

(No Model.)

2 Sheets—Sheet 1.

C. B. PUTNAM.  
WINDMILL.

No. 515,408.

Patented Feb. 27, 1894.

Fig. 1.

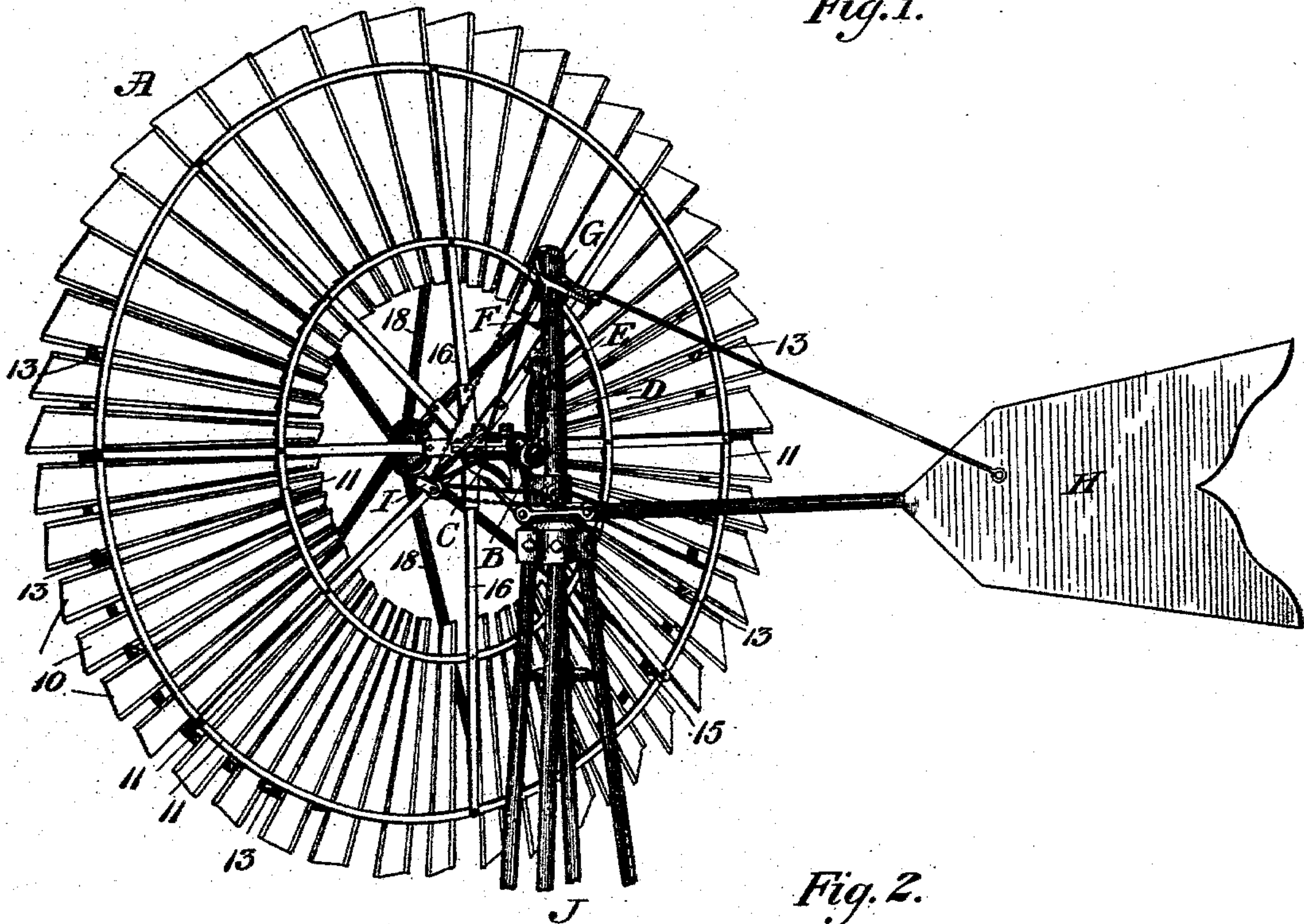
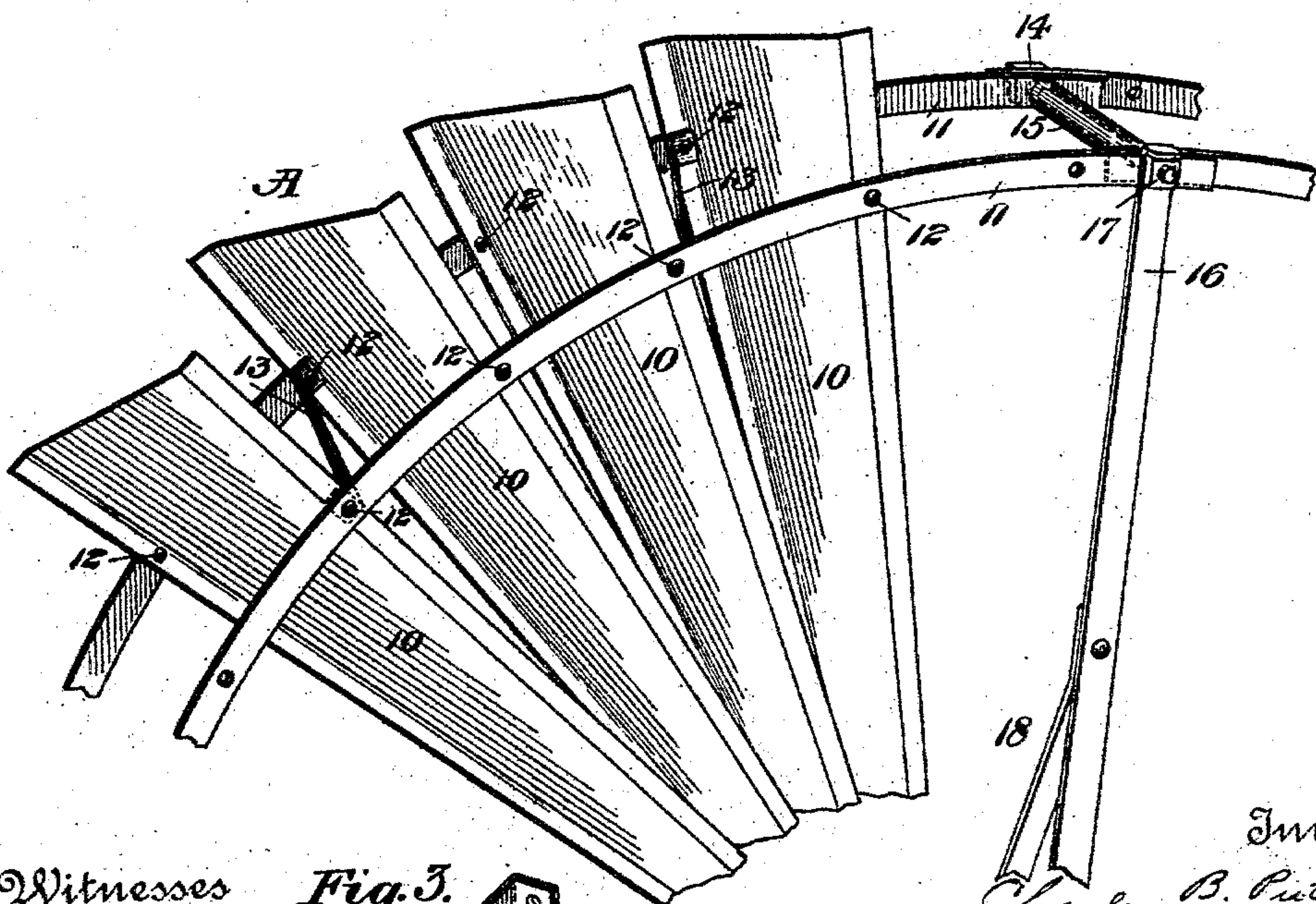
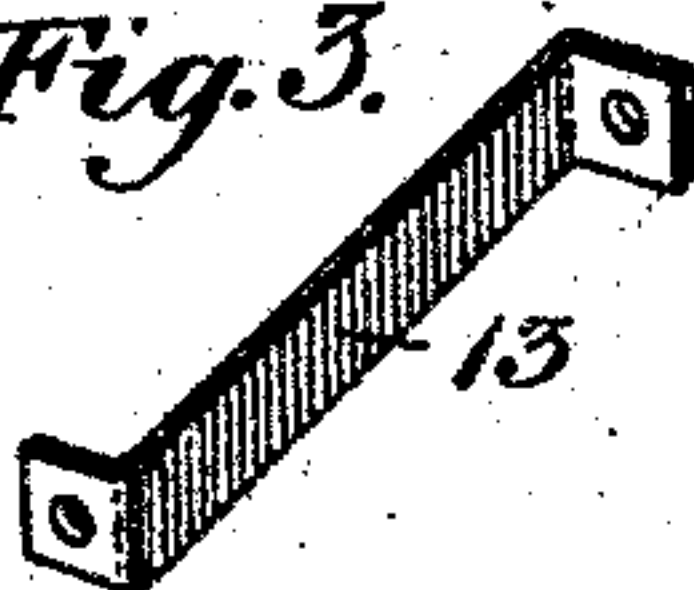


Fig. 2.



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Fig. 3.



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Fig. 4.

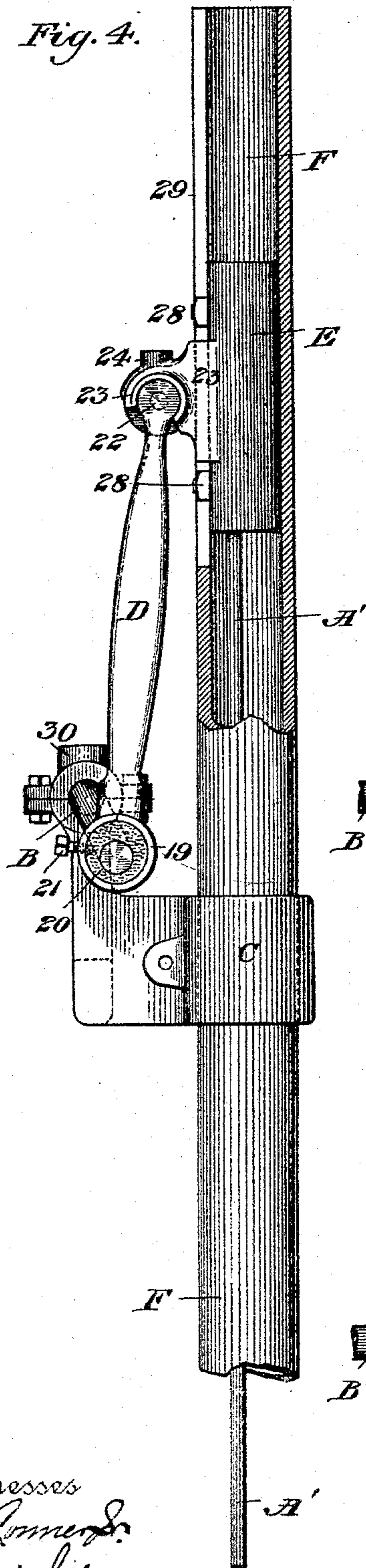


Fig. 7.

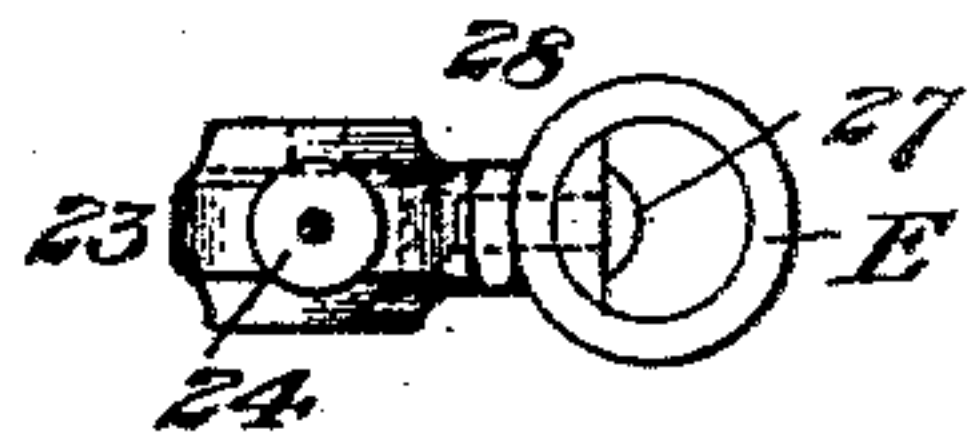


Fig. 8.

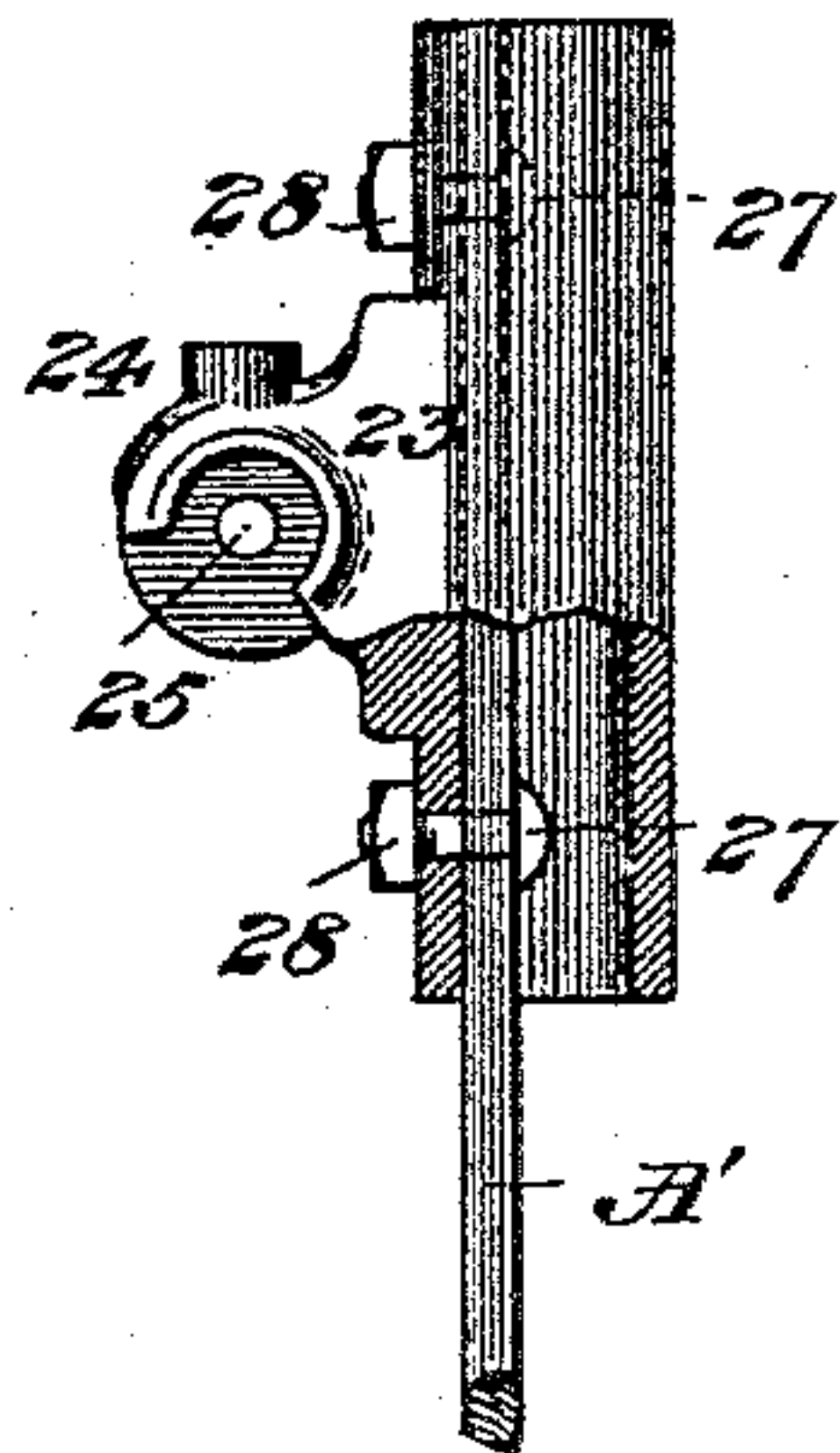


Fig. 5.

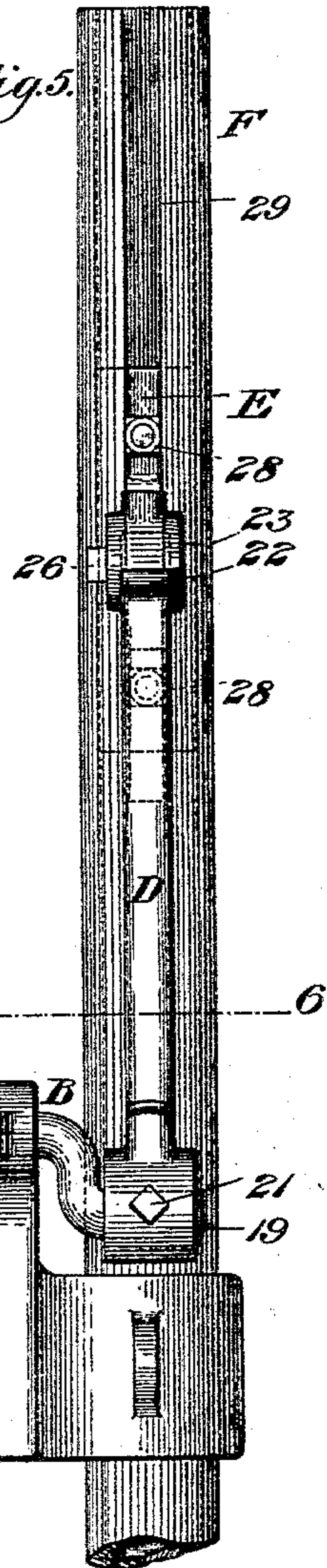
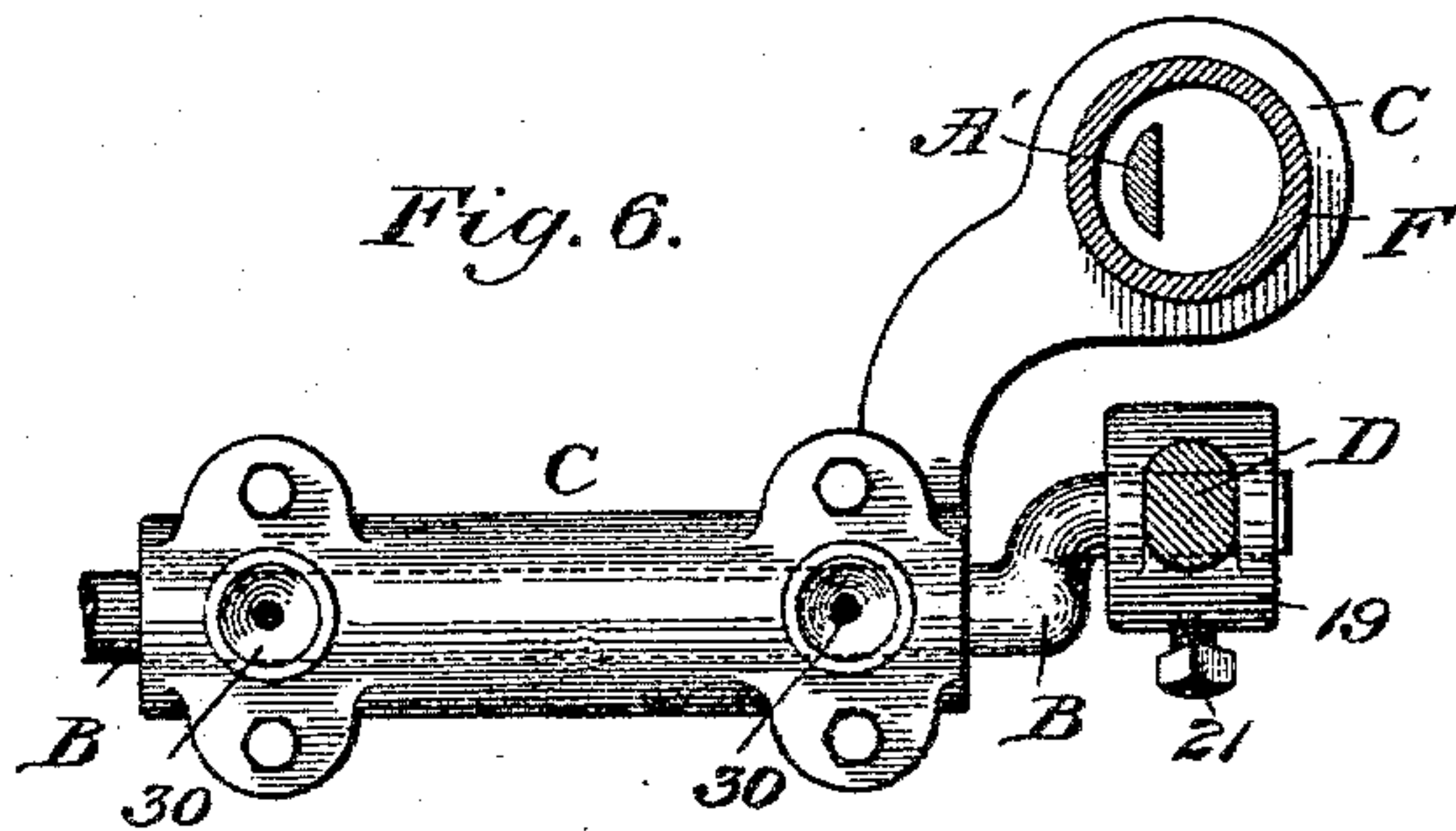


Fig. 6.



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# UNITED STATES PATENT OFFICE.

CHARLES B. PUTNAM, OF MARION, IOWA.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 515,408, dated February 27, 1894.

Application filed March 25, 1893. Serial No. 467,635. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES B. PUTNAM, a citizen of the United States of America, and a resident of Marion, in the State of Iowa, have invented a new and useful Improvement in Windmills, of which the following is a specification.

The first part of this invention consists in trussing a "vertical solid wheel" in a peculiar manner; and the second part of the invention consists in a peculiar "crank-motion," exclusively designed and adapted for employment in windmills, as means for transmitting power from the wheel to a pump-rod, and comprising certain novel combinations of parts, as hereinafter more fully stated.

The objects of the invention are to adapt a metallic solid wheel to be thoroughly braced with the least possible weight; to reduce friction between the wind-wheel shaft and the "pitman-guide" or slide reciprocated by said shaft, and to facilitate making and maintaining a tight joint between said slide and the pump-rod.

Two sheets of drawings accompany this specification as part thereof.

Figure 1 of the drawings is a perspective view of the upper part of a windmill embodying the present improvements. Fig. 2 is a fragmentary perspective view of the wheel, showing its peculiar details. Fig. 3 is a perspective view of one of its diagonal struts detached. Fig. 4 is an end view of the crank-shaft and side views of the pitman, slide, and guide-tube, the latter partly in section, showing the improved crank-motion. Fig. 5 is an elevation projected from Fig. 4. Fig. 6 is a cross-section on the line 6—6 Fig. 5, and a plan view of the parts below this plane shown in Fig. 5. Fig. 7 is a top view of said slide and the attached pump-rod, and Fig. 8 is an elevation, partly in section, projected from Fig. 7.

Like letters and numbers refer to like parts in all the figures.

As shown in Fig. 1, the improved windmill is composed of a "vertical solid wheel" A, a horizontal crank-shaft B on one end of which said wheel is fast, a suitable frame-casting C in which said shaft has its bearings, an upwardly extending pitman D transmitting power from the crank, a slide E reciprocated

by said pitman, a slotted vertical guide-tube F on which said casting C is fast, a cap G on the upper end of said guide-tube, a tail H, supported in part from said cap, and loosely attached to said guide-tube below the casting C, and devices I, which form no part of the present invention, for pulling the wheel A into the wind with the aid of said tail H; the whole being mounted on the upper end of a tower J, which as shown in Fig. 1 is of the improved construction set forth in my Patent No. 406,470, dated July 9, 1889, but for the purposes of the present invention may be of any approved description. The wheel A, in common with some other solid wheels, is composed of several segmental sections, each in turn comprising several radial sails of sheet metal, set obliquely at an effective angle. In the improved wheel the sails 10, Fig. 2, of each section of the wheel, are rigidly connected with each other near their outer ends and also near their inner ends by "segmental rim-sections" 11, in pairs, attached by rivets 12, Fig. 2, to the respective lateral edges of each sail. One or more diagonal struts 13, Figs. 2 and 3, are interposed between the rim-sections of each pair, so as to form in connection with the oblique sails and the rim-sections a "truss," complete in each section of the wheel, and of the requisite rigidity to withstand the maximum wind-pressure. Where the wheel-sections are connected with each other, a through-bolt 14, Fig. 2, at each joint, surrounded by a strut-tube 15, passes through the overlapping ends of the adjoining rim-sections, and at the same time attaches thereto one of the radial ribs 16, Figs. 1 and 2, of which there is one for each inter-section joint; the screw-nuts 17 of said bolts being securely locked in any approved way. The customary front braces 18, Figs. 1 and 2, are attached to the ribs 16 midway between the inner and outer rims of the wheel, and converge from these points to the hub of the wheel, at the outer or front end of its shaft. It will be understood that trusses are formed at the inner rim, shown only in Fig. 1, in precisely the same way as at the outer rim which is shown in detail in Fig. 2, and that there may be a single diagonal strut 12 at mid-width of each section, or two or more, equally distributed, as may be required.



The wheel A may be made fast on the front end of the crank-shaft B in any approved way, and the frame-casting C and its appurtenances may likewise be of any approved construction. To coact with the crank at the rear end of said crank-shaft, the pitman D, has a large cylindrical loop 19, Figs. 4 to 6, at its lower end, provided internally with a wooden bushing 20, Fig. 4, preferably of hard maple, with the grain of the timber running lengthwise of the bushing; and a radial screw 21, tapped into the loop 19 at a convenient point, fastens the bushing 20 securely therein. At its upper end the pitman D is connected with the slide E by a knuckle-joint, Figs. 4, 5, 7 and 8, composed of a strong, nearly solid and nearly circular head 22 on the pitman, a socketed lug 23 on the slide E, having its socket entirely open on one side, as well as open to a sufficient extent lengthwise of the pitman, or at bottom, and provided with an oiling neck 24 at top, and with a central hole 25, Fig. 8, in the closed side of the socket, through which a screw 26, Fig. 5, extends into said head of the pitman, which is drilled and tapped to a sufficient depth to hold the screw, so as to be kept in place thereby. The slide E is otherwise in the form of a hollow cylinder, or tubular, as shown in Figs. 7 and 8; the pump-rod A' is of what is known as half-round iron, with its convex side fitted to the interior of the slide; and the slide and pump-rod are tightly connected by means of a pair of screw-bolts 27, Figs. 7 and 8, having their heads within the slide, and their outer ends provided with square nuts 28 of substantially the same width as the shank of said lug 23. The open-ended vertical slot 29 of the guide-tube F is fitted as to width to said nuts 28 and said shank of the lug 23, which work within the same, as in Figs. 4 and 5, and any loosening of the joint between the slide and the pump-rod is thus effectively prevented, while the joint is one readily made by unskilled persons, and the parts can be separated and re-assembled without any danger of their failing to keep tight after being once loosened. The wooden bushing 20 is thoroughly saturated with oil before its insertion in the loop 19 of the pitman D, and then requires no further attention until it is so worn as to require renewal, making meanwhile a noiseless and frictionless "box" for the wrist of the crank. Oil is supplied occasionally to the cups 30 of the shaft-bearing formed on the casting C, and to the neck 24 of the knuckle-joint between the pitman D and the slide E, as it may be required.

Having thus described the said improvement in windmills, I claim as my invention

and desire to patent under this specification—

1. In a vertical solid wind-wheel made in sections, the combination with the oblique sails of segmental rim-sections in pairs near the outer and inner ends of the sails, rivets rigidly uniting said rim-sections with both lateral edges of the several sails, and diagonal struts interposed between the rim-sections at angles the reverse of those of the sails, whereby each section of the wheel is converted into a truss, substantially as hereinbefore specified.

2. The combination, in a solid vertical wind-wheel of oblique sails arranged radially in customary manner, segmental rim-sections riveted fast to both edges of each sail, and diagonal trussing struts interposed between the rim-sections and attached by the rivets which unite the rim-sections with the sails, substantially as hereinbefore specified.

3. The combination, in a vertical solid wind-wheel, of oblique sails arranged radially in customary manner, segmental rim-sections riveted to both lateral edges of each sail, diagonal trussing struts interposed between the rims and extending from the front edge of one sail to the rear edge of an adjoining sail, through-bolts at the joints between successive rim-sections, strut-tubes surrounding said bolts between the rim-sections at each joint, and radial ribs attached to the rim-sections at the respective joints by means of said bolts, substantially as hereinbefore specified.

4. In a windmill, a power-transmitting pitman having a nearly circular and nearly solid head, in combination with a slide having a socketed lug the socket of which is open at one side and partly open at bottom, in the direction of the length of the pitman, and is provided on top with an oiling neck and in its closed side with a central opening, and a screw passing through said opening into a tapped hole in said head of the pitman, substantially as hereinbefore specified.

5. In a windmill, the combination with a power-transmitting pitman of a tubular slide, a pump-rod attached to said slide by outwardly extending screw-bolts having square nuts at their outer ends, and a guide-tube having an open-ended vertical slot fitted as to width to said nuts, and which coacts with said nuts when the parts are assembled, to keep them from unscrewing, substantially as hereinbefore specified.

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