

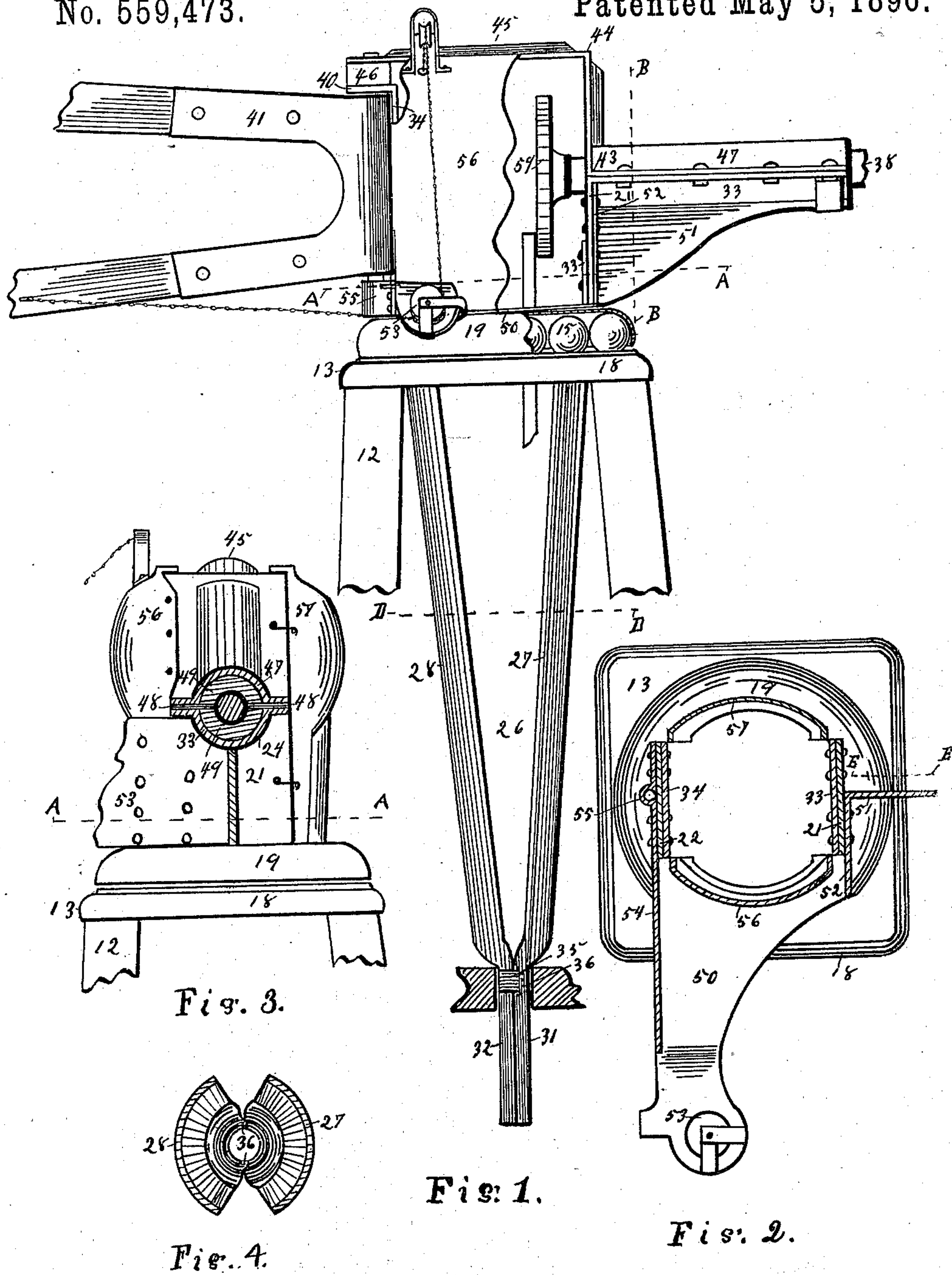
(No Model.)

2 Sheets—Sheet 1.

M. B. WILLIAMS & G. J. BREMER.
WINDMILL.

No. 559,473.

Patented May 5, 1896.



Witnesses
Thomas Stewart
L. W. H. Cox

Inventors
Malcolm B. Williams: Godfrey J. Bremer
By their Attorney Lucius C. West.

(No Model.)

2 Sheets—Sheet 2.

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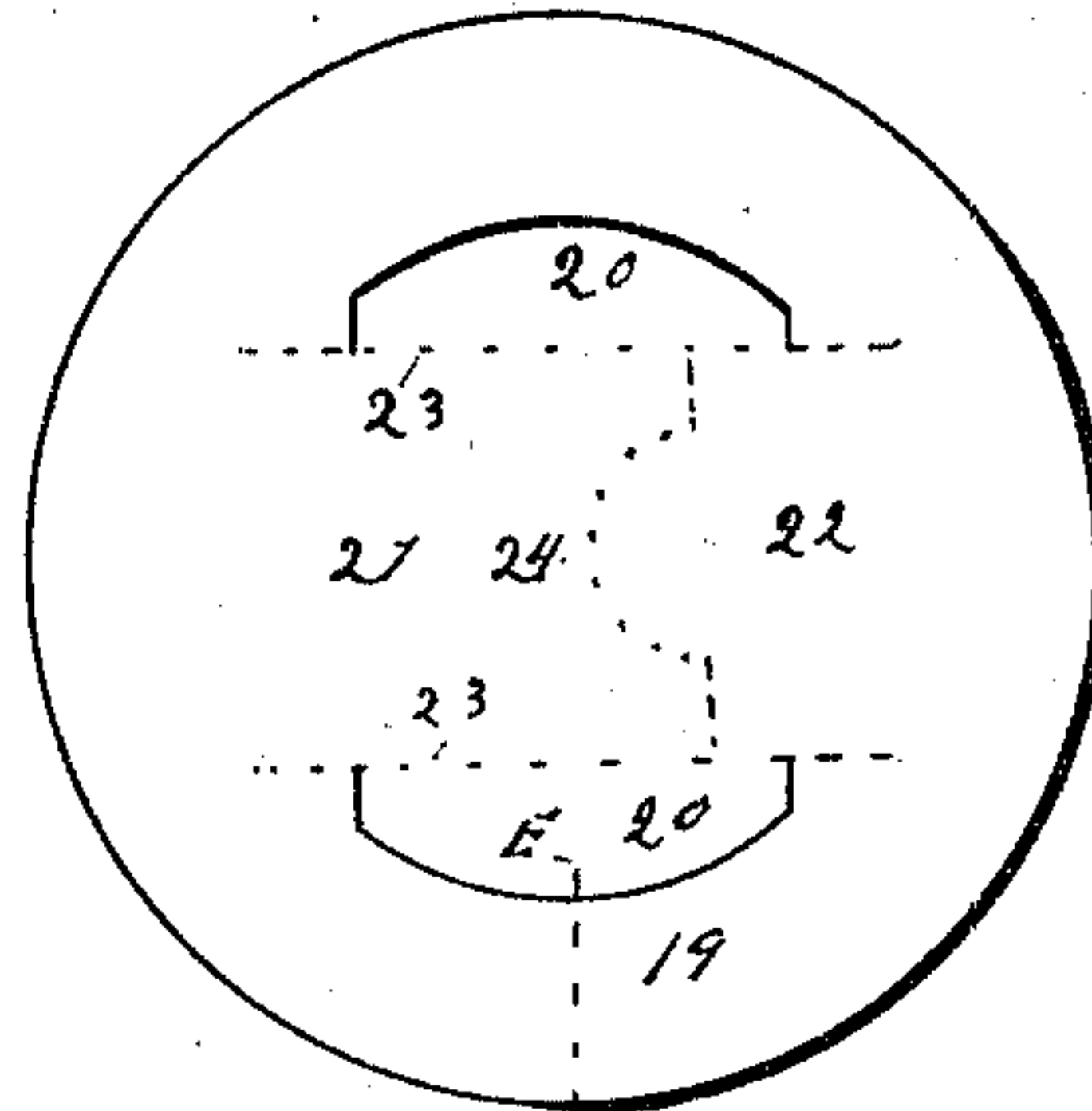
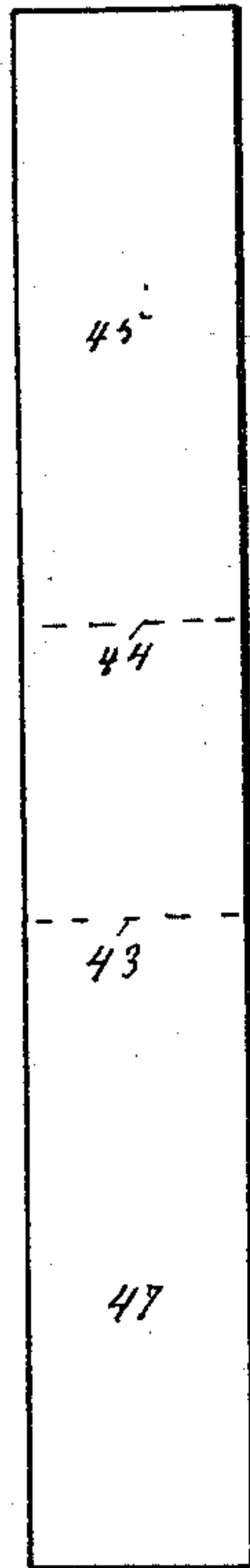
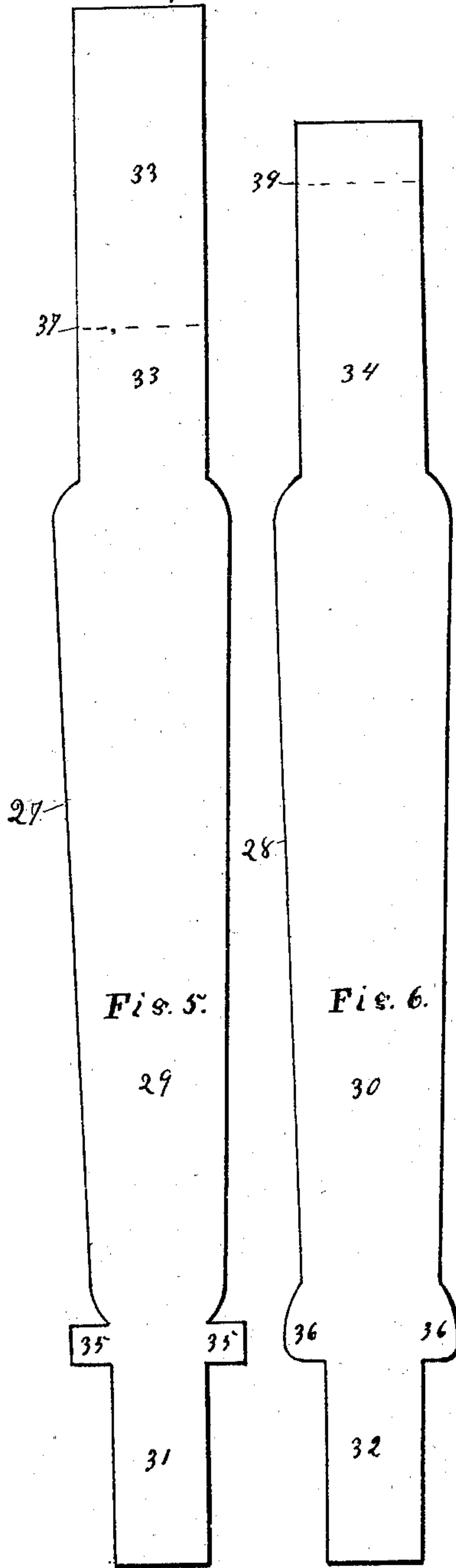


Fig. 8.

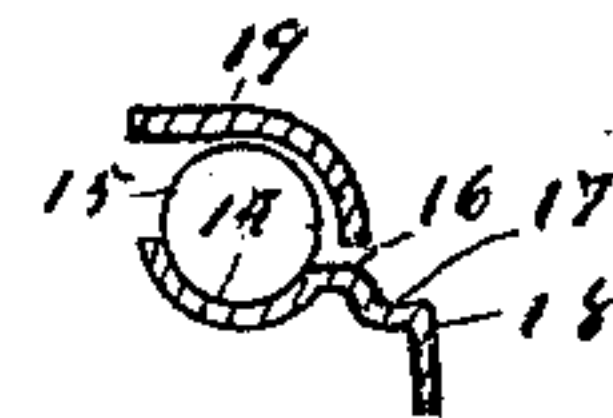


Fig. 9.

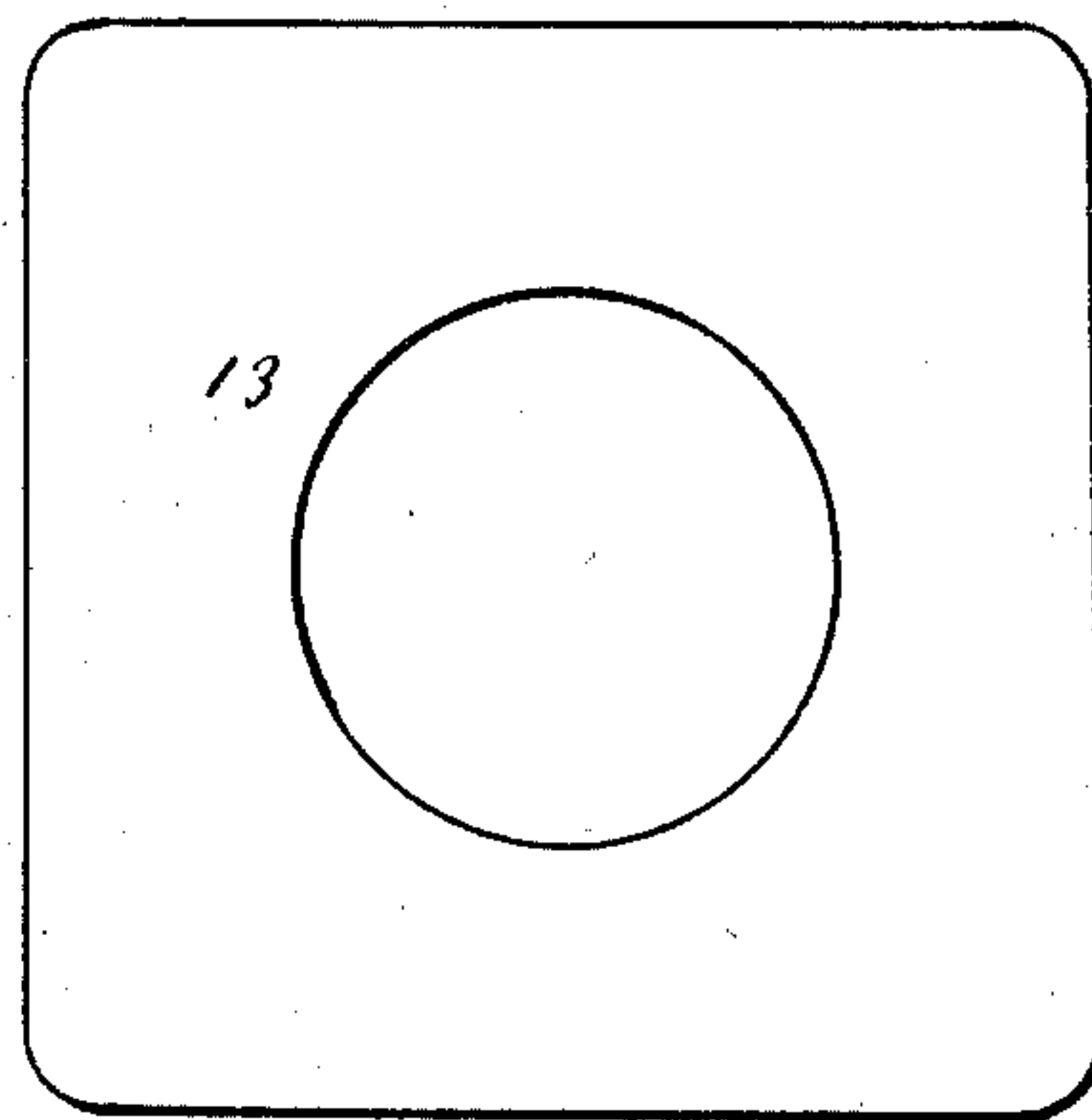


Fig. 10.

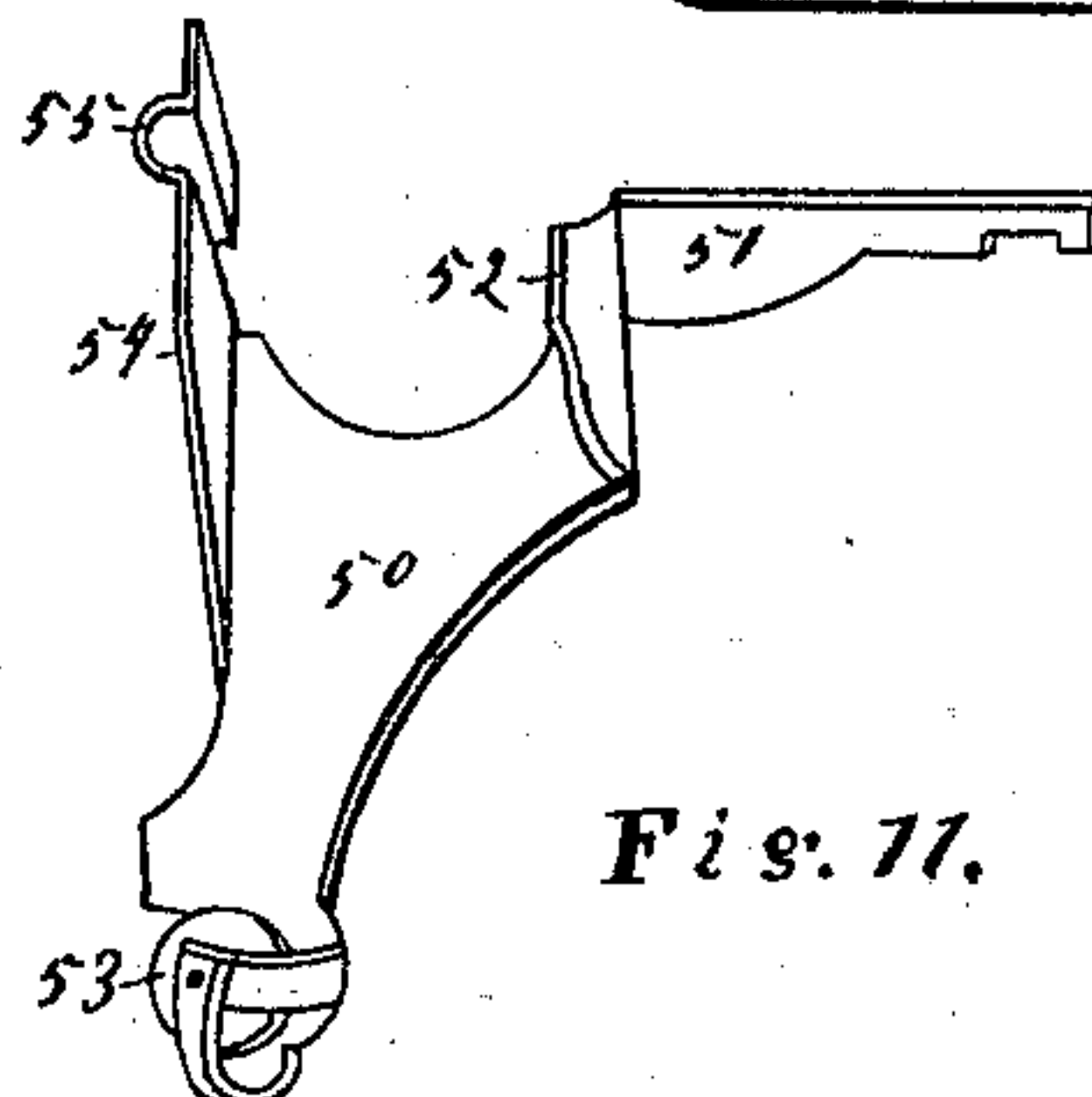


Fig. 11.

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UNITED STATES PATENT OFFICE.

MALCOLM B. WILLIAMS AND GODFREY J. BREMER, OF KALAMAZOO,
MICHIGAN; SAID BREMER ASSIGNOR TO SAID WILLIAMS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 559,473, dated May 5, 1896.

Application filed November 15, 1895. Serial No. 569,022. (No model.)

To all whom it may concern:

Be it known that we, MALCOLM B. WILLIAMS and GODFREY J. BREMER, citizens of the United States, residing at Kalamazoo, in the county of Kalamazoo, State of Michigan, have jointly invented a new and useful Windmill, of which the following is a specification.

This invention relates to those parts of a windmill which support the vane and wheel-shaft on the derrick, including the cap, turn-table, and mill-head proper; and it has for its main object to construct said parts from sheet metal by stamping and pressing and riveting or bolting the parts together with a design of lightening the weight, lessening the bulk, and greatly cheapening the product.

In the drawings, forming a part of this specification, Figure 1 is a side elevation of the mill, the derrick, vane, and wheel-shaft being shown broken; Fig. 2, a section on line A A in Figs. 1 and 3, looking from a point above; Fig. 3, a vertical section on line B B in Fig. 1, looking from a point at the right; Fig. 4, a section on line D D in Fig. 1, looking from a point above. Figs. 5 and 6 show blanks, as stamped out previous to pressing, of the companion pieces forming the pendent portion of the mill-head; Fig. 7, a blank previous to pressing, forming a portion of the head and other parts below described; Fig. 8, a plan of the turn-table in blank; Fig. 9, a section of turn-table and cap on line E E in Figs. 2 and 8; Fig. 10, a plan of blank cap prior to pressing; and Fig. 11 is a perspective, at a reduced scale, of the chain-pulley holder and bracket in Figs. 1 and 2.

Referring to the parts of the drawings pointed out by numbers, 12 is the derrick, and 13 the cap placed on top of said derrick in the ordinary manner. This cap is made by stamping it out in blank from sheet metal, as in Fig. 10 and then pressing it into shape between dies. Care must be taken in making the blank of proper size and shape and the hole in the center of a proper size, so that when the metal is taken up in making the configuration in cross-section in Fig. 9 the center hole and the entire cap shall then be of proper size and shape. The cap, after being pressed, has a circular concave furrow 14, Fig. 9, in which in use friction-balls 15 are located, a

convex rib 16, thence outward a flat lower surface 17, and then a turned-over flange 18, fitting over the top of the derrick 12. The rib 17 prevents water and ice collecting in the friction-ball channel or furrow 14. At 19 is the turn-table. This is stamped blank from sheet metal, as in Fig. 8. The openings 20 are first cut out to make the opening through the center of proper size, and this also establishes the sides of the standards 21 and 22. The blank in Fig. 8 is also cut on dotted lines 23 and 24 in stamping, and it is then pressed in shape so as to consist of an inverted dish for sitting over and resting on the friction-rollers 15, said part having formed thereon the upward extensions 21 and 22. The extension 21 has a concave notch 24 in the upper end, Figs. 3 and 8, to support the bearings of the wheel-shaft, as explained farther on. The pendant of the mill-head 26, Fig. 1, is made from two companion strips 27 and 28. These strips are stamped out in blank from sheet metal, as in Figs. 5 and 6. The bodies 29 and 30 of these blanks are both alike, starting wide at the point where they join the upper rectangular portions 33 and 34 and tapering to the lower end, where they join the lower rectangular bases 31 and 32. The bases 31 and 32 are alike, and so are the upper portions 33 and 34, except 33 is the longest, for reasons explained hereinafter. Blank 27 is provided with rectangular lugs 35 at the point where the body joins the base 31, and blank 28 is provided with tapered lugs at the same point, Figs. 5 and 6. These blanks 27 and 28, or companion pieces, are then pressed into shape, as in Figs. 1, 3, and 4, the bodies and bases being made curved or partially tubular in cross-section, as in Figs. 1 and 4, and the lugs 35 and 36 being turned so as to shut one within the other to interlock the base of the pendant, as in Fig. 1.

The upper end of the blank 27 is turned over at right angles on line 37, Fig. 5, and longitudinally concaved, as at 33 in Figs. 1 and 3, forming a base of the wheel-shaft bearing-box. In Figs. 1 and 3 this base 33 rests in the concaved end of the upright 21 of the turn-table, and the wheel-shaft 38 rests in said base.

The upright 21 and the vertically straight

part of the blank 27, which is just below the bend 37, are riveted or bolted together, as in Figs. 1 and 2. The body of this blank 27, below this point of riveting, converges at an oblique angle downward and toward the vertical center of the mill, so that when this blank is joined to its companion blank 28 the pendant of the mill will be tubular and tapering all round toward the base. The upper end 34 of the blank 28 is turned over at right angles on line 39, Fig. 6, forming a part of the upper hinging-eye 40 of the vane 41, Fig. 1. The upright 22 of the turn-table 19 and the vertically straight portion of the blank 28 above its body are riveted together, as in Figs. 1 and 2, and of course the body of this blank extends like its companion piece at an oblique angle until it meets it, as explained. The riveting or bolting of these parts together, as explained, makes the mill-head quite firm; but greater solidity and firmness are added by the use of the blank strip of metal in Fig. 7, which is stamped and pressed in form by turning at right angles on lines 43 and 44 in opposite directions. The portion between lines 43 and 44 forms a part of one side of the head, and the angle 45 the top, the outer end of which is bolted to the angled end of the blank 28, forming the hinge 40, a block 46 being inserted between them to add strength to the hinge. The end 47 is longitudinally convexed, forming the other half of the bearing-box of the wheel-shaft 38, Figs. 1 and 3, the two halves of said box being bolted together, thus holding them as an ordinary cast box is held and adding to the rigidity of the mill-head. Two metal plates 48 are placed between the parts of the box, as in Fig. 3, and Babbitt metal 49 filled in.

The vertical portion of the blank in Fig. 7 between the angles 43 and 44 and the upper part 45 are preferably longitudinally convexed, as in Figs. 1 and 3, to further stiffen the parts, but this is not necessary.

To further brace and stiffen the mill-head, to support the bearing-box of the wheel-shaft 38, to form a support for one of the chain-pulleys 53, and to form the lower hinge 55 of the vane 41, we form a bracket 50, all stamped and pressed from a single piece of sheet metal. This bracket comprises the arm 51 beneath the bearing-box, Figs. 1, 2, 3, and 11, the wall 52, riveted to the upright 21 of the turn-table 19, the outwardly-extending table-like portion supporting the chain-pulley 53, the wall-like portion 54, riveted or bolted to the upright 22 of the turn-table 19, and the curved-out portion at 55 forming the lower hinge to the vane. Of course this support 51 to the bearing-box may be made of a separate part, as also may be the lower hinge of the vane; but when formed of a single piece, as in Fig. 11, and riveted or bolted, as shown, it imparts still greater firmness to the mill-head, and this is a convenient and cheap way of constructing these parts after the first cost of the dies is provided for, and which is also the case relative

to the other stamped and pressed parts. The mill-head may or may not be provided with the side closures 56 and 57 in Figs. 1, 2, and 3; but it is preferable to have one said closure attached rigid to the mill-head, as 56, and one detachable, so as to see the working parts within the head, as 57. These closures are stamped and pressed from sheet metal and may be shaped as shown, or may be of any suitable shape. A part of one of the closures in Fig. 1 is broken away, showing the crank-disk 59 of the wheel-shaft within the mill-head, and in Fig. 2 both of these closures are shown in section.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. A windmill having its head-pendant composed of two companion parts stamped and pressed from sheet metal, and forming when put together, a tapering tubular body with vertically-tubular base, one of said companion parts being bent at an angle at the upper end and longitudinally concaved to form a base to the wheel-shaft bearing-box, substantially as set forth.

2. In a windmill, a pendent portion composed of two companion parts, the upper end of one of said parts being bent at an angle and longitudinally concaved forming a base to the wheel-shaft bearing-box, substantially as set forth.

3. A windmill having its head-pendant composed of two companion parts stamped and pressed from sheet metal and forming when put together a tapering tubular body with vertically-tubular base, the upper end of one of said parts being bent over forming one of the hinges to the vane, substantially as set forth.

4. A windmill having its head-pendant composed of two companion parts stamped and pressed from sheet metal and forming when put together a tapering tubular body with vertically-tubular base, the upper end of one of said parts being bent at an angle and longitudinally concaved to form the base of the wheel-shaft bearing-box, the other bent over forming the upper hinge to the vane, and a metal blank bent to make one end form the top of the mill-head and bolted to the upper hinging-eye of the vane; and the other end concaved longitudinally to form the upper half of the wheel-shaft bearing-box, substantially as set forth.

5. The mill-head pendant, composed of two companion parts stamped and pressed from sheet metal and forming when put together a tapering tubular body with vertically-tubular base, the upper end of one of said parts being bent at an angle and longitudinally concaved to form the base of the wheel-shaft bearing-box, the other bent over forming the upper hinge to the vane; and a metal blank bent to make one end form the top of the mill-head and bolted to the vane-hinge; and the other end convexed longitudinally to form the other

half of the bearing-box, combined with the turn-table provided with the upward extensions attached to the companion blanks, and one of them having the concaved end supporting the bearing-box, substantially as set forth.

6. The combination, of the turn-table stamped and pressed from sheet metal forming the inverted-dish portion with the upward extensions, one of which is concaved in the end, the pendant companion parts, one of which is rigidly attached to one of the upward extensions, thence bent at an angle and longitudinally concaved, resting in the concave of the upright of the turn-table, and forming the lower portion of the wheel-shaft bearing-box, the other companion part being attached to the other upward extension of the turn-table, and bent over at the upper end forming the upper hinge to the vane, substantially as set forth.

7. The combination, of the head-pendant composed of two companion parts stamped and pressed from sheet metal, and forming when put together a tapering tubular body with tubular base, one of said parts being bent

at an angle and longitudinally concaved to form the base of the wheel-shaft bearing-box, and a bracket stamped and pressed from sheet metal to form a support to the bearing-box, and for one of the chain-pulleys, substantially as set forth.

8. The combination of the turn-table having the upward extensions, one of which is concaved in its upper end, the pendent two-part portion, the upper portion of one of which forms the base of the wheel-shaft bearing-box, and the upper end of the other forming the upper vane-hinge, the bracket, stamped and pressed from sheet metal to form a support beneath the bearing-box, a support for one of the chain-wheels, and the lower hinge to the vane, substantially as set forth.

In testimony of the foregoing we have hereunto set our hands in the presence of two witnesses.

MALCOLM B. WILLIAMS.
GODFREY J. BREMER.

Witnesses:

LEVI F. COX,
JASON W. BISHOP.