double strength.



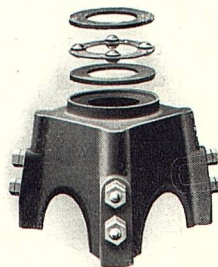
Star Steel Rudder

Star's Ball-Bearings Reduce Friction to a Minimum

Friction is reduced to a minimum in the Star by the use of ball-bearings. The thrust between the main journal and the hub of the wheel spider is a point of constant wearing pressure as it receives the full force of the wind; this is relieved by a bearing of case-hardened tool steel balls revolving on hardened steel washers.

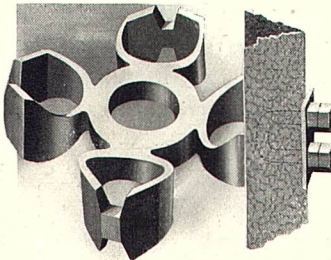


Ball-Bearing Thrust



Ball-Bearing Bed Plate

A similar ball-bearing is used on the turntable or bed plate, here illustrated. The weight of the whole mill is borne at this point, and its constant swiveling with the shifting of the wind would make a most destructive grind without the ball-bearing protection. This bed plate is made of sufficient strength to bear the weight and strain upon it, and is attached to the top of tower, over the corner angles, with double nutted staple bolts, making it very rigid. Ball-bearings, as we construct them, are essential to the best windmill



Truing Spider

The Star is Responsive to the Lightest Breeze

Not only do they prolong the life of the mill by saving it at the points of greatest wear, but they add smoothness and ease to its operation, and make it responsive to the lightest breeze. When a mill has to swivel on a flat surface, the friction is so great that a gentle wind fails to move it and so the wheel, not being brought into the wind, stands still. This explains why the Star, turning on its ball-bearings, goes readily into the mildest zephyr that blows, and you get service out of it when mills not so equipped are loafing.

London, Ohio.
Gentlemen:—I am well pleased with my windmill which was put up in 1905. I have not pumped a bit of water by hand since. It will run in the slightest wind and my stock has water all the time. It saves me lots of hard work. I have water in seven different places. I would not take \$500.00 for it if I could not get another one like it.

Yours very truly,

G. A. Street.

The long pipe mast of mill is held firmly and centrally in place in the top of tower by the truing spider or guide shown above, which



Swivel

is bolted to the corner posts with double nutted staple bolts. This insures steadiness of the mill as it swivels with the wind. As both the bed plate and truing spider are bolted through the corners of tower angles with special double nutted staple bolts, it prevents any shearing motion whatever.

To prevent the twisting or straining of pump rod requires a good swivel, otherwise you might have more or less trouble as the mill shifts in the wind. We use a swivel that is perfect in its operation, and makes a strong connection between the wood pump rod and the mill's pump rod or plunger.

With each Star mill we furnish a reefing gear, which is a strong little windlass with a ratchet and crank, so that you can pull the mill out of gear, that is out of the wind, when you want to. This reefing gear is securely bolted to a corner post of the tower. When the ratchet is released, the wheel is quickly brought into the wind by the rudder, and the mill again resumes its work. The

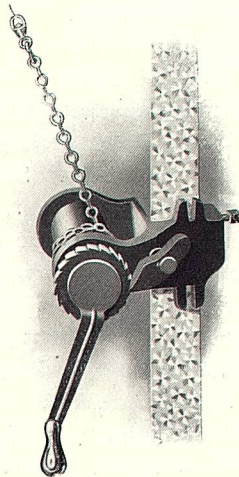


Fig. 607—Reefing Gear

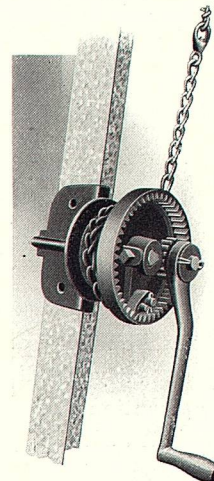


Fig. 609—Reefing Gear

reefing gear shown at left is for ten-foot mills and smaller, the one at right for twelve-foot and larger mills. Either pattern easily operated and durable.

Star's Self-Feeding Oil Cups Insure Perfect Oiling

Star Windmills, like other fine machines, must have a regular supply of oil. At every place where oil is to be applied to the mill's working parts, there is a cup or bowl of large capacity which holds the oil. A tube extends from the journal almost to the top of this cup. Through this tube runs a twisted wire wick, one end of which hangs down in the oil cup, and the other end reaches the journal. This wire wick, by natural attraction, draws the oil from the

cup, and slowly feeds it to the working part in just the right quantity to insure perfect oiling. One filling of oil cups will run mill a month or more.

Star Windmill Oil The Best to Use

Ordinary machine oil made for any kind of machine and made chiefly to sell, will not oil a windmill satisfactorily. Star windmill oil is the result of careful experiments with special reference to the needs of a windmill, which has to work in all kinds of weather. The consistency

Kokomo, Ind.
Gentlemen:—I have been using the Star Mill for the past four years. It has proven more than satisfactory in every respect. Previous to buying the Star I had two mills of another make, but find your mill runs with less wind than either of them, which saves time and labor; besides my stock is always supplied with an abundance of fresh water.

Respectfully,
H. C. Sellers.

of this oil will not be changed by summer heat or winter cold. It will feed constantly and evenly, no matter what the atmosphere. The oiling should not be regarded a matter of little importance; when all bearings are properly lubricated it greatly prolongs the life of the windmill. Star windmill oil is furnished in



convenient one gallon wood covered cans.

How a Windmill Attracts Attention

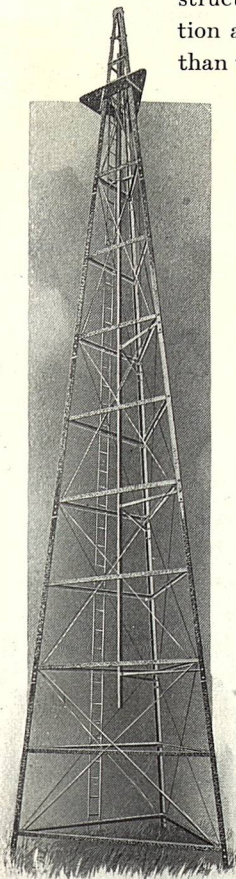
About the only way the cheaper mills have of attracting attention is by the *noise* they make in operation. We know that you don't want a mill that will keep you awake nights, or make so much noise that you would have to chain it down so that you could hear the bell ring for dinner. The Star Windmill attracts attention because of *Star Construction*, *Star Simplicity* and *Star Bearings*, which are an absolute guarantee against the undesirable noisy feature.

Perfection in Details Makes Enthusiastic Supporters of the Star

In the construction of the Star Windmill you will find better material and better finish than you might think necessary in a windmill. But it is by just such rigid adherence to the highest standards in details, that Star mills have been made to stand up and do good work years after the cheaper constructions have been worn out and forgotten. This policy has made enthusiastic supporters of the Star all over the world. So we shall continue to depend on these high standards for success.

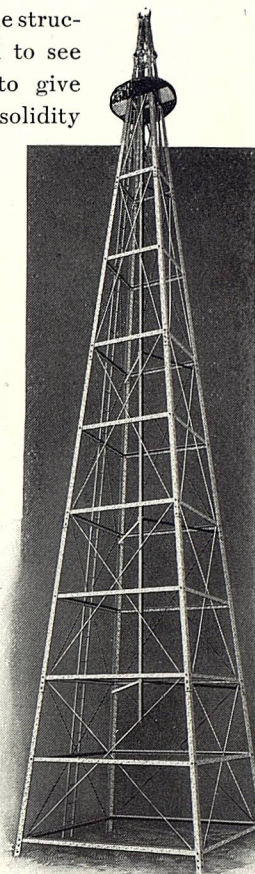
**Star Windmill
Towers are Strong
and Reliable**

A windmill tower looks like a simple structure, yet you would be surprised to see how much science is employed to give Star towers the greatest possible solidity and resisting capacity. The same principle is involved in their construction as in a high building. In constructing such a building, the foundation and lower walls must be heavier than the upper part because they have the upper weight to support. Likewise, the anchor posts and lower parts of a Star tower are made heavier than the upper, not only to carry the upper portion of the tower, but also the weight of the mill and the strain to which the wind subjects it. The heavy angle steel corner posts of tower are in ten-foot sections, and the bands or girts are made of steel angles. The round steel brace rods have welded head on one end and threaded nut on the other; this allows for proper adjustment, so that the tower can be kept perfectly rigid.



Star 3-Post Tower

Our Star towers are built in three-post and four-post designs of various heights. The No. 1 towers have bands and brace rods spaced ten feet apart, and are for eight-foot mills and smaller. The towers here illustrated are No. 2, which have bands every five feet and the brace rods are ten feet apart, for supporting eight and ten-foot mills. For the larger mills the towers are banded



Star 4-Post Tower

and braced every five feet, making a double braced tower of great strength. The size of material in the heavier towers is increased in proportion to the increased size of mills they are to support. Each tower is equipped with a strong steel ladder, which is fastened to the bands with heavy hook bolts, making it perfectly safe and easy to climb. The steel angle corner posts and girts are made from hot-rolled special carbonized Bessemer steel and so shaped as to have the greatest possible strength. The Star tower is thoroughly galvanized, including all bolts.

You will, therefore, readily understand that our method of construction makes a strong and thoroughly reliable tower, one that will carry the mill with perfect safety in any storm that does not damage substantial buildings. And more than that, the rigidity of a Star tower insures effectual working of the mill at all times.

**Star Tower
Platform of Good
Size and Strong**

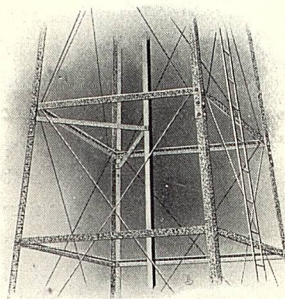
No chances are taken with the Star tower platform. It is made of good size and just as strong as it can be. For the three-post tower it is triangular in shape, and for the four-post tower it is round. Heavy steel angles projecting across the underside of platform are bolted firmly to the corner posts. A steel band securely binds its outer edge. When you mount a Star platform you may be sure that nothing can give way as it is perfectly safe.

**Swinging
Pump Rod Guides
Keep Pump Rod
in Line**

The windmill pump rod is kept in line by our new swinging pump rod guides. A set of these guides is shown in the accompanying illustration. They are attached to the corner posts, one set immediately below each ten-foot girt, by means of special shoulder bolts. These bolts tighten the tower splice and still

leave the ends of the guides free to swing with the up and down motion

of the pump rod. The guides are attached to the pump rod with bolt and spring cotter, so they cannot work loose. They not only keep the pump rod true, but reduce the friction to a minimum, and prevent squeaking and wearing out of the pump rod.



Pump Rod Guides

Frankfort, Ind.

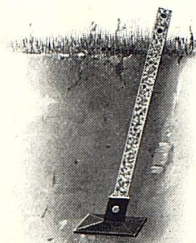
Dear Sirs:—Some three years ago I purchased one of your Star Steel Windmills with a 30-foot tower and can freely recommend it to anyone wanting a windmill that will run in a very light breeze. My mill has been in two very severe storms and still stands as good as new, and far superior to some of my neighbors' mills of other makes, whose wheels have been taken off during some of these storms.

Yours respectfully,

John B. Smith.

**Star Anchor Posts
Make Secure
Anchorage**

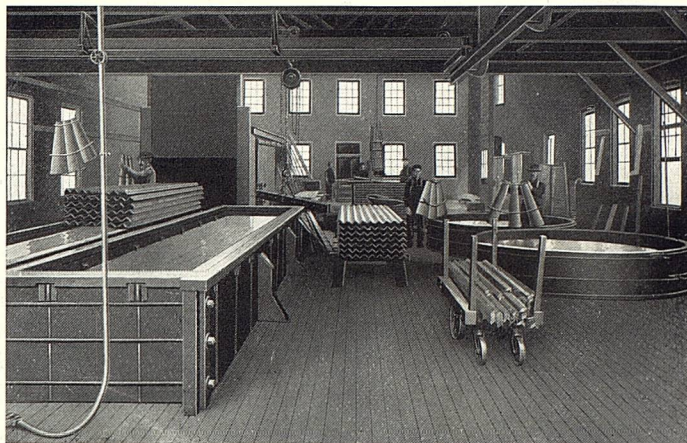
The anchorage for a Star tower is constructed to meet everything in the way of an attack from a summer zephyr to a cyclone. Here is a good illustration of the Star anchor post and plate. The anchor post, which is made of heavy angle steel, is bolted to a large iron plate. When the posts are placed in position and leveled, cobble stone or metal scrap is thrown in, then earth and thoroughly tamped. This is continued until the holes are filled. Concrete placed in the bottom of the holes makes a solid bed on which to set the anchor post plates. If the anchor posts are properly set and anchored as directed, it is practically impossible for them to pull up.



Anchor Post

**Zinc and
Aluminum
Galvanizing Will
Last a Lifetime**

The special method of galvanizing Star Steel Windmills and Steel Towers is one of the important things that gives them long life. The steel



Galvanizing Department

wheel, the rudder, and the tower all receive extra heavy galvanizing in our own galvanizing plant, which is one of the most complete and finest

in the country. We use our own special galvanizing mixture of pure zinc and aluminum alloy instead of zinc and lead alloy which so commonly make up galvanizing mixtures. Aluminum is, of course, a much more costly

Ypsilanti, Mich.
Gentlemen:—I have been using
a Star Windmill for several years.
It has done excellent work and is
still doing so, pumping water for
seventy head of cattle and horses.

Yours truly,

C. A. Ainsworth.



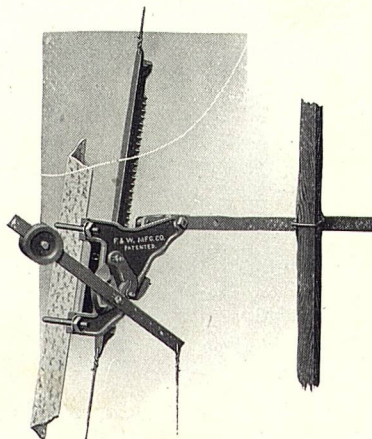
I wind about, and in and out,
With here a blossom sailing,

And here and there a lusty trout,
And here and there a grayling.
—Tennyson.

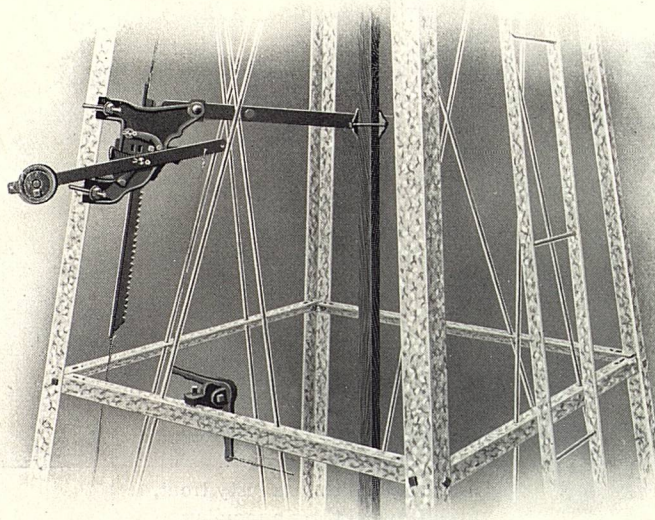
metal than lead, and is also much more lasting. There is practically no wear out to it. Aside from the excellence of our galvanizing material, it is very important that all steel work and bolts should be carefully and thoroughly galvanized. You would be surprised how quickly moisture begins its corroding effect on exposed steel; rust eating on imperfectly galvanized goods soon causes damaging results. Our process of galvanizing makes Star Steel Windmills and Steel Towers capable of resisting the attacks of all kinds of weather for an indefinite number of years; in fact, as long as you wish to use a windmill. That is why Star Windmills are just as rigid after years of constant use as when first erected.

**Hoosier Regulator
Automatically
Starts and Stops
the Mill**

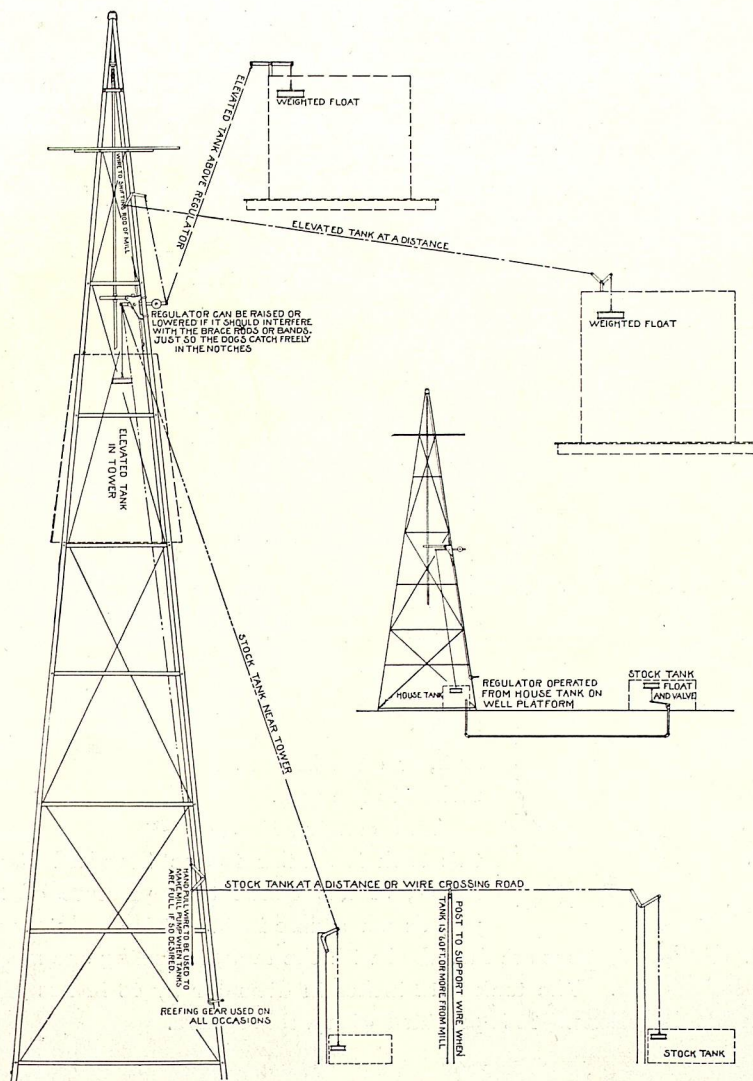
When you have a Hoosier windmill regulator, you don't have to go to the trouble of starting your mill when the tank is empty, or stopping it when the tank is full. The regulator will look after that more faithfully than the best hired man you ever had. You can go about your work on the farm with a satisfied feeling that the water supply is well taken care of, and always ready for the stock and other uses without any worry or atten-



Hoosier Regulator—Fig. 666



Connected Ready for Operation



This cut shows many ways the Hoosier Regulator can be used. It will work as well with the tank at an elevation above as below it. There are no springs to weaken, and the parts will not get out of order; in fact, its simplicity and efficiency meet every condition.

tion from you. Nothing will please you better. The regulator is attached to the angle corner post of tower by means of special L-bolts clamping over the angle. The triangle connection should be attached to the angle corner post at the desired point below regulator, or can be connected to tower band as shown in the cut on page 26. As the water in tank lowers a little, the weighted float pulls a lever that releases the notched bar, so that it slides up. The mill immediately goes into the wind, or in gear, and resumes pumping. When the tank is again full, the pump rod, by a simple lever device, is thrown into connection with the notched bar which brings it down, pulling the mill out of gear, when it ceases to pump. The regulator, automatically controlling the windmill and tank supply, saves the mill from unnecessary wear and prevents waste of water.

**Water is Always
Fresh in a Star
Pressure House
Tank**

In order that your windmill outfit may be complete in every particular, it should include a Star Pressure House Tank, which makes a convenient and successful water supply system. With this system it is impossible for your house tank to overflow, and the water in the tank is always fresh, it being forced in at the bottom and out at the top. The tank can be placed anywhere on the sink, or on a bracket attached to the wall.

Fairmount, Ind.
Gentlemen:—I have three Star Windmills on my different farms and they are giving entire satisfaction. If I should need another mill I would buy a Star because it is perfectly reliable. I also do not think any farmer can afford to do without a mill.

Very respectfully,
W. H. Lindsey.

The construction of Star Pressure House Tank this tank is similar to the Standard Range Boiler, and is tested to a pressure of 200 pounds per square inch. It is absolutely airtight. All connections are furnished with the tank, including one nickel-plated bibb-cock. The tank is 12 inches in diameter by 48 inches high, and holds 24 gallons. It is provided with a relief valve.



**Our Tanks Score
100% in All Points
of Excellence**

When you invest in a windmill, you will in all probability require one or more tanks, and naturally you will want good ones. We have given just as much attention to the construction of tanks as to any other of our allied lines, and are confident that our tanks will score 100 per cent. in all points of excellence. This is because in tanks, as in everything else, we omit nothing that does not bring them up to the highest standard.

We build our wood tanks of either White Pine or Louisiana Red Cypress, free from unsound knots, shake or sap that will impair the durability of a tank. Cypress is universally recognized as the best wood for tank purposes, as it swells and shrinks less, and will last a lifetime. We carry in stock a large quantity of the finest grade of lumber for tank purposes, which is supplied

Burkett, Ind.

Gentlemen:—I have had a Star Mill about thirteen years and it has given perfect satisfaction. I have not been put to one cent of expense on the mill for repairs during that time. It runs just as nice and true as it did when first put up. Of course I have kept it well oiled and given it the best of care. If anyone desires to write to me concerning the Star Windmill, I will be glad to answer him.

Yours respectfully,

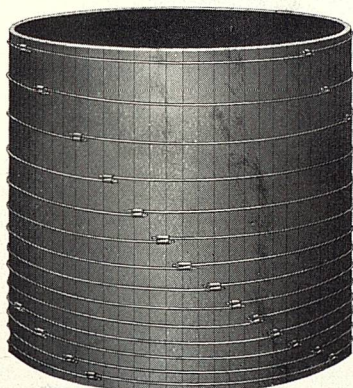
J. D. Goehenour.

by the mills in accordance with our own specifications. All lumber is thoroughly seasoned before using. Round hoops with adjustable draw lugs are put on all wood tanks, unless otherwise ordered. These tanks are made in all sizes.

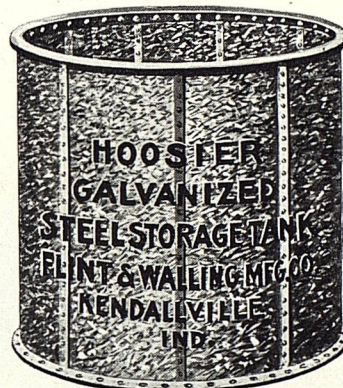
Our steel tanks are constructed of the highest grade of heavily galvanized steel, and are good for practically unlimited service. We can supply you with a steel tank of almost any size or shape you may desire. The following illustrations of

our complete line of wood and galvanized steel tanks will enable you to select the kind you may require.

Hoosier Round Storage Tanks

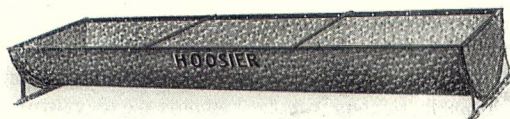


Wood Tank

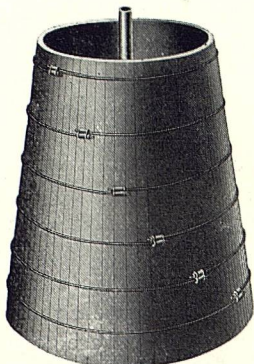


Steel Tank

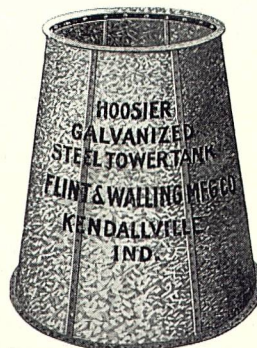
Hoosier Tanks



Round Bottom Steel Tank



Taper Tower Wood Tank



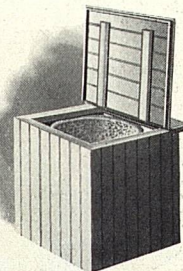
Taper Tower Steel Tank



Square End Steel Tank



Round End Steel Tank



Star House Tank

**Float Valves and
Floats for Tanks**

Here are illustrated our various designs of float valves and floats, for automatically regulating the supply of water in tanks; also tank outlet valves. We can furnish you with valves made of iron or brass, and tin, galvanized steel or copper floats. They are well made of the best material and do the work perfectly that is required of them.

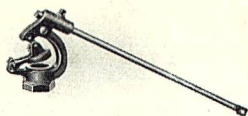


Fig. 670—Walling Float Valve

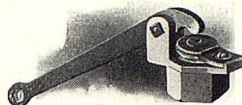


Fig. 671—Float Valve



Fig. 673—Float Valve

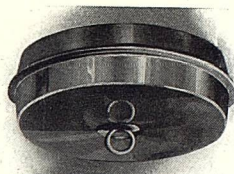


Fig. 678—Float

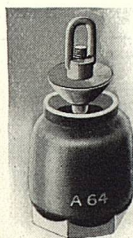


Fig. 676—Tank Outlet Valve

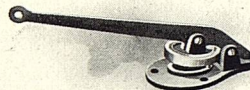


Fig. 674—Tank Outlet Valve

**Hoosier
and Fast Mail
Pumps Meet Every
Requirement**

There is just as much difference among pumps as there is among windmills, or any kind of machinery. There are good pumps and poor pumps. When you buy a pump you want to be sure it's a good one, and will suit the conditions for which it is desired.

Having gone deeply into the subject of hand and windmill pumping for many years, we have ascertained just what kind of pump will do the very best work under a particular condition, and our Hoosier and Fast Mail pumps are of the same standard of excellence as Star Windmills. Our Patent Never Leak Check Valve adds great efficiency and reliability to our pumps.

We make all our own pumps. Everything, from the drawing of the pattern to the finished product, comes from our factory. Our line is complete, including a pump for every purpose and of every capacity. The few shown here are simply illustrations of our extensive line.

Hoosier Pumps



Fig. 700—Pitcher



Fig. 703
Round Spout

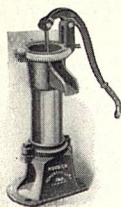


Fig. 704—Brass
Cylinder Pitcher

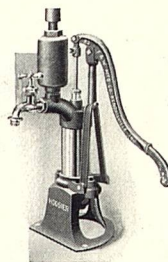


Fig. 707
House Force Pump

Hoosier Pump Standards

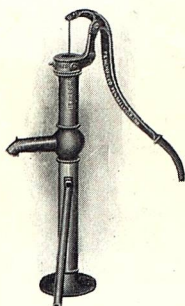


Fig. 710—Lift.

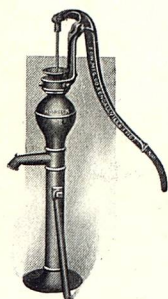


Fig. 718—Lift

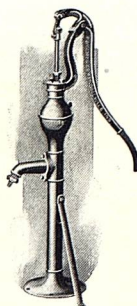


Fig. 719.—Force

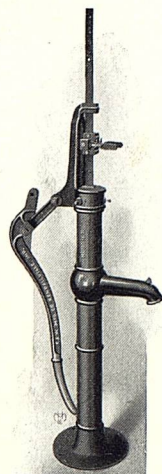


Fig. 724
With Handle Connector

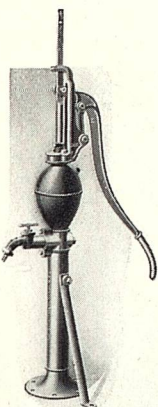


Fig. 745—Force
Standard

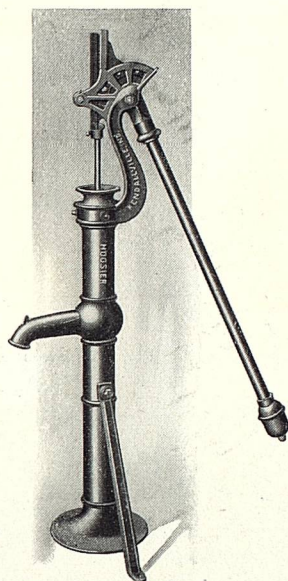


Fig. 717
Hoosier Rack Pump Head

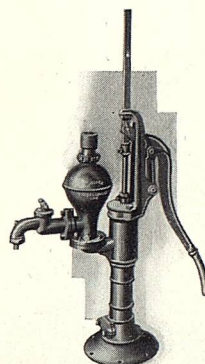


Fig. 762
Force Pump

Hoosier Pumps

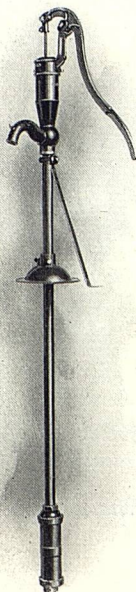


Fig. 772 --- Lift

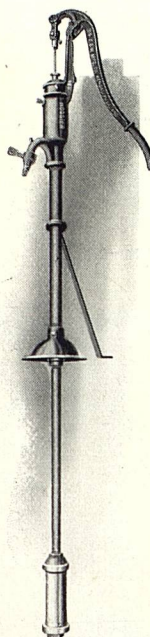


Fig. 795 --- Force

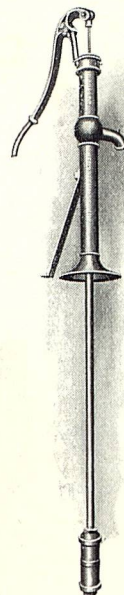


Fig. 776 --- Lift

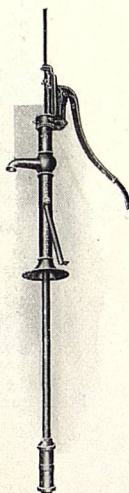


Fig. 800 --- Lift

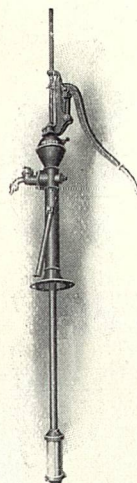


Fig. 827 --- Force

Hoosier Special Force Pumps

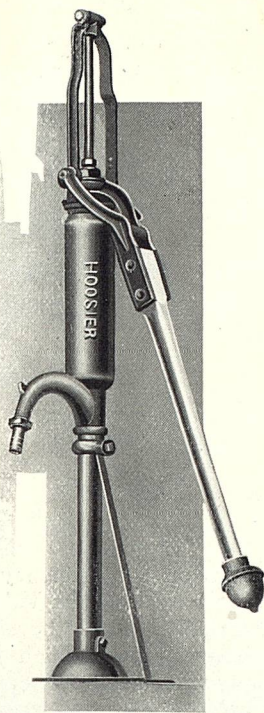


Fig. 833
Force Pump Standard

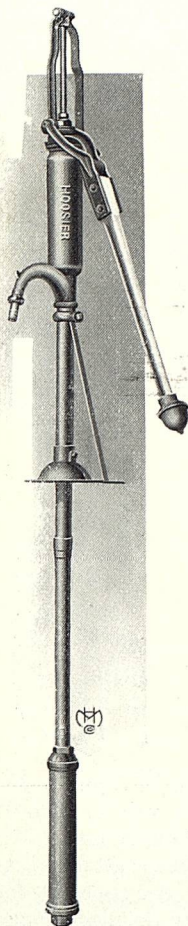


Fig. 836
Iron Cylinder
Fig. 837
Brass Cylinder

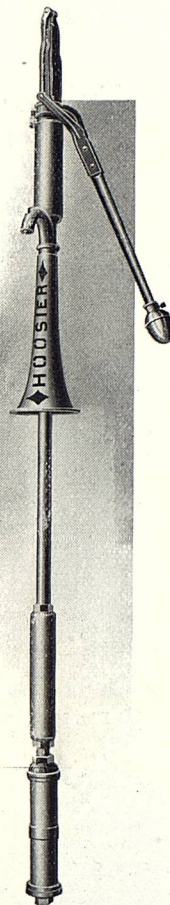


Fig. 838
Iron Cylinder
Fig. 839
Brass Cylinder

Fast Mail Force Pumps

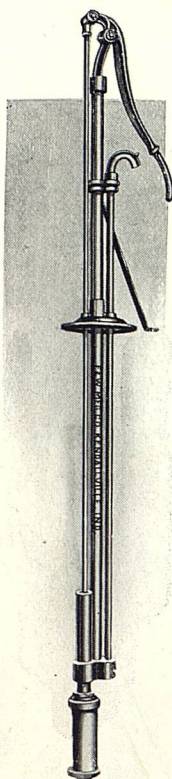


Fig. 842

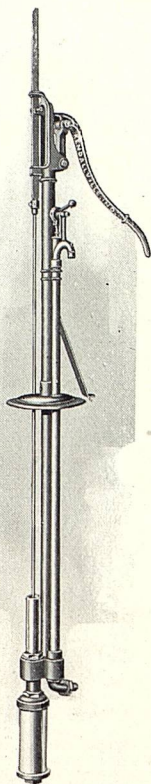


Fig. 845

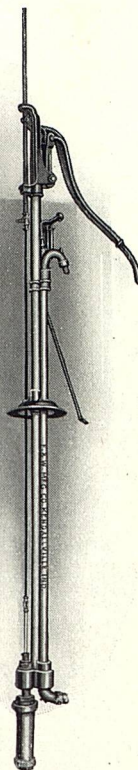
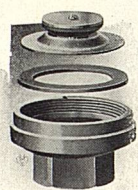


Fig. 848

Never Leak Check
Valve

The value of a pump depends much on the efficiency of the check valve. Our Patent Never Leak Check Valve, here shown, is made of sheet brass, with heavy beveled pure rubber attached to the brass poppet which fits perfectly the specially formed brass valve seat. There is absolutely no place for sand to lodge and cause trouble. The check has a straight lift, giving a large and free water-way, being much more effective than the old leather hinged check. You should have your pump fitted with a Patent Never Leak Check Valve.

**Hoosier Regulator
Pump Keeps Tank
Full and Prevents
Waste of Water**

We have already told you about our Hoosier Windmill Regulator, how it will save you the trouble of starting your mill when the tank is empty, or stopping it when the tank is full. The same self-regulating function, that of controlling the windmill and tank supply, is successfully accomplished by using our Hoosier Regulator Force Pump, here illustrated. Some prefer this regulator to any other kind, as the regulator and pump are combined in one, affording the greatest simplicity and efficiency. This self-regulating pump is perfect in its operation.

The hydraulic cylinder is made of seamless brass tubing, and the bottom is provided with trip, for tripping the plunger valve when pressure becomes too great. Directly above this cylinder is a brass stuffing box, and the piston rod is connected with quadrant to which a lever is attached, with the adjustable weight thereon as shown. The windmill pull-out wire is attached to this lever.

As the tank fills with water the float closes the valve on end of inlet pipe, and the water being shut off at tank, it

forces the plunger downward in the hydraulic cylinder, pulling windmill out of gear. When water is used from tank the float lowers, permitting the float valve to open, which releases the pressure on the hydraulic cylinder plunger; the weight on quadrant lever then lowers, which raises the plunger, allowing the mill

to go into gear, and pumping is resumed. The mill working automatically in this manner always keeps the tank full, and prevents unnecessary wear of the mill and pump.

Burkett, Ind.

Dear Sirs:—When I purchased this farm there was an 8-foot Star Galvanized Steel Mill on the farm for stock purposes only. When I wished to install a water plant at the house, I of course looked up the Star agent and purchased another 8-foot galvanized mill, equipping it with a pressure house tank and stock tank at the barn, and the outfit gives complete satisfaction.

Yours very truly,

Bert A. Rush.

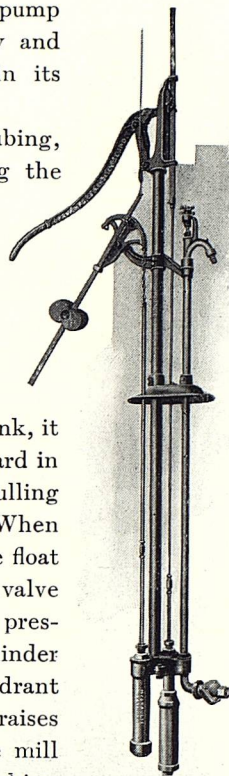


Fig. 877

Hoosier Pumps and Working Heads

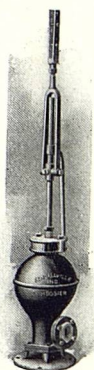


Fig. 754
Working Head

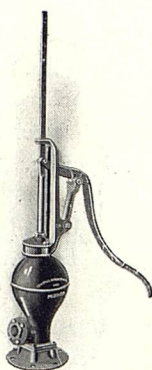


Fig. 755
Working Head



Fig. 757
Syphon Pump

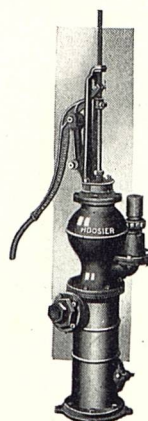


Fig. 758
Syphon Pump

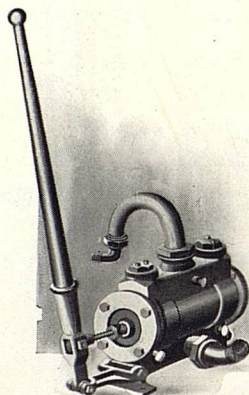


Fig. 880
Tank Pump

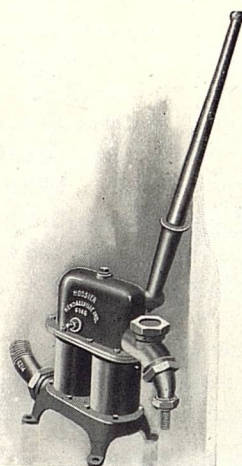


Fig. 882
Duplex Tank Pump

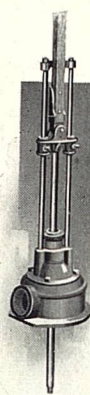


Fig. 899
Working Head

Hoosier Cylinders, Etc.

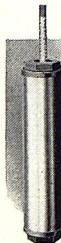
A good pump is often condemned because of an imperfect cylinder. Much care is taken in the manufacture of our complete line of cylinders that they may be as perfect as possible.



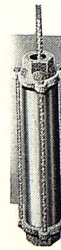
All Iron



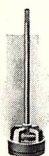
Brass—Outside Caps



Brass—Inside Caps



Brass—Bolted Caps



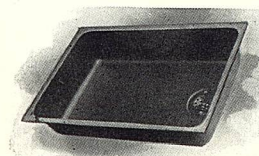
E Plunger



A Plunger



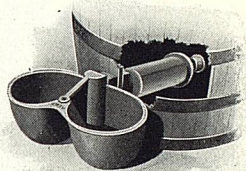
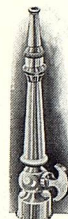
D Plunger



Cast Iron Square Sinks



Hose Nozzles



Double Automatic Stock Waterer



Cast Dipper or Water Conductor

Hoosier Hydrants



Fig. 905



Fig. 906



Fig. 909



Fig. 911

Stuffing Box Heads



Fig. 894

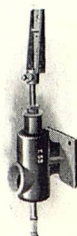


Fig. 895

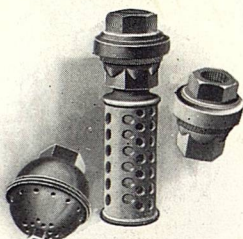


Fig. 897

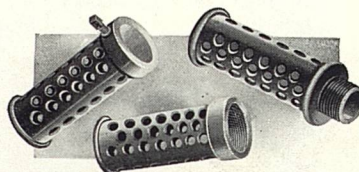


Fig. 898

Foot Valves and Strainers



Foot Valves



Strainers

Iron Pipe Fittings



Elbow



Tee



Cross



Coupling



Union



45° Elbow



Street Elbow



Reducer



Bushing



Plug



Lock Nut



Cap

Compression Bibbs For Standard Pipe



Plain



Hose

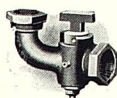


Plain



Hose

Brass Valves and Cocks



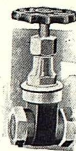
Hydrant Cock



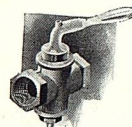
Globe Valve



Angle Valve



Gate Valve



Lever Handle Stop Cock

Brass Jacket Well Points



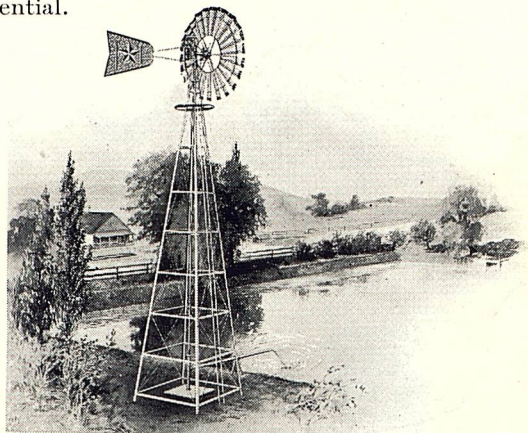
Air Chamber



**Irrigation
Produces Abun-
dant Crops and
Fruitage**

The systematic application of water to land creates a regularity of moisture that enriches the soil and stimulates the growth of crops. The need of appropriate irrigation in dry countries or in localities where there is a deficiency of rainfall is very essential.

It is the desire of progressive agriculturists to raise larger and better crops. Many acres of now worthless land can be made to produce abundant crops and fruitage by proper irrigation. The application of an ample supply of water to such land can be successfully effected at a reasonable cost by the installation of Star Windmill Irrigating Plants, the equipments depending upon the available water supply and the variety of crops



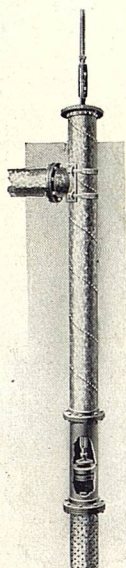
Star Irrigating Outfit

to be irrigated.

Our Star Steel Irrigating Windmill has the same mechanism and the same improvements as the Star back-gear mill, which we have already described, but all the parts are larger and stronger and the strokes longer, giving it great capacity. It has been tried severely under all conditions, and has proved a great success and equal to all requirements.

For irrigation and all heavy work, a large pump of great capacity is required. We have a pump especially designed for these purposes, which is here illustrated. It is made of galvanized spiral pipe, and has a brass working barrel or cylinder with flanges screwed on each end. The plunger is double leathered, with poppet valves leather lined. The water-way in valves permits of a large volume of water.

We are prepared to give expert advice to those who desire irrigating plants. We have practical experience at your disposal as to the matter of arranging the reservoirs, piping, and flumes.



Hoosier
Irrigating Pump

**Star Water Supply
Outfit Always
Dependable**

With the high development, efficiency, and practicability of Star Windmills, there is no reason why every owner of a suburban or country home should not have a water supply system, equal in every respect to that of the city home. Just think of the convenience it means. The elevated tank, affording an adequate storage of water, makes the system reliable because the gravity pressure always remains the same, and can be depended upon at all times and under all conditions. Water can be forced into various parts of the building, and with plenty of water for the kitchen, the bath room, and the laundry, it keeps the home in the very best sanitary condition. With the use of piping and hydrants, water can be conducted to various places about your premises, and you can have hose connections at any point you wish for sprinkling your lawn and gardens, and for washing your vehicles. You also get a pressure that will throw a stream of water far enough and

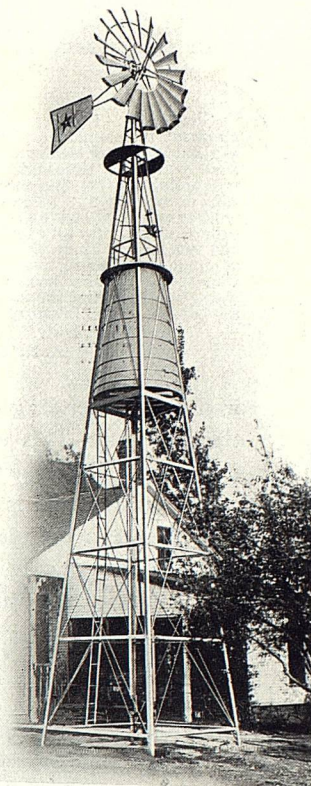
Loyalton, Pa.

Gentlemen:—The 10-foot Star Back-Geared Windmill and tower you sent me last fall are perfectly satisfactory. After careful investigation I found the Star the best make by far. My tower is fifty feet high with bands every five feet, which makes the strongest tower I ever saw, and will not sway. I also have a Hoosier Regulator which makes the outfit complete. It needs no attention, for when tank is full it stops the mill, and when water in tank lowers, allows it to start again. My advice to anybody in need of a windmill is to buy the Star. The Star Mill and Hoosier Regulator cannot be beat.

Yours respectfully,

Edmund Hoover.

strong enough to give you adequate fire protection. Besides the convenience and security afforded by a Star independent water supply system, there is a cash saving in the reduction of the insurance rate, and there is no high water tax to be met year after year. The expense of such a system ceases when the outfit is erected. Our Star Windmill suburban outfit, here illustrated, is used by suburban and country residents, and private clubs, requiring a moderate supply of water. The tower is constructed along the same lines as our regular windmill tower; the portion



Star Suburban Outfit

below the tank is made of heavy material, amply strong and rigid to safely support the weight of mill and the tank when filled with water. It is an attractive and practical outfit at nominal cost.

We also illustrate our Star Windmill Institute Outfit, which is used with great success where a larger quantity of water is required than the capacity of our suburban outfit. Adapted particularly for suburban residences, golf clubs, parks, cemeteries, and institutions of all kinds. The tank may be any capacity and elevated on steel substructure

Methuen, Mass.

Gentlemen:—I wish you would allow me to comment on the Galvanized Steel Star Mill I purchased from you some time ago. That mill is doing extra fine work and runs as nice as any piece of machinery could. We have a constant supply of water for all uses—stock and domestic. There is no need of moving to town for modern conveniences. We have hot and cold water in all parts of the house, in the bath room and lavatory.

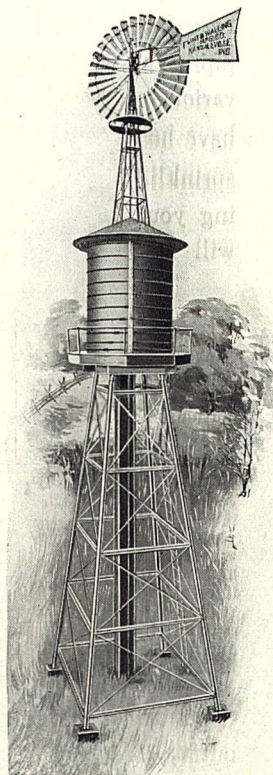
Yours truly,

A. N. Turner.

any height to give the desired pressure. The windmill tower is anchored to bottom of tank on inside with iron rods extending through it and connected to the platform. This outfit is erected on piers built of concrete, brick, or stone masonry, and the base of the substructure is bolted to the anchor rods and plates built in the piers. This manner of construction obtains practically unlimited strength. For cold climate, the outfits can be made frost proof for use throughout the year.

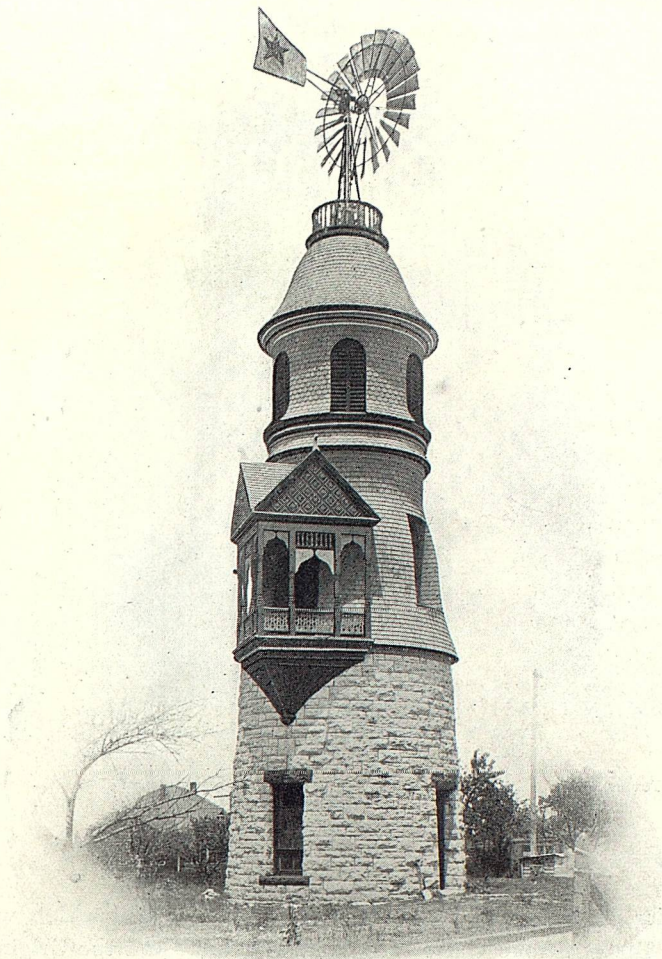
Without a reliable water supply system, your unprotected country home may some day burn to the ground. You will then regret that you did not provide an adequate water supply for fire protection. Install a Star Windmill Water Supply Outfit and you will have a reliable and economical system.

Much water is needed for the lawn, gardens and foliage, and these can be kept fresh and beautiful throughout the long, hot summer days and late in the fall with an outfit of this kind.



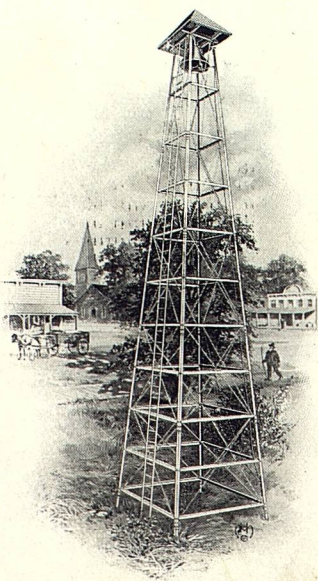
Institute Outfit

Ornamental Outfit



There are various designs in which our Star Windmill Water Supply Outfits may be finished. The accompanying illustration shows a modern and very attractive design. A storage tank of large capacity is elevated the proper height in the outfit to give it the necessary pressure for household use, and for sprinkling the lawn and gardens. Outfits of this kind can be built to harmonize with the buildings on the premises, making the place one of architectural beauty to be admired by all.

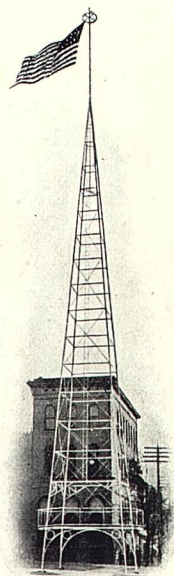
Steel Towers for Various Purposes



Bell Tower



52-ft. 4-Post Substructure and
25,000-Gallon Tank Outfit



Flag Tower

Besides producing the superior goods shown in this booklet, we build the Star Direct Stroke Galvanized Steel Windmill and the Original Star Wood Windmill, of which we issue separate booklets, and Hoosier Gas and Gasoline Engines.

We can furnish anything you may require in the line of Water Supply Goods.

MANZ ENGRAVING COMPANY
THE HOLLISTER PRESS
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