

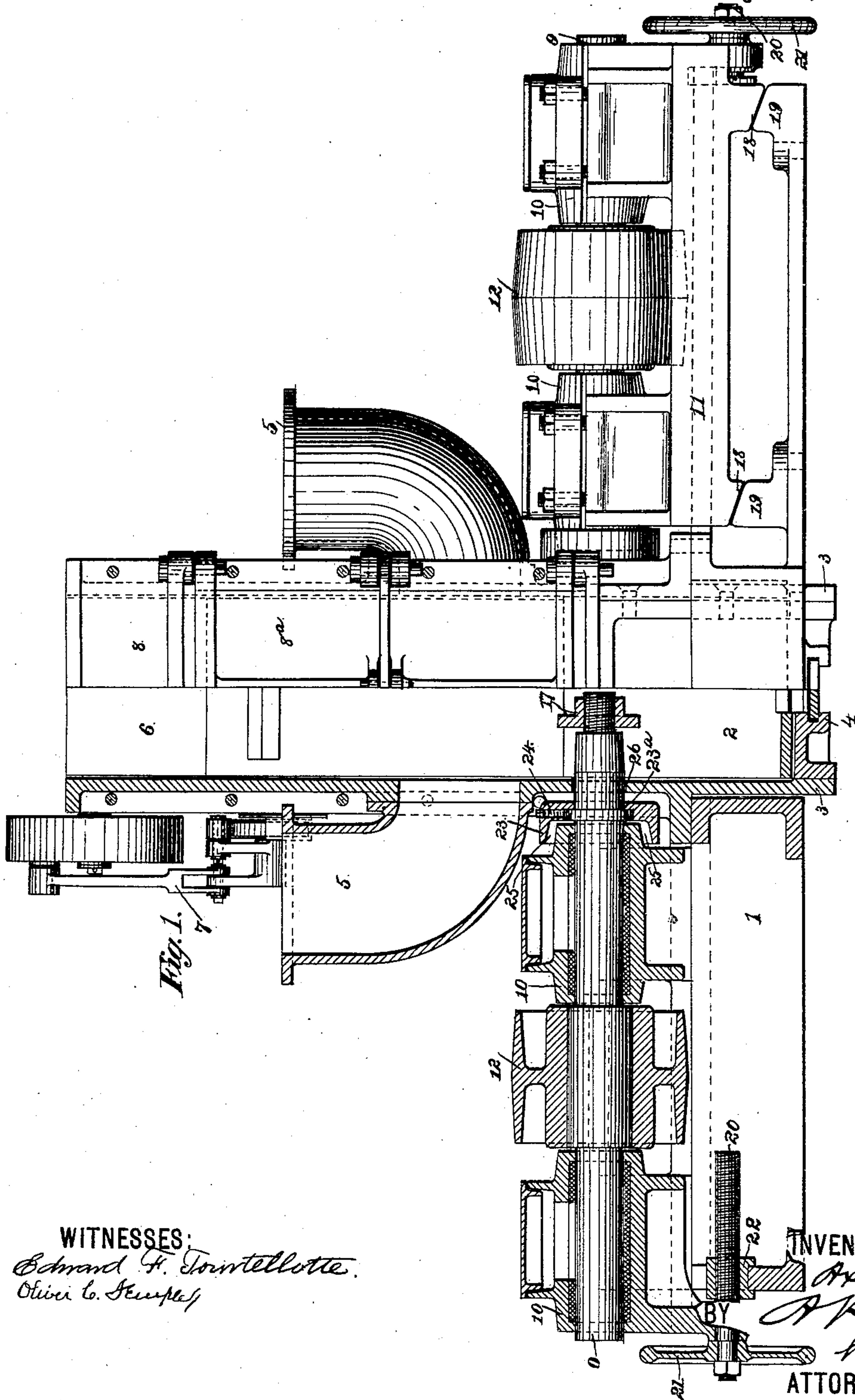
(No Model.)

4 Sheets—Sheet 1.

A. SAHLIN.
PULVERIZING MACHINE.

No. 475,471.

Patented May 24, 1892.



(No Model.)

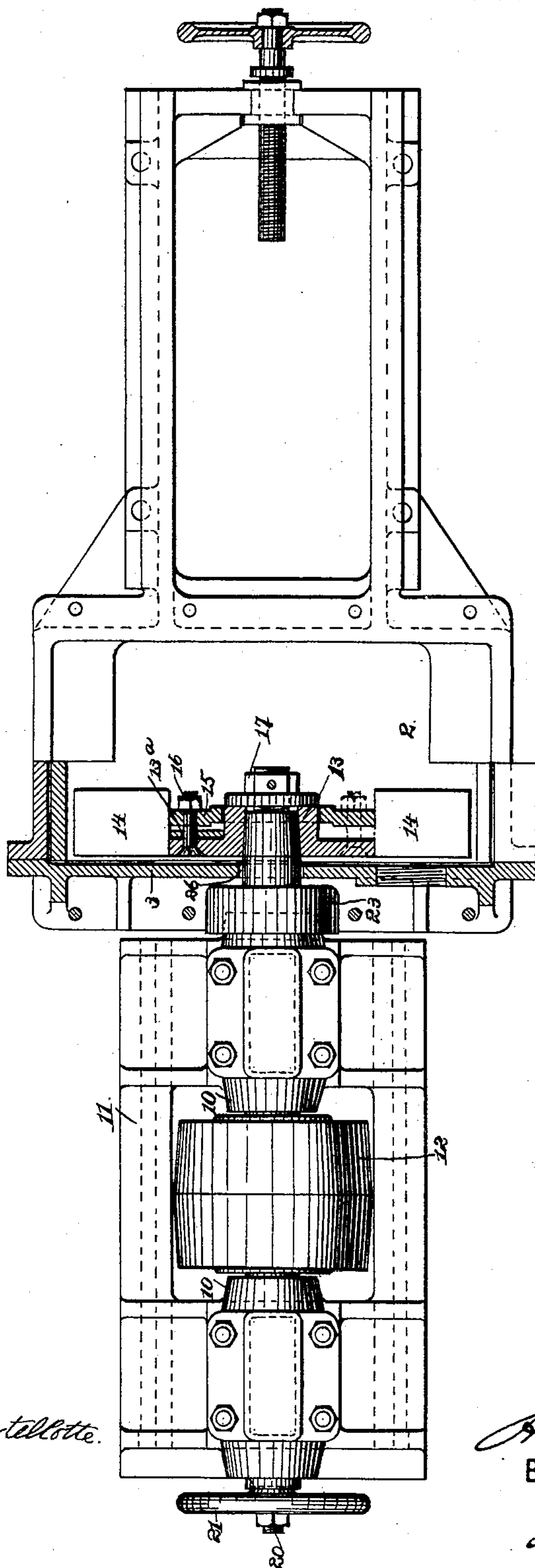
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Fig. 2.



WITNESSES:

Edmond H. Tomtellotte.
Oliver C. Kumpfer.

INVENTOR

Axel Sahlin
BY *P. P. Smith*
his ATTORNEY

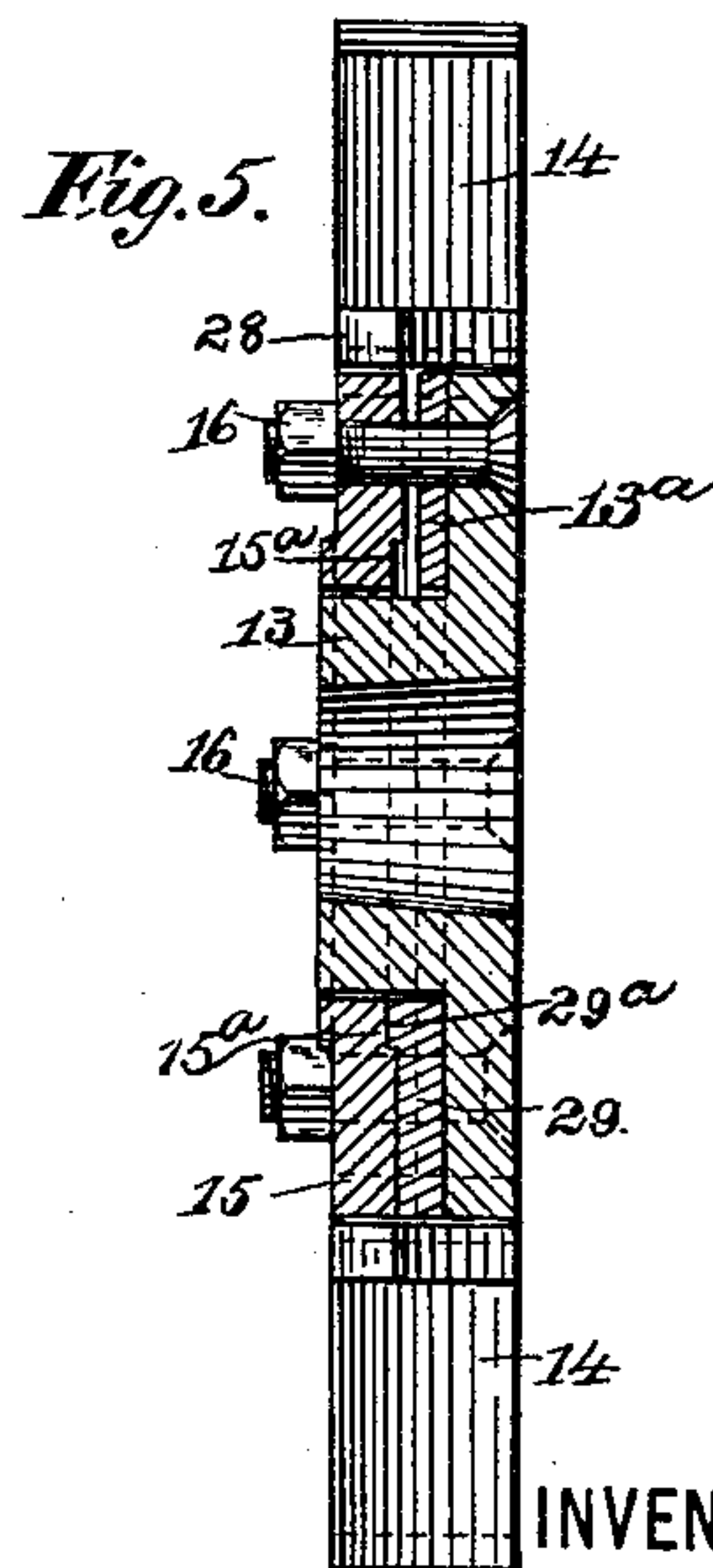
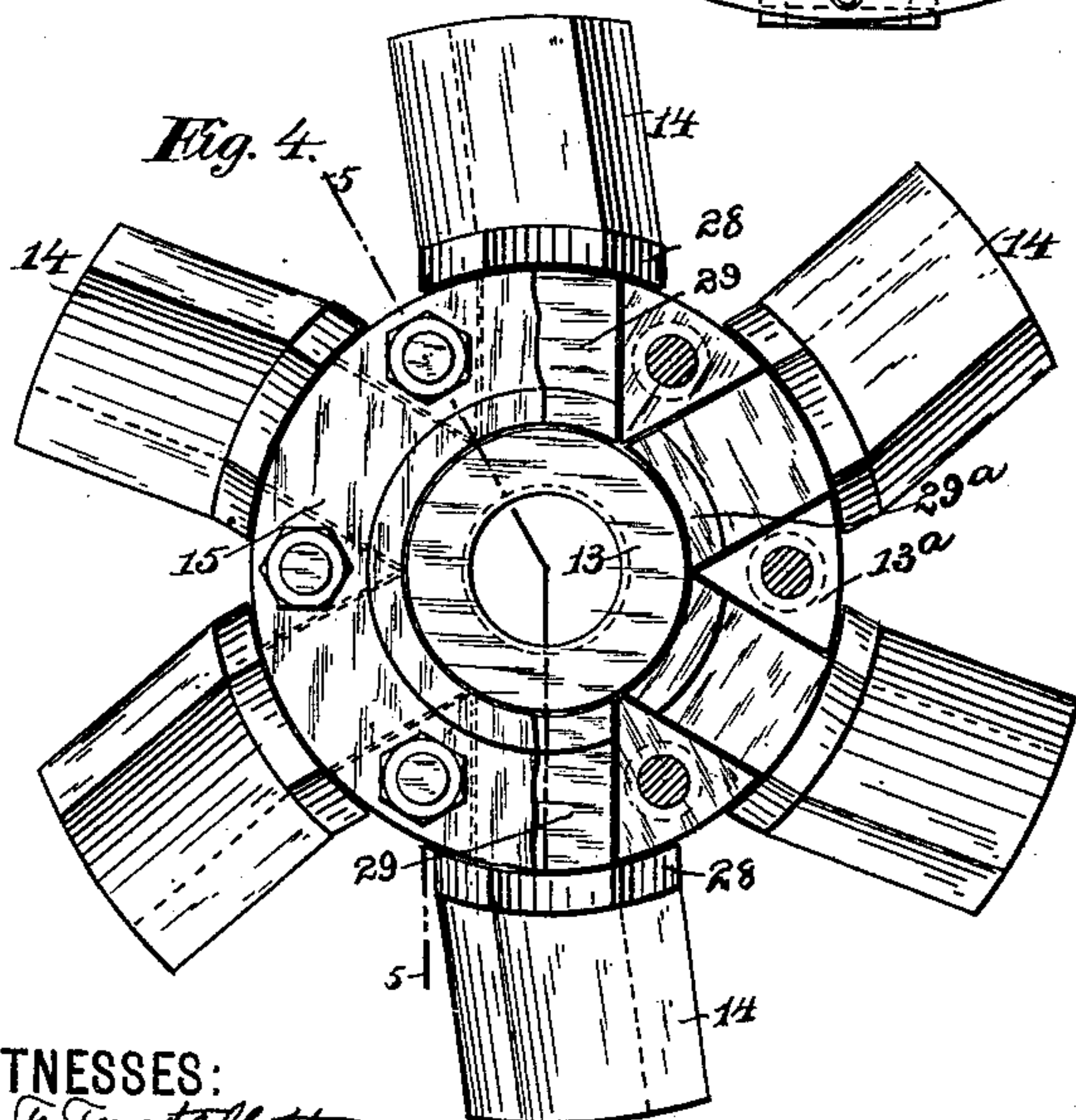
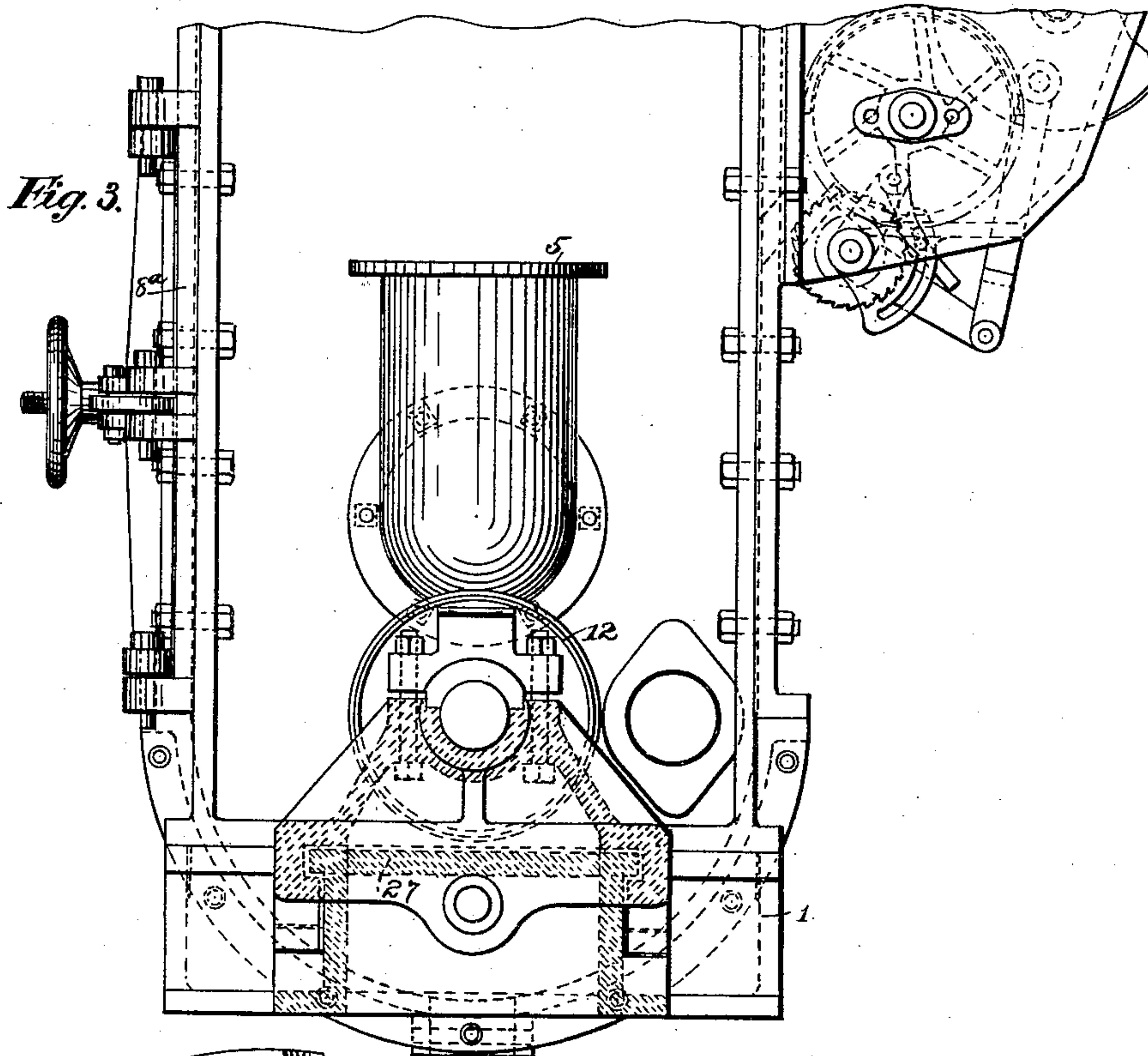
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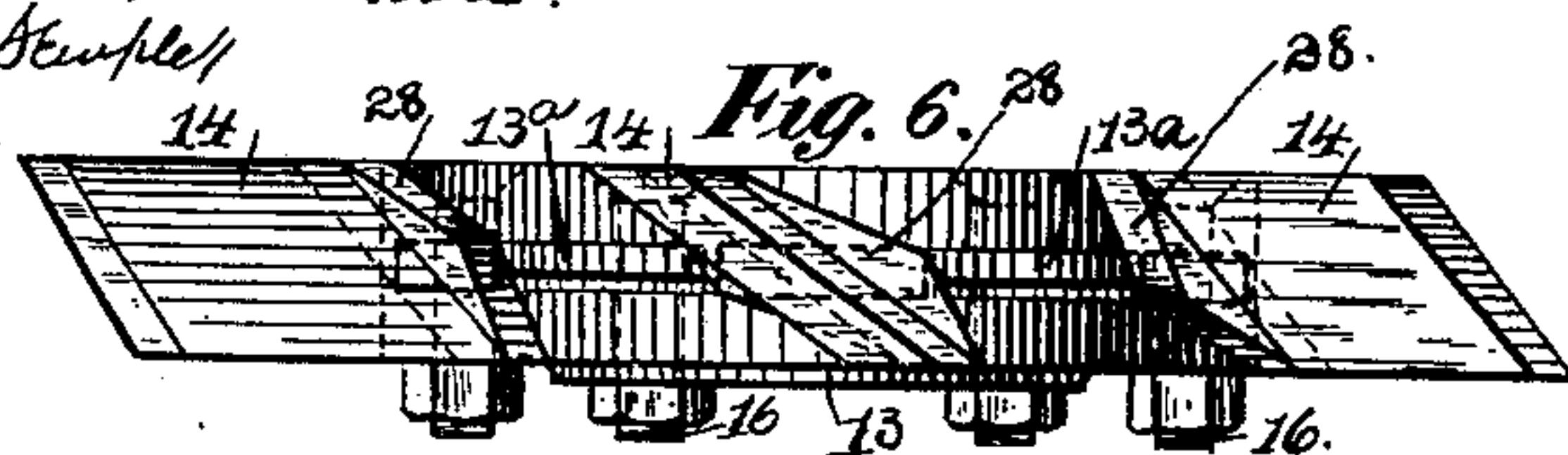
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WITNESSES:
Edmond F. Tomtelotte.
Oliver C. Stimpert.



INVENTOR

Axel Sahlén
BY *R. P. Smith*
his ATTORNEY.

(No Model.)

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A. SAHLIN.
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Fig. 8.

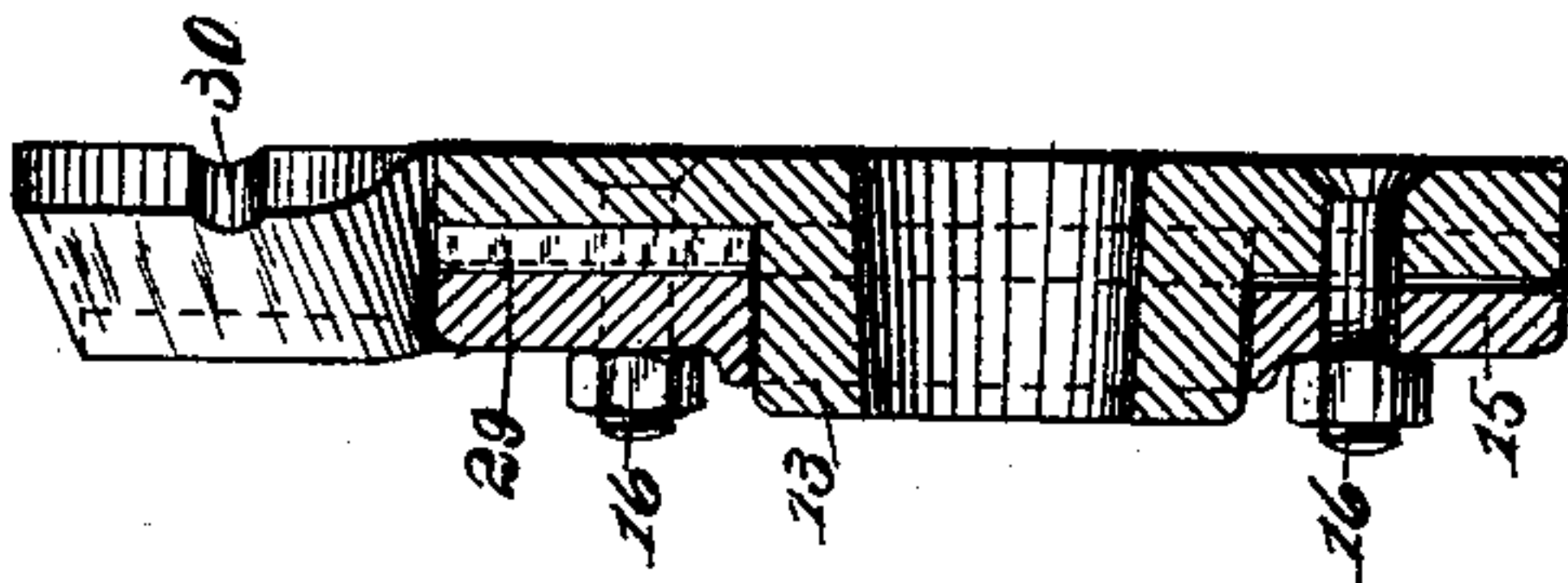


Fig. 7.

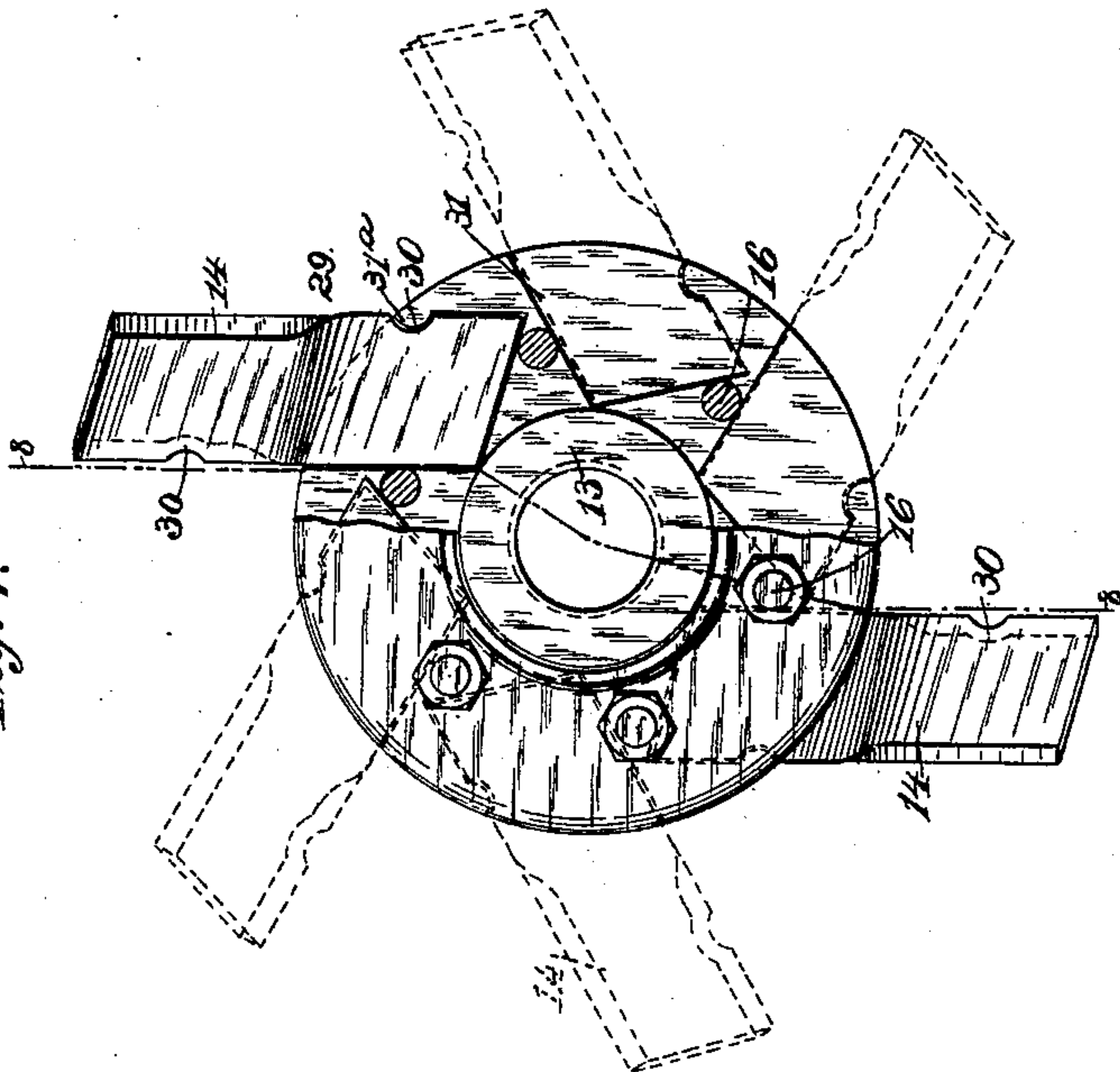
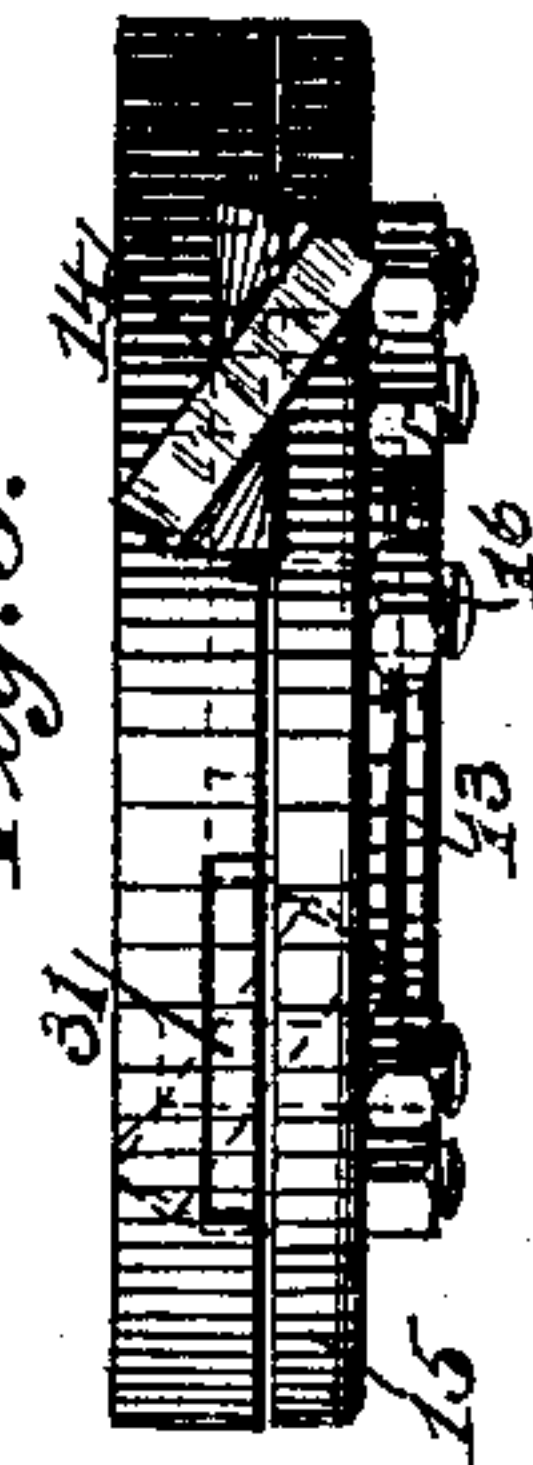


Fig. 9.



WITNESSES:

Edmond F. Tourtellotte.
Oliver C. Skemples

INVENTOR

Axel Sahlin
BY R. P. Smith
his ATTORNEY

UNITED STATES PATENT OFFICE.

AXEL SAHLIN, OF NEW BRIGHTON, ASSIGNOR TO THE CYCLONE PULVERIZER COMPANY, OF NEW YORK, N. Y.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 475,471, dated May 24, 1892.

Application filed August 14, 1891. Serial No. 402,617. (No model.)

To all whom it may concern:

Be it known that I, AXEL SAHLIN, a citizen of the United States, residing at New Brighton, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Pulverizing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of pulverizing-machines in which two sets of beaters are caused to revolve in opposite directions in a pulverizing-chamber.

In the drawings, Figure 1 is a side elevation and half-central vertical section of a machine with my improvements attached thereto. Fig. 2 is a plan view and partial section with the shaft and bearings removed upon one side. Fig. 3 is an end elevation. Fig. 4 is a front elevation of the hub and beaters with part of the follower-plate broken away. Fig. 5 is a longitudinal section on line 5 5 of Fig. 4 of the hub with beaters in place. Fig. 6 is a plan view of same. Figs. 7, 8, and 9 illustrate modifications.

In machines of this kind it has been found desirable to have the two oppositely-placed sets of beaters work as closely together as possible and to make the pulverizing-chamber as narrow as possible, so that there may be little or no waste space; but as the beaters have frequently to be taken off it has heretofore been necessary to leave enough space between the two sets to enable one to be slipped off over the end of its shaft for removal and repairs. To avoid this difficulty and to improve the machine in various other points, I have invented the construction illustrated in the accompanying drawings, in which—

1 represents the bed of the machine.

2 is the pulverizing-chamber formed by the plates 3 3 and 8 8, fastened together in any suitable manner, with the bottom plate 4. The inlets or feed-openings 5 5 admit the stuff to the pulverizing-chamber 2, where it is knocked down by the beaters into a fine pow-

der and driven out through the uptake 6, 50 which is really a continuation of the pulverizing-chamber.

7 is a portion of the feed-controlling apparatus, of well-known construction, and 8^a is a door by which the interior of the pulverizing-chamber may be inspected and the beaters removed, if necessary.

9 9 are two oppositely-revolving shafts upon which the beaters are mounted. Each of these shafts has two journal-bearings 10 10, 60 and these are connected by parts forming one casting 11, as shown in Fig. 2. This casting rests upon and overhangs a horizontal table-bearing 27. It also has oblique faces 18 18, which may be forced against oblique counter-bearings 19 65 19 by the action of the screw 20, turned in the nut 22 by twisting the hand-wheel 21. The belt-pulley 12 revolves the shaft 9 at a rapid rate, and upon the inner tapering end of said shaft is mounted the hub 13, held in place by 70 the nut 17. The beaters 14 are held in place by the follower-plate 15 and bolts 16. The shaft 9 projects through an opening 26 in the side of the pulverizing-chamber. Said opening is slightly larger than the shaft, so that 75 the plate 3 does not touch the shaft. Upon the shoulder 23^a upon said shaft is mounted the cup-shaped collar 23, held in place by the set-screw 24. This collar overhangs the adjacent end of the journal-bearing 10 and 80 forms an annular space 25 around the same, which may be filled with stiff grease. The beaters 14 are all twisted at an angle to the plane of their rotation and are bent forward at a considerable angle to the radii of 85 the hubs, so as to overcome in part centrifugal force in the particles subjected to the impact of the beaters, and by throwing the stuff to the center retain it longer in the zone of action of the beaters. These beaters may be 90 made in several ways. In Figs. 4 to 6 they are represented with flanges 28, which fit down upon the hub, and shanks 29, which go in between the hub and the follower-plate 15. The shanks have toes 29^a, which catch in a 95 ring-shaped depression 15^a in the follower-plate, and so the beaters are kept from flying off. The sector-shaped pieces 13^a keep the beat-

ers spaced at the right distance apart. The bolts 16 pass through the spacing-pieces 13^a and not through the beaters, so that all weakening of the latter is avoided.

5 In the modification illustrated in Figs. 7, 8, and 9 the beater 14 is made reversible. Fig. 8 is a section on line 8 8 of Fig. 7. The beater is made of two parts twisted at an angle one to the other and each part having a depression or projection 30. Either end may be
10 used as the shank 29 of the beater and the other end will then be the blade. The hub has depressions 31, whose outlines have projections or depressions 31^a, interlocking with
15 the depressions or projections 30 in the beater, so that when the follower-plate 15 has been bolted on the beaters are securely held in place.

From the foregoing description of parts the
20 method of operation of my invention will be readily understood. The stuff fed into the chamber 2 is pulverized to fine dust in the manner well known in machines of this character. As the shaft 9 does not touch the
25 plate 3, forming the side of the chamber, there is no wear at that point. The dust which sifts through is prevented from getting into the journal-bearing by the cup-shaped collar 23 and the mass of grease which it contains.
30 When it is desired to remove the beaters, the nut 17 is taken off and the shaft withdrawn by turning the hand-wheel 21. The beaters can then be lifted out of the pulverizing-chamber through the door 8^a. When replaced,
35 the shaft is forced back again and the oblique surfaces 18 18, coming against the oblique counter-bearings 19 19, the casting 11 is forced up against the under side of the horizontal bearing-table 27 and a perfect alignment of
40 shafts with freedom from vibration and chattering parts is secured. The beaters may be readily removed from the hub by taking off the follower-plate 15, and when in the form illustrated in Figs. 7, 8, and 9 they may be
45 shifted end for end when worn, thus giving them a double life.

The advantages of my invention are that while the beaters nearly fill the narrow pulverizing-chamber, revolving within a few
50 inches of each other, the width of said chamber being little more than the sum of the widths of the two sets of beaters, any set of beaters may be readily withdrawn for repairs, balancing, or replacing by simply withdrawing the shaft. On replacing the beaters
55 or substituting new ones the shaft journal-bearings can quickly be brought to a solid bearing and perfect alignment. There is little chance for the dust from the pulverizing-chamber to get into the journal-bearings and
60 cut them out. The beaters act in the most effective manner possible upon the stuff, cannot get loose or fly off and wreck the machine,

and yet can be readily taken out and reversed or replaced when worn.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a pulverizing-machine, the combination of the shaft, the two journal-bearings for
70 said shaft cast in one piece, the horizontal bearing for said casting, the oblique counter-bearings, and the screw which gives an endwise motion to said casting, substantially as described.

2. In a pulverizing-machine, the combination of a narrow pulverizing-chamber, two sets of beaters oppositely placed in and almost filling said chamber, two oppositely-rotating
80 shafts upon which the said beaters are mounted, the two journal-bearings for each of said shafts, which are cast in one piece, the horizontal bearing for each of said castings, the oblique counter-bearings, and the screws
85 which give endwise motion to said castings, substantially as described.

3. In a pulverizing-machine, the combination of the pulverizing-chamber, an opening in said chamber, a horizontal shaft which projects through said opening, but does not fill
90 the same, a journal-bearing for said shaft outside of the chamber, and a cup-shaped collar on said shaft which overhangs and surrounds the end of said journal-bearings nearest to said pulverizing-chamber, substantially
95 as described.

4. In a pulverizing-machine, the combination of a hub which has recesses formed in its face, beaters whose shanks fit into said recesses, and a follower-plate which is held
100 against the face of the hub by bolts which pass through the spaces intermediate between the recesses, substantially as described.

5. In a pulverizing-machine, the combination of a hub which has recesses formed in
105 its face, two or more beaters whose blades are set at an angle to their plane of rotation and which are bent forward at an angle to the radii of the hub, and a follower-plate which is held against the face of the hub by bolts
110 which pass through the spaces intermediate between the recesses, substantially as described.

6. In a pulverizing-machine, a reversible beater composed of two parts set at an angle
115 one to the other and each part provided with a recess by which it may be gripped in the hub when used as a shank, substantially as described.

In testimony whereof I affix my signature in
120 presence of two witnesses.

AXEL SAHLIN.

Witnesses:

O. C. SEMPLE,
H. L. LUQUES.