

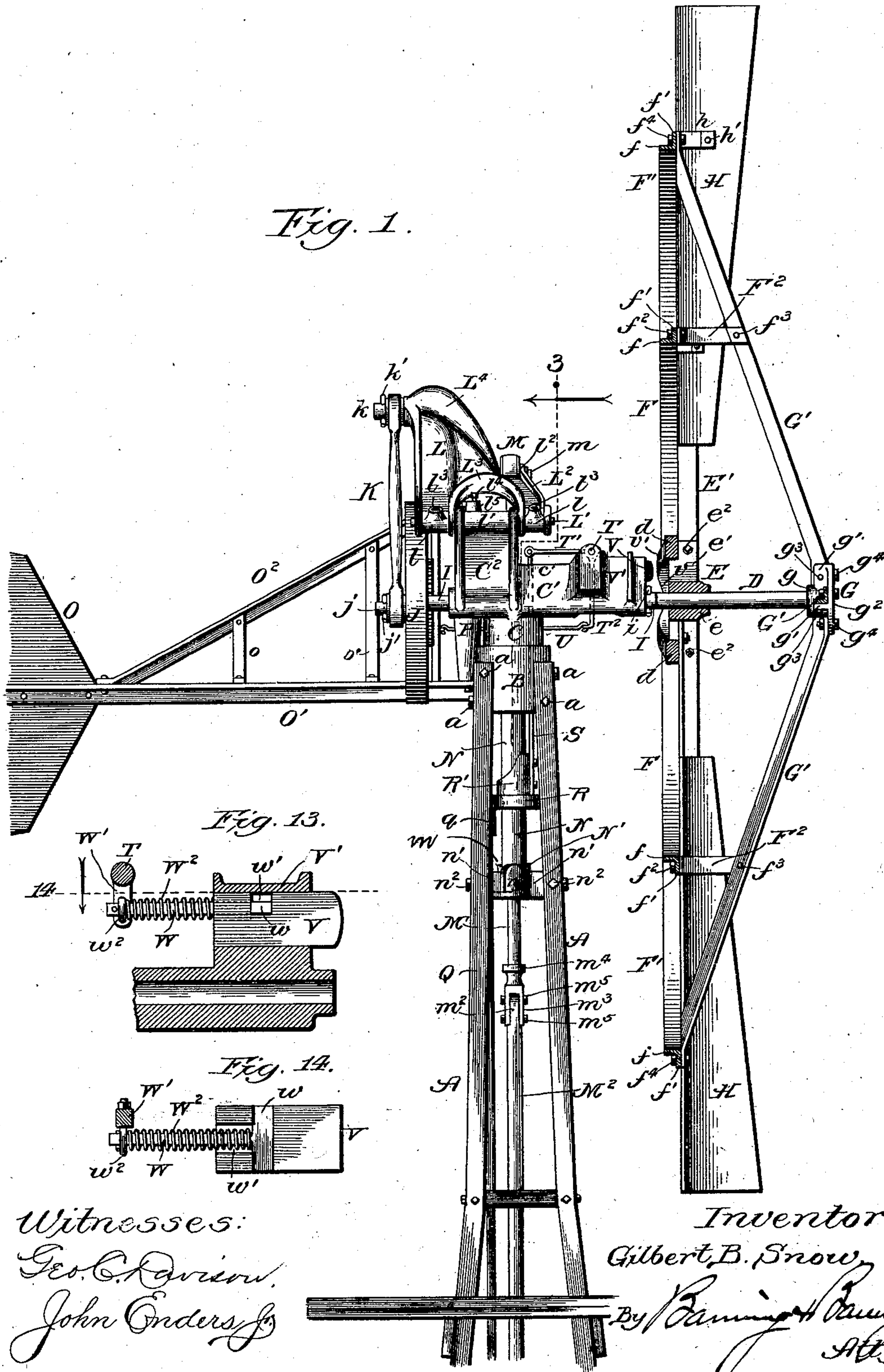
G. B. SNOW.  
WINDMILL.

(Application filed July 1, 1901.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



Witnesses:  
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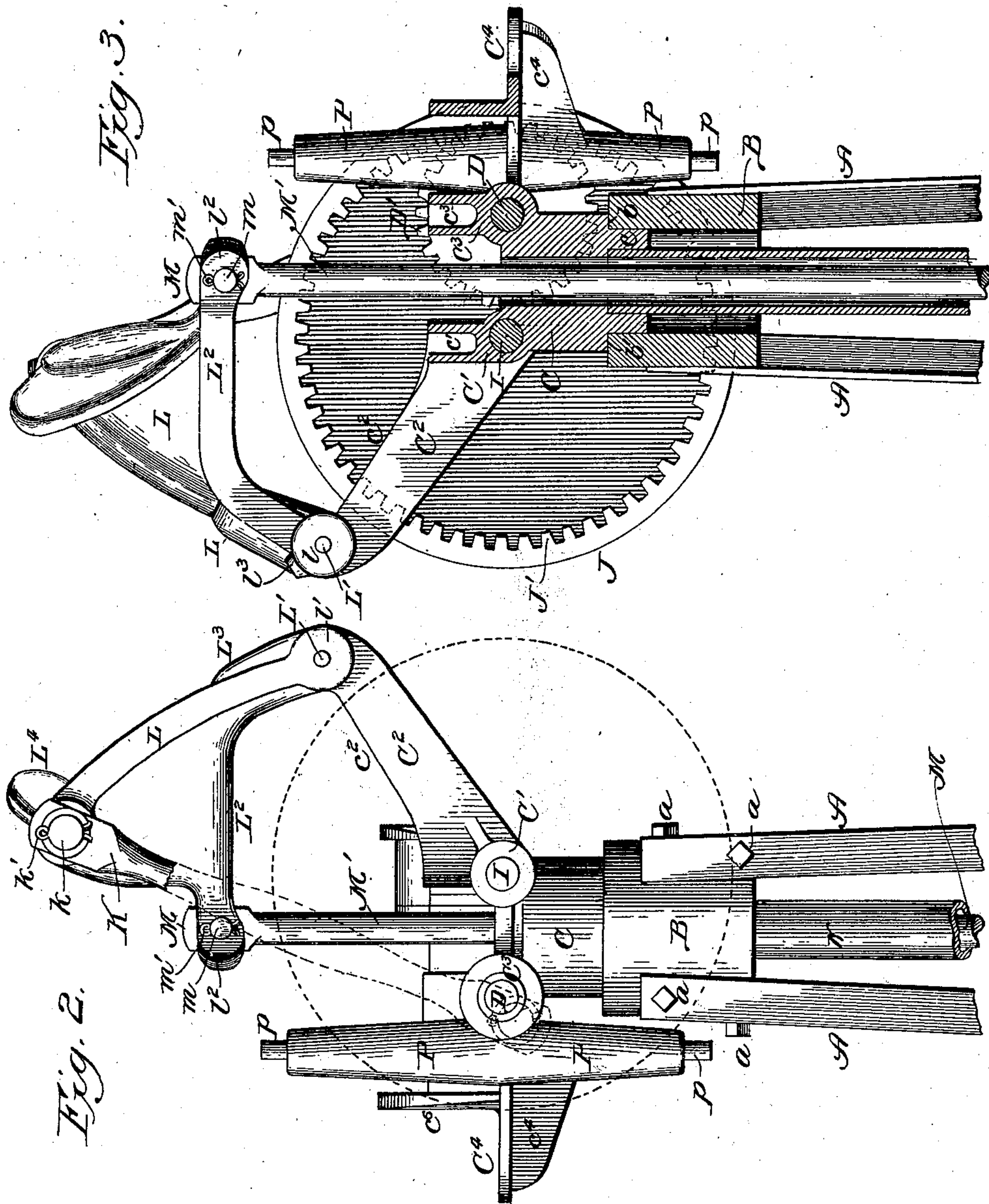
G. B. SNOW.

WINDMILL.

(Application filed July 1, 1901.)

(No Model.)

4 Sheets—Sheet 2.



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G. B. SNOW.  
WINDMILL.

(Application filed July 1, 1901.)

(No Model.)

4 Sheets—Sheet 3.

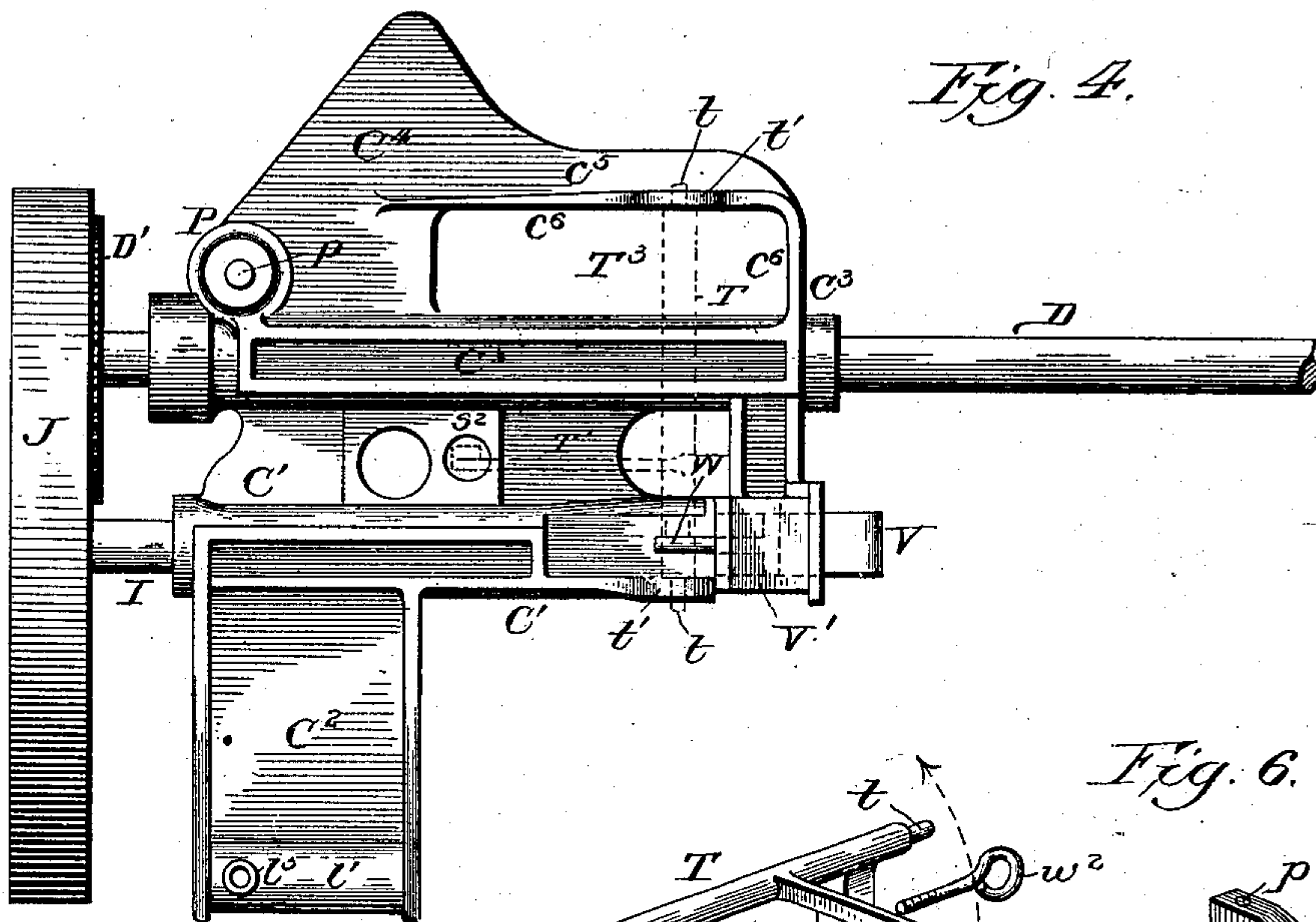


Fig. 4.

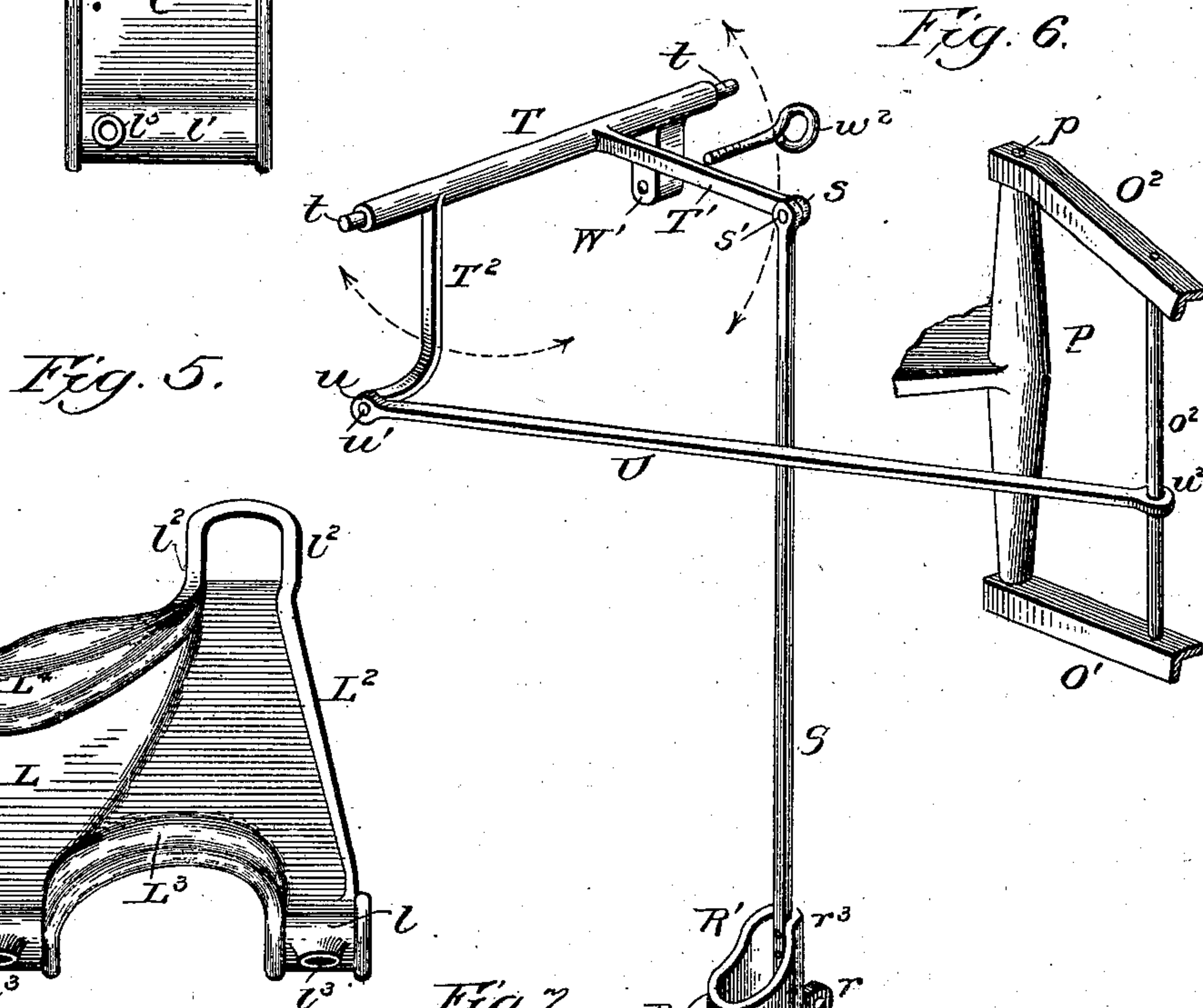


Fig. 5.

Fig. 6.

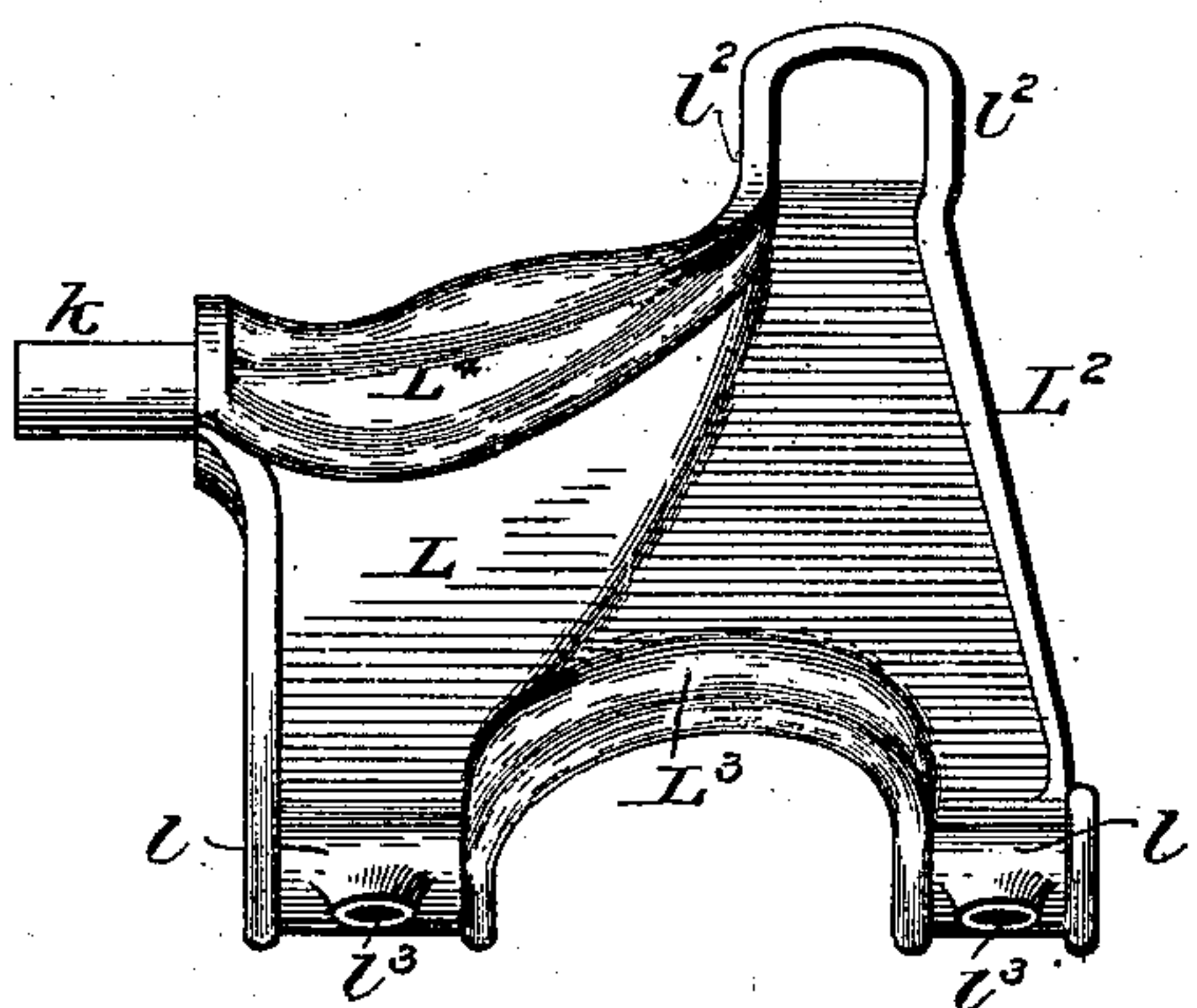
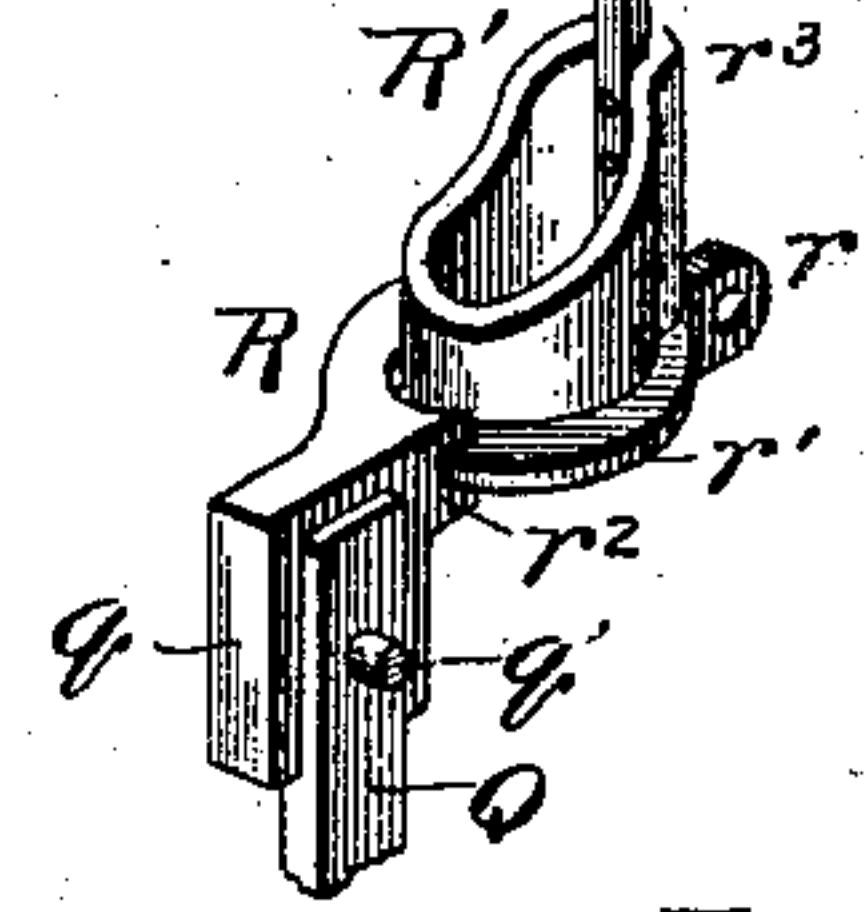
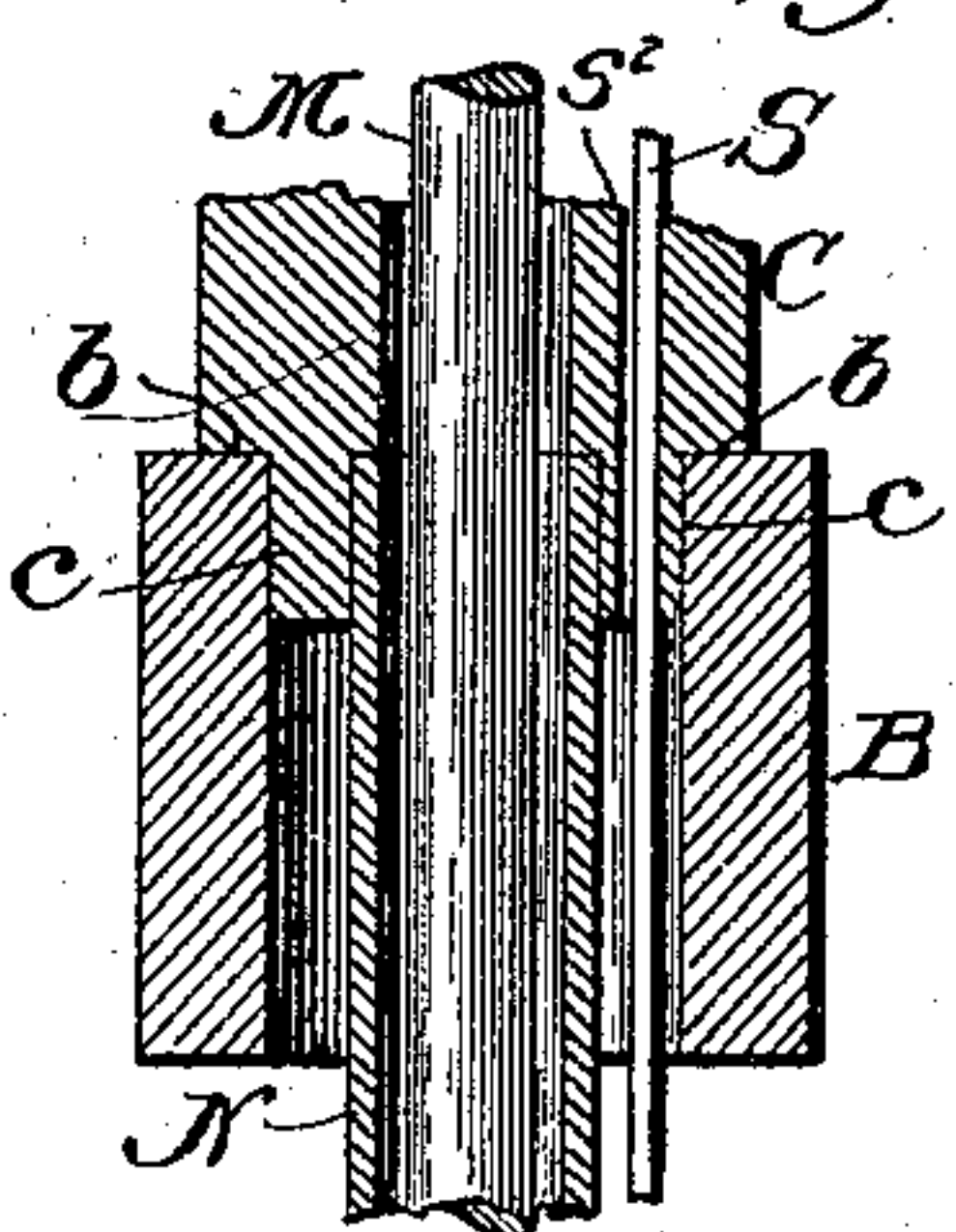


Fig. 7.



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G. B. SNOW.  
WINDMILL.

(Application filed July 1, 1901.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 8.

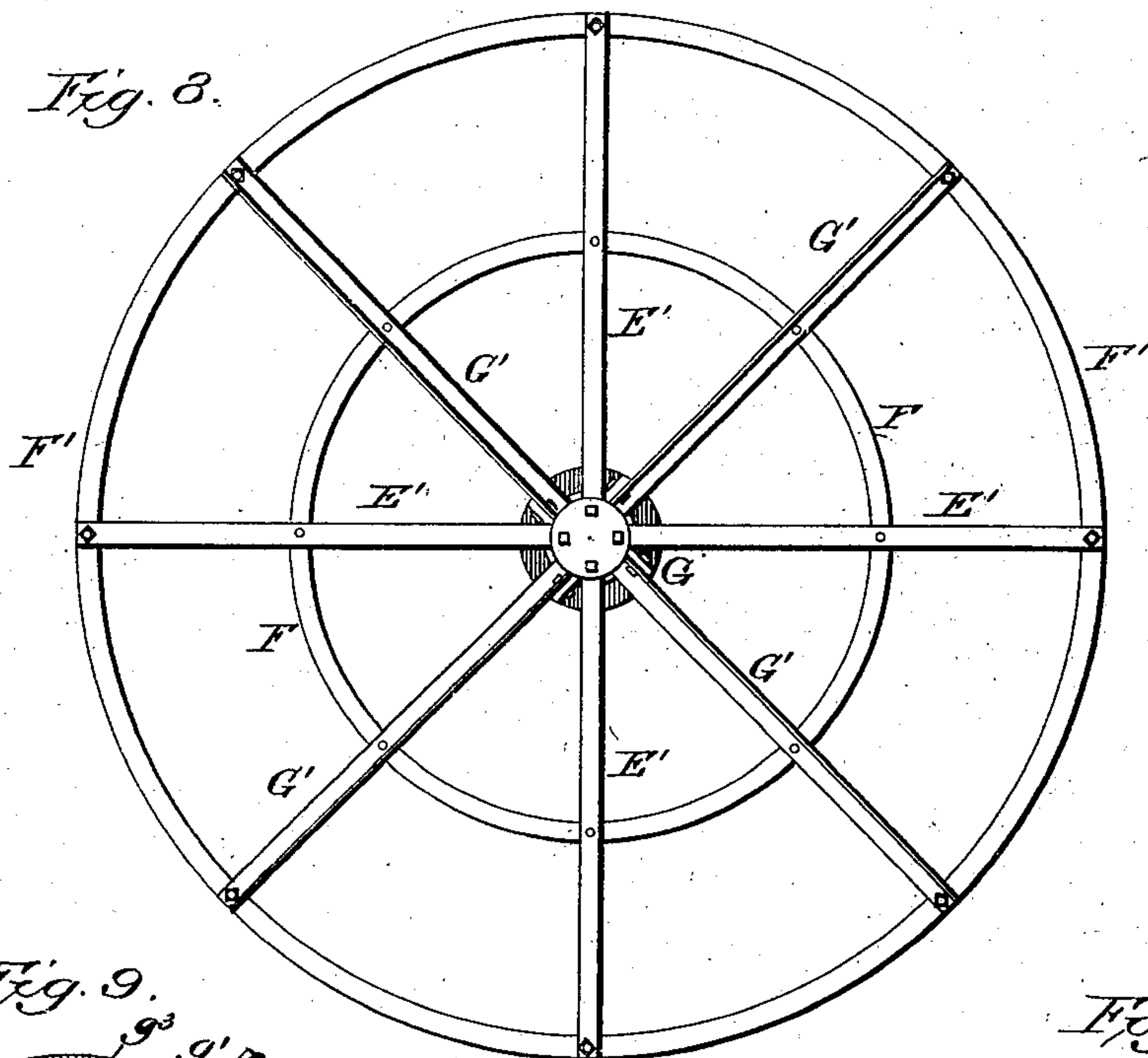


Fig. 9.

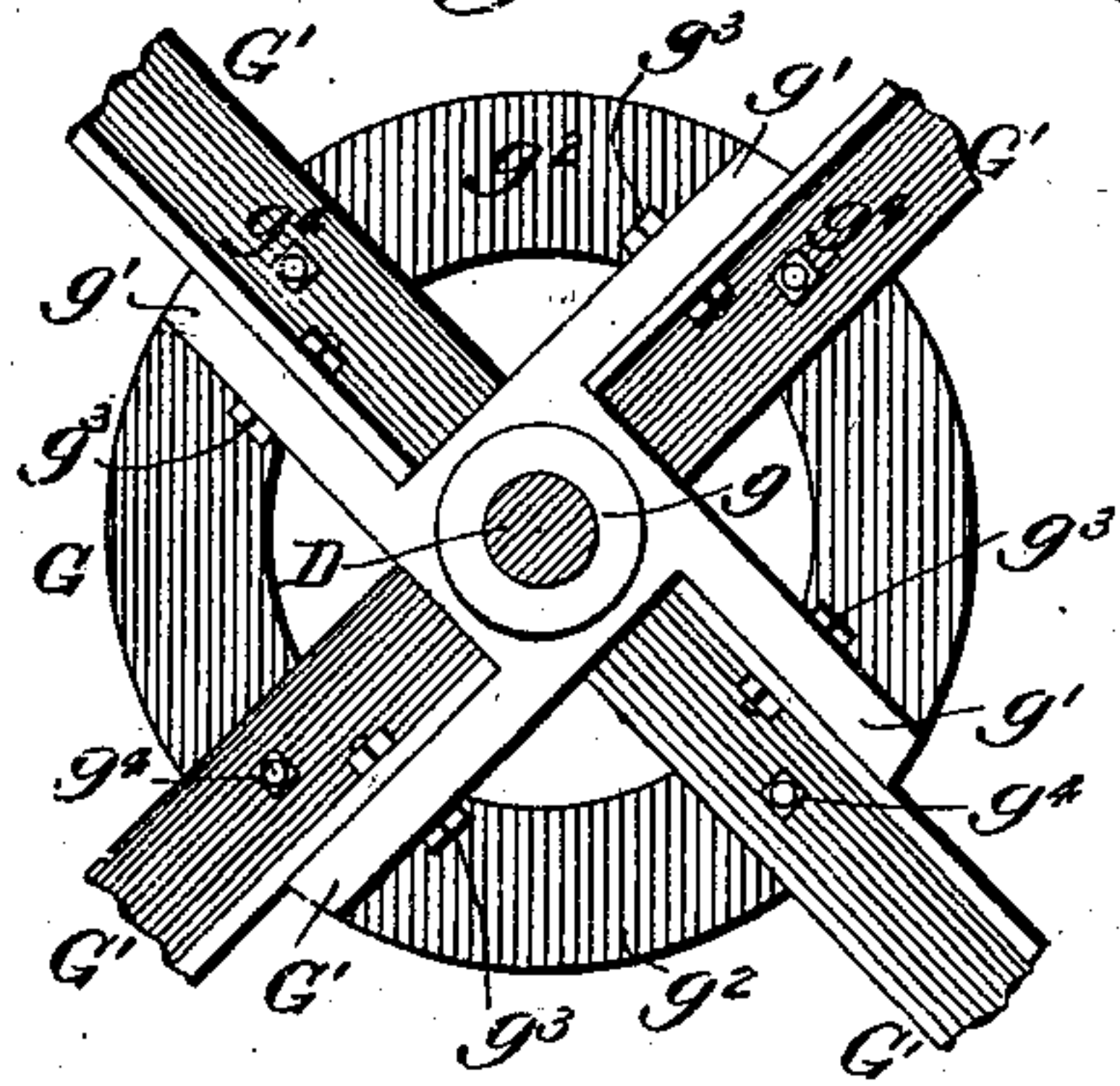


Fig. 10.

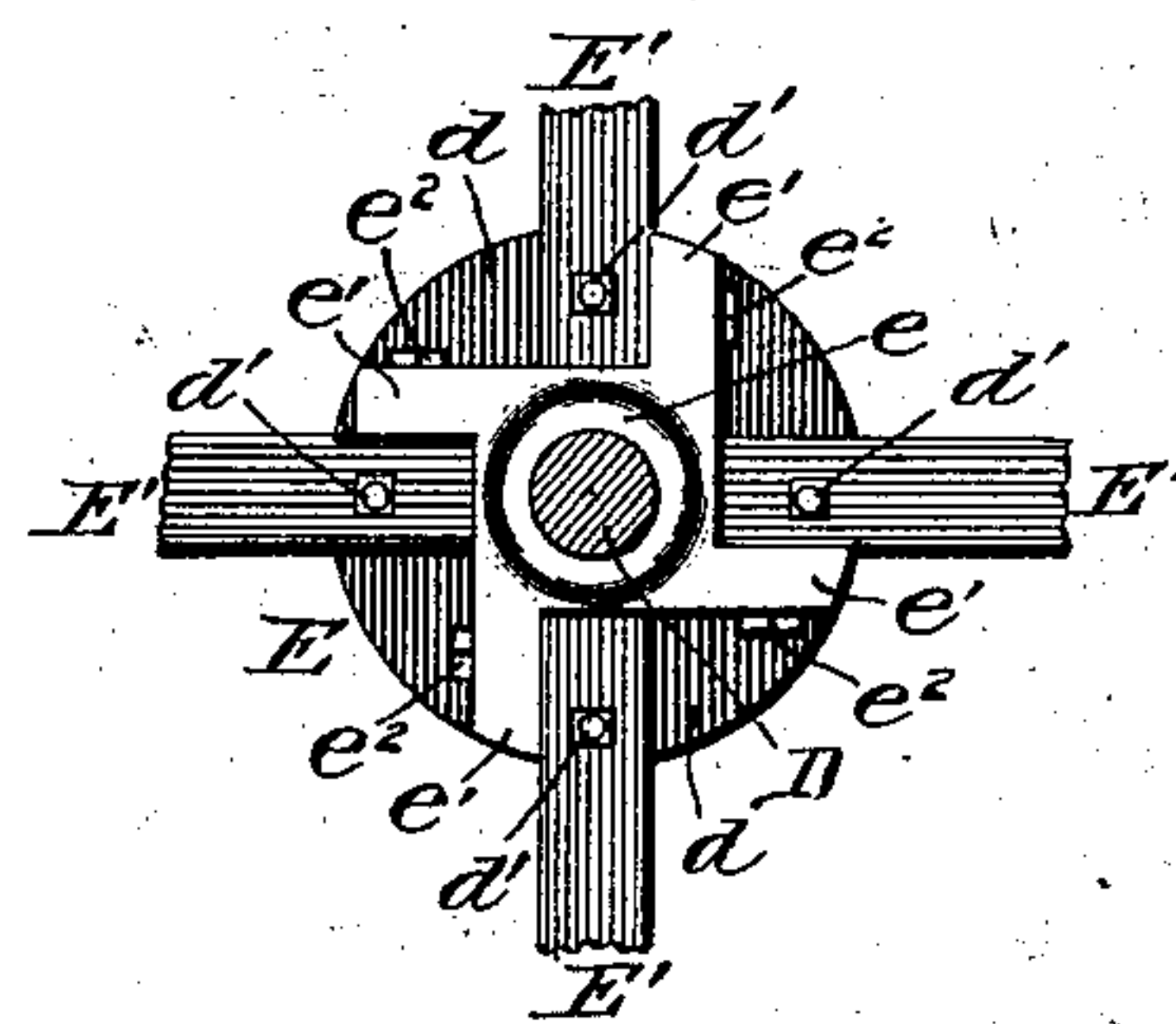


Fig. 11.

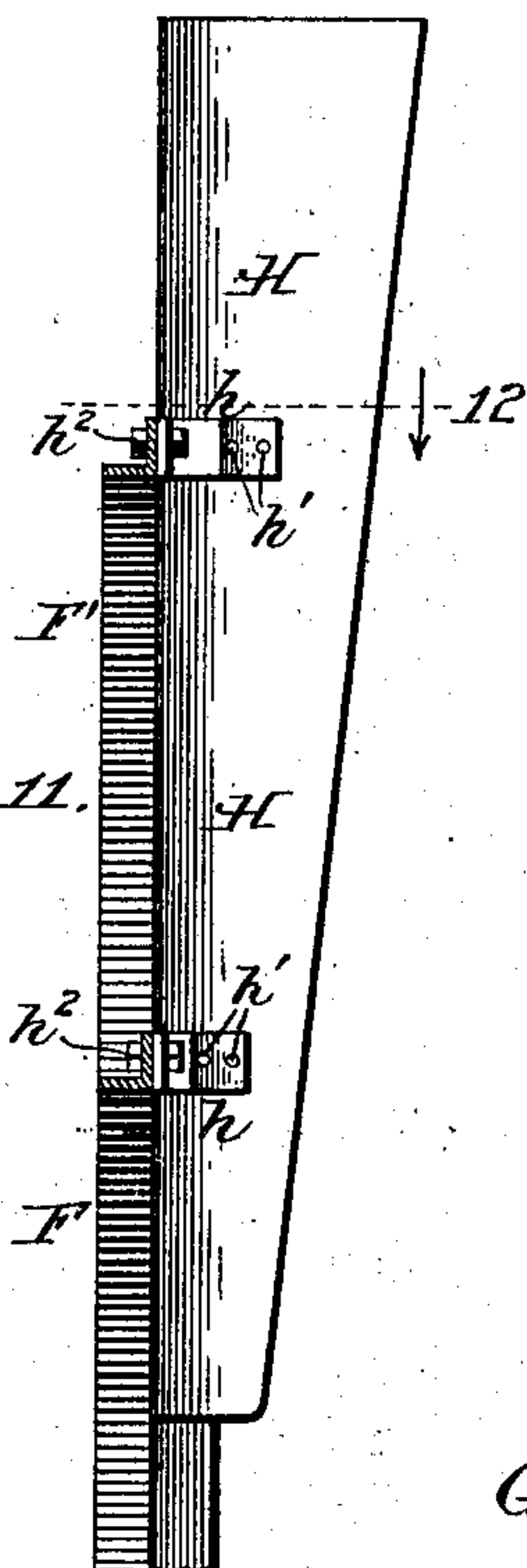
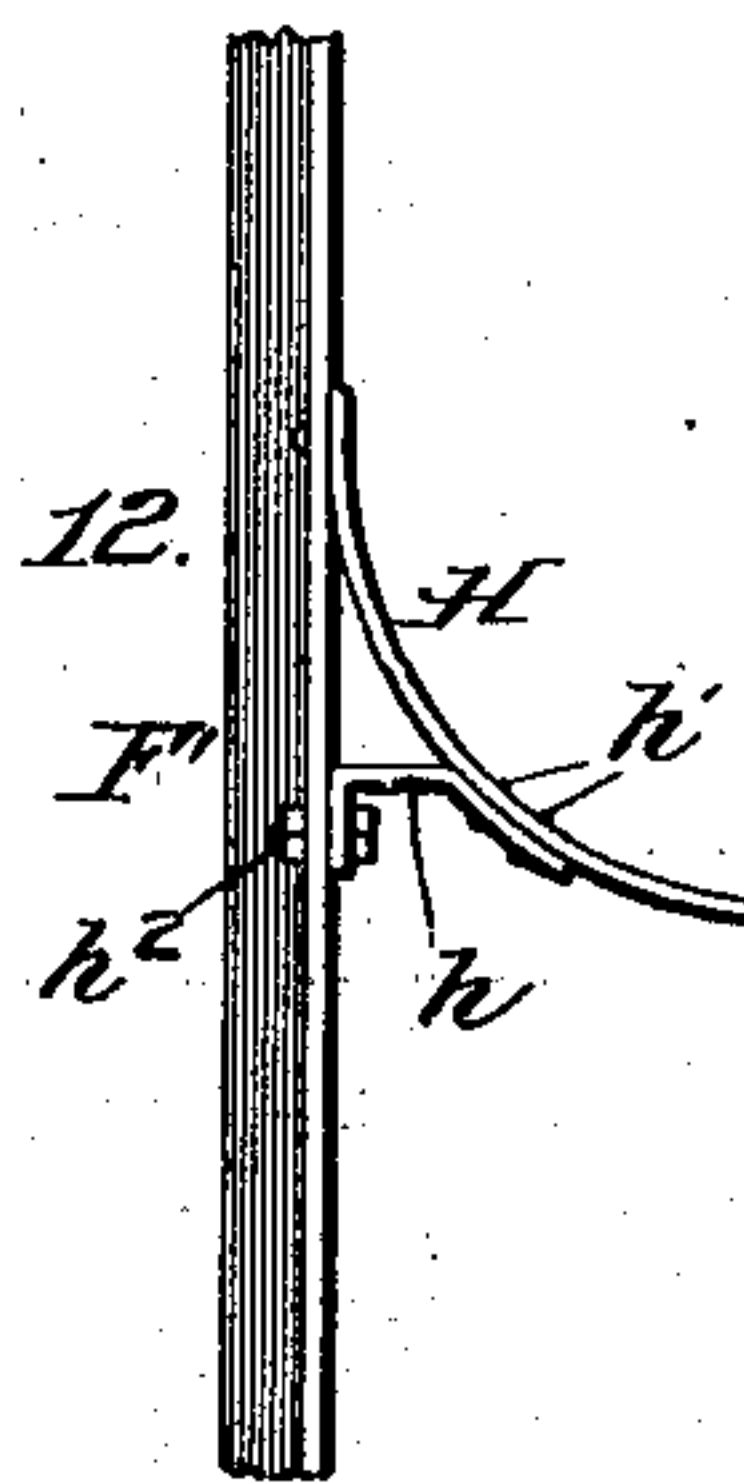


Fig. 12.



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# UNITED STATES PATENT OFFICE.

GILBERT B. SNOW, OF ELGIN, ILLINOIS, ASSIGNOR TO ELGIN WIND POWER AND PUMP COMPANY, OF ELGIN, ILLINOIS, A CORPORATION OF ILLINOIS.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 702,161, dated June 10, 1902.

Application filed July 1, 1901. Serial No. 66,632. (No model.)

*To all whom it may concern:*

Be it known that I, GILBERT B. SNOW, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

The principal objects of the invention are to improve the construction of the wheel as regards the frame or support for the fans and the manner of locating or mounting the frame or support on the main shaft of the wheel; to improve the hubs or mountings which carry the arms and braces constituting the body of the wheel and to which the rims supporting the fans are secured; to improve the construction and operation of the main gearing and its head or support; to improve the bearings for the wheel-shaft and the driving-shaft for the gearing and the connections of the gearing with the pump-rod; to improve the means for throwing the wheel out of the wind, and to improve generally the construction and operation of the parts relating to the wheel and mill as a whole.

The invention consists in the features of construction and combinations of parts hereinafter described and claimed.

As the invention pertains to the construction of the wheel and the support or head carrying the wheel and the main gearing, and the construction and arrangement of the parts operated from the main gearing to reciprocate the pump-rod, and to the means for throwing the mill or wheel out of the wind, it is only deemed necessary to illustrate the parts of a windmill to which the invention particularly relates, and therefore the upper portion of the tower, with the parts pertaining to the invention thereon, is all that is shown.

In the drawings, Figure 1 is an elevation of the upper end of a windmill-tower and the support or frame for the main gear and the wheel, showing the wheel in sectional elevation and showing the vane broken off; Fig. 2, an end elevation of the support or frame for the main gearing and the wheel, showing also the upper end of the tower. Fig. 3 is a sectional elevation of the parts shown, taken on line 3-3 of Fig. 1 looking in the direction of the arrow; Fig. 4, a top or plan view of the

support or frame for the main gearing and the wheel with the connections for operating the pump-rod removed; Fig. 5, a plan view of the swinging arm or lever for operating the pump-rod; Fig. 6, a perspective view showing the means for throwing the wheel out of and into the wind; Fig. 7, a detail in section of the bearing at the top of the tower for the main support or frame for the gearing and wheel, showing the rod for operating the parts by which the mill or wheel is thrown out of and into the wind; Fig. 8, an elevation of the wheel without the fans, showing the hubs, the arms and braces, and the rims of the wheel; Fig. 9, a detail in elevation of the outer hub or mounting for the wheel-frame; Fig. 10, a detail in elevation of the inner hub or mounting for the wheel-frame; Fig. 11, a detail, partly in section, showing the attachment of the fans to the rim of the wheel; Fig. 12, a detail in plan, showing the attachment of the fans to the rims of the wheel; Fig. 13, a sectional side elevation of the brake block or head and its housing, and Fig. 14 a plan view of the brake block or head.

The tower A, the upper portion only of which is shown, can be made of four corner supports or uprights, each preferably of angle-iron, with the corner posts or uprights suitably braced or connected to each other to form a solid and firm tower. The tower at its extreme upper end has attached thereto by bolts *a* or otherwise a hollow head or bearing B, having on the outer face projections or corners adapted to fit the interior of the angle-iron posts or standards of the tower. A head C, having an annular rim or flange *c* and a shoulder *b*, is mounted on the head or bearing B, with the rim *c* entered into the bearing and the shoulder *b* resting on the end of the bearing, as shown in Fig. 3. The head C has formed therewith a box or bearing C' and a support or arm C<sup>2</sup> on one side and on the opposite side has formed therewith a box or bearing C<sup>3</sup> and a horizontally-extending shelf or plate C<sup>4</sup>, which parts, in connection with the head C, constitute the main frame or support for the gearing and the wheel. The box or bearing C' has upwardly-extending flanges or ribs *c'*, and the arm or support C<sup>2</sup> has upwardly-extending ribs or flanges *c*<sup>2</sup>



for giving additional strength to the parts, and the box or bearing  $C^3$  likewise has upwardly - projecting strengthening ribs or flanges  $c^3$ . The horizontal sleeve or plate  $C^4$  has on its under side a bracing and strengthening flange or rib  $c^4$  and is connected to the opposite end of the box or bearing  $C^3$  by a horizontal flange  $c^5$  and a vertical flange  $c^6$ , leaving an opening between the flange  $c^6$  and the box or bearing  $C^3$  for the passage of an arm of a rock-shaft for throwing the mill out of or into the wind.

The main shaft  $D$  of the wheel is mounted in the box or bearing  $C^3$  and has attached to its inner end a pinion  $D'$  for driving the wheel of the gearing which operates the pump-rod. This shaft  $D$  has secured thereto a hub or mounting  $E$ , formed of a center  $e$  and ears or brackets  $e'$ , and a circular web or facing  $d$ , uniting and bracing the outer ends of the ears or brackets, as shown in Figs. 1 and 10. Each ear or bracket  $e'$  has attached thereto by a bolt  $e^2$  or otherwise the inner end of a spoke or arm  $E'$ , and in addition the inner end of each spoke or arm is attached to the rim or facing  $d$  by a bolt  $d'$ , firmly securing the radiating spokes or arms to the hub or mounting  $E$ , as shown in Fig. 10. Attached to the spokes or arms  $E$  are two rims  $F$  and  $F'$ , each made of angle-iron, with the outer rim  $F'$  attached to the outer ends of the spokes or arms and the inner rim attached to the spokes or arms intermediate of the outer rim and the hub or mounting, as shown in Figs. 1 and 8. Each rim has a horizontal flange  $f$  and a vertical flange  $f'$ , and, as shown, the rims are attached to the radial arms or spokes  $E'$  by bolts  $f^2$ , passing through the flange  $f'$  and the arms or spokes. The extreme outer end of the main shaft  $D$  has secured thereto a hub or mounting  $G$ , consisting of a center  $g$  and ears or brackets  $g'$ , and a web or facing  $g^2$ , connecting the ears or brackets. Each ear or bracket  $g'$  has secured thereto by a bolt  $g^3$  or otherwise the inner end of a brace  $G'$ , preferably made of angle-iron, and, in addition, the inner end of each brace is secured to the web or facing  $g^2$  by a bolt  $g^4$  or otherwise, so as to firmly secure the end of the braces to the hub or mounting at their inner ends. The outer end of each brace is turned so as to lie parallel with the vertical flange  $f'$  of the outer rim and is attached thereto by a bolt  $f^4$  or in any other suitable manner. The arms or spokes stand vertical, and the braces stand diagonal to the arms or spokes, as shown in Fig. 1. The diagonal braces in the construction shown are supported midway of their length by braces  $F^2$ , attached at their outer ends by a bolt  $f^3$  or otherwise to the brace and attached at their inner ends by suitable bolts or otherwise to the inner rim of the wheel-frame. The spokes and the braces alternate, so that a brace lies midway between two spokes, as shown in Fig. 8, thus giving the rims a support from the rims or spokes and the braces at eight points, making

the frame of the wheel very strong and durable and capable of standing great strain in use. The wheel is completed by attaching to the rims  $F$  and  $F'$  the fans  $H$ , which are set at such angle to the wind as to make the mill very powerful and also to enable the mill to run in very light wind, and, as shown, the fans are each attached to the rims by strips or brackets  $h$ , secured at one end by a bolt  $h'$  or otherwise to a fan and at the other end to the vertical flange of the outer and inner rim, thus giving each fan a support at two points and in direct line with the rims.

The construction of the wheel-frame with an inner hub or mounting and an outer hub or mounting, radial arms or spokes extending from the inner hub or mounting, diagonal braces extending from the outer hub or mounting, an inner rim attached to the arms or spokes, and an outer rim attached to the arms or spokes and the diagonal braces furnishes a frame for the wheel having eight points of support of a skeleton formation well adapted for attachment of the fans thereto at the rims, so as to make the wheel capable of great resistance and very powerful in use and at the same time of a construction to run in light wind.

The gear-shaft  $I$  is mounted in the box or bearing  $C'$  and, as shown, is held against end-wise movement by a pin  $i$ , which bears against the end face of the box or bearing. The other end of the shaft  $I$  extends beyond the end of the box or bearing and has attached thereto a disk or wheel  $J$ , having an internal gear  $J'$ , in mesh with which is the pinion  $D'$ , so that with the revolving of the wind-wheel shaft  $D$  the pinion will be revolved, transmitting power to the disk or wheel  $J$  through the internal gear  $J'$ . The driving-pinion  $D'$ , it will be seen, is located at one side of the wheel-gear  $J'$ , by which arrangement any wear of the wind-wheel shaft will not operate to throw the gears apart, thus remedying a fault which is common with driving-pinions and power-gears in windmills. The disk or wheel  $J$  has projecting from its outer face a wrist-pin  $j$ , on which is entered the end of a pitman  $K$ , which is held on the wrist-pin by a pin or split key  $j'$  in the construction shown. The opposite end of the pitman  $K$  is entered onto a wrist-pin or stud  $k$  and is held thereon by a pin or split key  $k'$ , so that the rotation of the disk or wheel  $J$  will give a reciprocating movement to the pitman  $K$  and transmit such movement to the arm or lever having the pin or stud  $k$  projecting out therefrom. The pin or stud  $k$  projects out from the free end of an arm or lever  $L$ , having ears  $l$  at its inner end, which are mounted on a rod  $L'$ , secured in a bearing  $l'$  at the upper end of the fixed arm or support  $C^2$  by a set-screw  $l^4$  passing through a boss  $l^5$  on the bearing  $l'$  to have its end engage with and lock the shaft in a fixed position. The arm or lever  $L$  has a continuation  $L^2$ , as shown in Figs. 1, 2, 3, and 5, at the outer end of which is an eye or loop  $l^2$  for the at-



attachment of the upper end of the pump-rod. The arm or lever L is strengthened in the construction shown by flanges  $L^3$  and  $L^4$ , but could be otherwise formed so long as it furnishes a connection between the reciprocating pitman and the upper end of the pump-rod for the pitman to oscillate or swing the arm or lever and give a reciprocating movement to the pump-rod. The pump-rod at its upper end has a head M to enter the stirrup or loop  $l^2$  and be secured therein by a pivot pin or bolt  $m$ , held in place by a pin or split key  $m'$ , as shown in Fig. 3, and this head has the first section  $M'$  of the pump-rod extending downward therefrom to pass through a suitable hole therefor in the head C, as shown in Fig. 3. The pump-rod, as shown, has a second section  $M^2$  with a flattened end  $m^2$ , secured between ears  $m^3$  of a forked head  $m^4$ , attached to the lower end of the rod-section  $M'$  by bolts  $m^5$ ; but the pump-rod could be otherwise formed. The pump-rod passes through a tube N, the upper end of which is secured in the head C and the lower end of which is stepped or supported in a spider  $N'$ , having guide-ears  $m$  to receive the lower end of the tube and arms  $n'$  for attachment to the corner posts or standards of the tower by bolts  $n^2$  or otherwise, so as to have the spider fixed permanently in position and serve as a step or support for the lower end of the tube.

The vane O may be of any suitable construction and is attached to a main rod or shaft  $O'$ , extending from which is a diagonal rod or brace  $O^2$ , with the shaft and the brace connected by cross-bars  $o$   $o'$  or otherwise. The ends of the shaft  $O'$  and brace  $O^2$  have holes to receive journal pins or studs  $p$  on a post P, formed with the main frame or support of the wheel and main gearing at the inner end of the box or bearing  $C^3$  and adjacent to the horizontal shelf or plate, as shown in Figs. 2 and 3, thus giving the vane a pivotal connection to the head or support of the wheel and gearing, by which the vane is free to be swung for throwing the wheel out of or into the wind. The vane is swung as required for bringing the wheel out of or into the wind by a rod Q, having attached to its lower end a rope (not shown) extending down to the base of the tower. The rod Q is attached to a pendant or socket  $q$  on a section or division R of a coupling encircling the tube N, which coupling-section is in two halves or parts, each half or part having thereon one half or part of the pendant or socket  $q$ , into which the end of the rod Q is entered and secured by a bolt  $q'$  or otherwise. Each half or part of the coupling-section R on the side opposite to the half pendant or socket has an ear  $r$ , through which a bolt can be passed, securing together the two halves or parts of the coupling-section, and each half or part of the coupling-section R has a groove or recess  $r^2$  to receive a flange  $r'$  on the base end of the companion-section  $R'$  of the coupling, so that the coupling-section R is free to turn

in the coupling-section R, and the coupling as a whole is free to be raised and lowered vertically by means of the rod attached to the pendant or socket. The coupling-section  $R'$  on one side has an upward extension or lip  $r^3$ , to which is attached the lower end of a rod  $s$ , running up inside of the head B and through an opening  $s^2$  in the head C, with its upper end terminating above the box or bearing  $C'$ , as shown in Fig. 1. The upper end of the rod S has a fork  $s$ , between the ears of which is pivoted by a pin or pivot  $s'$  the outer end of an arm  $T'$ , extending out from a rock-shaft T, having journals or pins  $t$  at its ends, mounted in ears  $t'$  on the box or bearing  $C'$  and the flange  $c^6$ , supporting the shaft T on the main or gearing frame. The rock-shaft T has an arm  $T^2$  extending down through the opening  $T^3$  between the flange  $c^6$  and the box or bearing  $C^3$ , the lower end of which arm is attached to an eye or ear  $u$  of a rod U by a pivot or pin  $u'$ , and the outer end of the rod U has an eye or loop  $u^2$  encircling a rod  $o^2$  between the shaft  $O'$  and brace  $O^2$  of the vane, so that the movement of the rock-shaft T by the raising and lowering of the coupling will swing the vane so as to throw the mill out of or into the wind. The construction and arrangement of the parts constituting the means for throwing the mill out of and into the wind are shown in perspective detail in Fig. 6 of the drawings. The controlling means for the vane by means of which the mill is thrown out of or into the wind can be balanced by weights or otherwise at the base of the tower, so that by changing the weights the mill can be held lighter or stronger in the wind, as desired, and the balancing in connection with the other parts carried by the main frame or support of the gearing and wheel will enable the wheel to be easily and quickly thrown into and out of the wind.

The mill should have a brake to be applied to the wheel when the mill is thrown out of the wind, and the application of the brake should be simultaneous with the turning of the vane to throw the mill out of the wind. The brake block or head V has its outer or acting end in the construction shown slightly rounded in order to fit the depressions  $v$  in the rear face of the web or facing  $d$ , which face, as shown, is formed convoluted, having depressions or concave portions  $v$  and risers or convex portions  $v'$ , so that when the acting end of the brake block or head is in a depression the riser will serve as a resistance to stop the rotation of the wheel. The brake block or head V is slidable in and out in a housing  $V'$ , formed on the end of the journal-box  $C'$  adjacent to the path or travel of the wheel. The brake block or head has therein a T-shaped recess  $w'$ , which receives the head  $w$  of a rod or link W, and the inner end of the link is connected by an eye-pin  $w^2$  with an arm  $W'$ , extending down from the rock-shaft T, the end of the link passing through the eye in the pin, and between the pin and the



head of the link is a coil-spring  $W^2$ , which furnishes a yielding resistance for projecting the brake block or head to have its acting face engage the convoluted face of the web or facing of the wind-wheel. The turning of the rock-shaft to throw the vane out of the wind moves the arm  $W'$  in the direction to push against the spring and have the spring force the brake block or head forward beyond the housing and into the line of travel of the hub or spider  $E$  of the wheel, so as to engage with the convolutions on the rear face of the spider and have the engagement sufficiently strong to retard and finally stop the revolving of the wind-wheel. The brake is exceedingly simple in construction and is operative coincidingly with the throwing of the mill out of the wind by the turning of the vane, so that with the operation of throwing the mill out of the wind the brake will be applied to stop the revolving of the wheel.

The frame or support carrying the shafts of the wind-wheel and of the gearing is of a form to give the necessary support for the shafts and the parts connected therewith and operated therefrom. The main gearing by which the pump-rod is actuated is carried in such manner on the frame or support as to give the best advantages for operation in transmitting power from the wheel to operate the pump-rod. The connection between the wheel and the pump-rod is one which utilizes the full power of the wheel in operating the rod. The connecting means are so arranged and formed as to furnish strength without too much weight, and at the same time have the transmitted power act in the best manner possible on the pump-rod, and the construction of the wheel is one which while light as to the parts composing the frame is strong against resisting pressure without impairing the running qualities of the wheels in light wind. The pitman, it will be noticed, is located entirely outside of the gear, being attached at one end to the wrist-pin projecting out from the face of the gear disk or wheel and at the other end to the wrist-pin projecting out from the arm or lever, leaving the space within the gear entirely clear of the connecting means between the gear and the pump-rod. This arrangement enables the main frame to be foreshortened and brought into a very compact form, occupying but small space as compared with the main gear-frame of other mills, and it also makes the connection between the gear and the pump-rod on the outside, so as to be readily accessible for repairs or other purposes, and it also enables a continuous and solid bearing to be had for both the wind-wheel shaft and the gear-shaft, making it possible with the construction and arrangement to greatly cheapen the cost as well as to give increased strength and durability. The several advantages which enter into the invention add to the windmill as a whole power, strength, and durability, which are

desirable features in the construction and operation of windmills.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a windmill, the combination of a wind-wheel shaft, an inner hub or mounting and an outer hub or mounting on the wind-wheel shaft, spokes or arms radiating from the inner hub or mounting, an inner and an outer rim, both rims continuous and each rim having a horizontal flange and a vertical flange, both rims attached each by its vertical flange to the radiating spokes or arms, and radial diagonal braces extending from the outer hub or mounting to the outer rim and attached to the hub or mounting and to a flange of the outer rim, the braces alternating with the arms or spokes, substantially as described.

2. In a windmill, the combination of a wind-wheel shaft, an inner hub or mounting and an outer hub or mounting on the wind-wheel shaft, spokes or arms radiating from the inner hub or mounting, an inner and an outer rim, both rims continuous and each rim having a horizontal flange and a vertical flange, both rims attached each by its vertical flange to the radiating spokes or arms, radial diagonal braces extending from the outer hub or mounting to the outer rim, and attached to the hub or mounting and to a flange of the outer rim, the braces alternating with the arms or spokes, and fans attached to the outer and inner rims, substantially as described.

3. In a windmill, the combination of a wind-wheel shaft, an inner hub or mounting and an outer hub or mounting on the wind-wheel shaft, each hub or mounting having a center and radial ears or brackets extending from the center, arms or spokes attached at their inner ends to the ears or brackets of the inner hub or mounting, an outer and an inner rim, both rims continuous and each rim having a horizontal flange and a vertical flange, both rims attached each by its vertical flange to the arms or spokes, and diagonal braces attached at their inner ends to the ears or brackets of the outer hub or mounting and attached at their outer ends to the vertical flange of the outer rim, the braces alternating with the arms or spokes, substantially as described.

4. In a windmill, the combination of a wind-wheel shaft, an inner hub or mounting and an outer hub or mounting on the wind-wheel shaft, each hub or mounting consisting of a center, radial ears or brackets and a plate or facing connecting the ears or brackets, arms or spokes attached at their inner ends to the ears or brackets of the inner hub or mounting and to the facing, an outer rim and an inner rim, both rims continuous and each rim having a horizontal flange and a vertical flange, both rims attached each by its vertical flange to the arms or spokes, and diagonal braces attached at their inner ends to the ears or brackets and the facing of the outer



hub or mounting and attached at their outer ends to the vertical flange of the outer rim, the braces alternating with the arms or spokes, substantially as described.

5 5. In a windmill, the combination of a wind-wheel shaft, an inner hub or mounting and an outer hub or mounting on the wind-wheel shaft, each hub or mounting consisting of a center, radial ears or brackets and a plate or  
10 facing connecting the ears or brackets, arms or spokes attached at their inner ends to the ears or brackets of the inner hub or mounting and to the facing, an outer rim and an inner rim, both rims continuous and each rim  
15 having a horizontal flange and a vertical flange, both rims attached each by its vertical flange to the arms or spokes, diagonal braces attached at their inner ends to the ears or brackets and the facing of the outer hub  
20 or mounting and attached at their outer ends to the vertical flange of the outer rim, the braces alternating with the arms or spokes, and fans attached to the outer and inner rims, substantially as described.

25 6. In a windmill, the combination of a horizontal main frame or support having on its upper face an extended box or bearing for the wind-wheel shaft and an extended box or bearing for the gear-shaft the two boxes or  
30 bearings arranged side by side in a horizontal plane, a fixed arm upwardly and outwardly extending from the main frame or support, and a vibratable arm or lever pivotally mounted at its inner end on the fixed arm and hav-  
35 ing an upward, forward and lateral projection for connection with a wheel or disk on the gear-shaft and a lower forward continuation for connection with a pump-rod for giving the pump-rod its reciprocating move-  
40 ments, substantially as described.

7. In a windmill, the combination of a horizontal main frame or support having on its upper face an extended box or bearing for the wind-wheel shaft and an extended box or  
45 bearing for the gear-shaft, the two boxes or bearings arranged side by side in a horizontal plane, a fixed arm upwardly and outwardly extending from the main frame or support, a vibratable arm or lever pivotally mounted at  
50 its inner end on the fixed arm and having an upward, forward and lateral projection, a pitman connecting the lateral end of the vibratable arm or lever with the disk or wheel on the gear-shaft, and a lower forward exten-  
55 sion of the vibratable arm or lever for attachment thereto of the pump-rod, substantially as described.

8. In a windmill, the combination of a horizontal main frame or support having an extended box or bearing for the wind-wheel shaft and an extended box or bearing for the gear-shaft, the two boxes or bearings arranged  
60 side by side in a horizontal plane, a fixed arm upwardly and outwardly extending from the main frame or support, a wind-wheel shaft mounted in the box or bearing therefor on the main frame or support, a pinion on the

wind-wheel shaft, a gear-shaft mounted in the box or bearing therefor on the main frame or support and having a disk or wheel in mesh  
70 with the pinion of the wind-wheel shaft, a vibratable arm or lever pivotally mounted at its inner end on the fixed arm of the main frame or support and having an upward, forward and lateral projection, a pitman con-  
75 necting the disk or wheel with the lateral end of the vibratable arm or lever, and a lower forward extension of the vibratable arm or lever for attachment to the pump-rod, substantially as described.  
80

9. In a windmill, the combination of a horizontal main frame or support having an extended box or bearing for the wind-wheel shaft and an extended box or bearing for the gear-shaft, the two boxes or bearings arranged  
85 side by side in a horizontal plane, a fixed arm upwardly and outwardly extending from the main frame or support, a wind-wheel shaft mounted in the box or bearing therefor on the main frame or support, a pinion on the  
90 end of the wind-wheel shaft, a gear-shaft mounted in the box or bearing therefor on the main frame or support, a disk or wheel on the end of the gear-shaft in mesh with the pinion of the wind-wheel shaft, a vibratable arm or  
95 lever pivotally mounted at its inner end on the fixed arm of the main frame or support and having an upward, forward and lateral projection, a pitman pivotally connected with the disk or wheel of the gear-shaft and with  
100 the lateral end of the vibratable arm or lever, a lower forward extension on the vibratable arm or lever for attachment to a pump-rod, and a pump-rod reciprocated by the movements of the arm or lever, substantially as  
105 described.

10. In a windmill, the combination of a bearing-head at the top of the tower, a horizontal main frame or support mounted on the bearing-head and having a box or bearing for the  
110 wind-wheel shaft and a box or bearing for the gear-shaft, the two boxes or bearings arranged side by side in a horizontal plane, a fixed arm outwardly and upwardly extending from the main frame or support, a vibratable arm or  
115 lever pivotally mounted at its inner end on the fixed arm and having an upward, forward and lateral projection for connection with the gear wheel or disk on the gear-shaft, and a lower forward extension for connection with  
120 the pump-rod for reciprocating the pump-rod, substantially as described.

11. In a windmill, the combination of a bearing-head at the upper end of the tower, a horizontal main frame or support mounted  
125 on the bearing-head and having a box or bearing for the wind-wheel shaft and a box or bearing for the gear-shaft, the two boxes or bearings arranged side by side in a horizontal plane, a fixed arm upwardly and outwardly  
130 extending from the main frame or support, a wind-wheel shaft mounted in the box or bearing therefor on the main frame or support, a pinion at the end of the wind-wheel shaft, a



gear-shaft mounted in the box or bearing therefor on the main frame or support, a disk or wheel on the gear-shaft in mesh with the pinion of the wind-wheel shaft, a vibratable arm or lever pivotally mounted at its inner end on the fixed arm and having an upward, forward and lateral projection, a pitman connecting the projecting lateral end of the vibratable arm or lever with the disk or wheel of the gear-shaft, a forward extension of the vibratable arm or lever in line with the pump-rod, and a pump-rod connected to the extension of the vibratable arm or lever, substantially as described.

12. In a windmill, the combination of a bearing-head at the upper end of the tower, a horizontal main frame or support mounted on the bearing-head and revoluble thereon and having a box or bearing for the wind-wheel shaft and a box or bearing for the gear-shaft, the two boxes arranged side by side in a horizontal plane and parallel one with the other, a fixed arm upwardly and outwardly extending from the main frame or support, a wind-wheel shaft mounted in the box or bearing therefor on the main frame or support, a gear-shaft mounted in the box or bearing therefor on the main frame or support, a disk or wheel on the gear-shaft revoluble from the wind-wheel shaft, and a vibratable arm or lever pivotally mounted at its inner end on the fixed arm and having an upward, forward and lateral projection for connection with the disk or wheel gear shaft and a forward extension for connection with the pump-rod for

reciprocating the pump-rod, substantially as described.

13. In a windmill, the combination of a main frame or support, a rock-shaft mounted on the main frame or support, an arm on the rock-shaft for turning the vane to throw the mill out of the wind, a second arm on the rock-shaft for advancing and receding a brake block or head with the act of turning the vane to throw the mill out of the wind, a slidable horizontal brake block or head, connected with and operated from the second arm of the rock-shaft and a center or hub for a wind-wheel and having a convoluted face engaged by the acting end of the brake block or head, substantially as described.

14. In a windmill, the combination of a main frame or support, a rock-shaft mounted on the main frame or support, an arm on the rock-shaft for turning the vane to throw the mill out of the wind, a second arm on the rock-shaft, a rod connected with the second arm, a coil-spring encircling the rod, a slidable horizontal brake block or head connected with the rod, and a hub or center for a wind-wheel having a convoluted face engaged by the acting ends of the brake block or head in turning the vane to throw the wheel out of the wind, substantially as described.

GILBERT B. SNOW.

Witnesses:

EDWARD C. LOVELL,  
C. M. HOWARD,  
G. C. LOVELL.