

E. S. MOSS.
AMALGAMATOR.
APPLICATION FILED MAR. 23, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

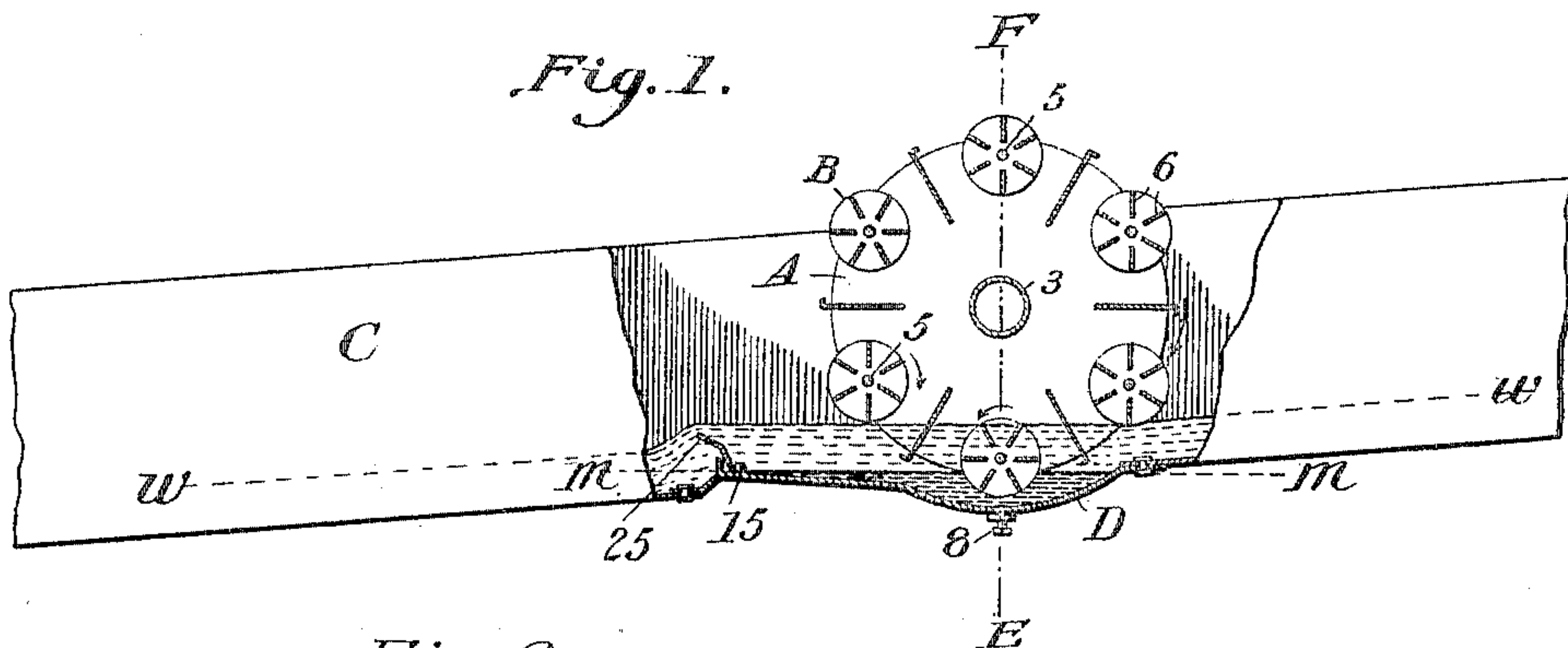


Fig. 2.

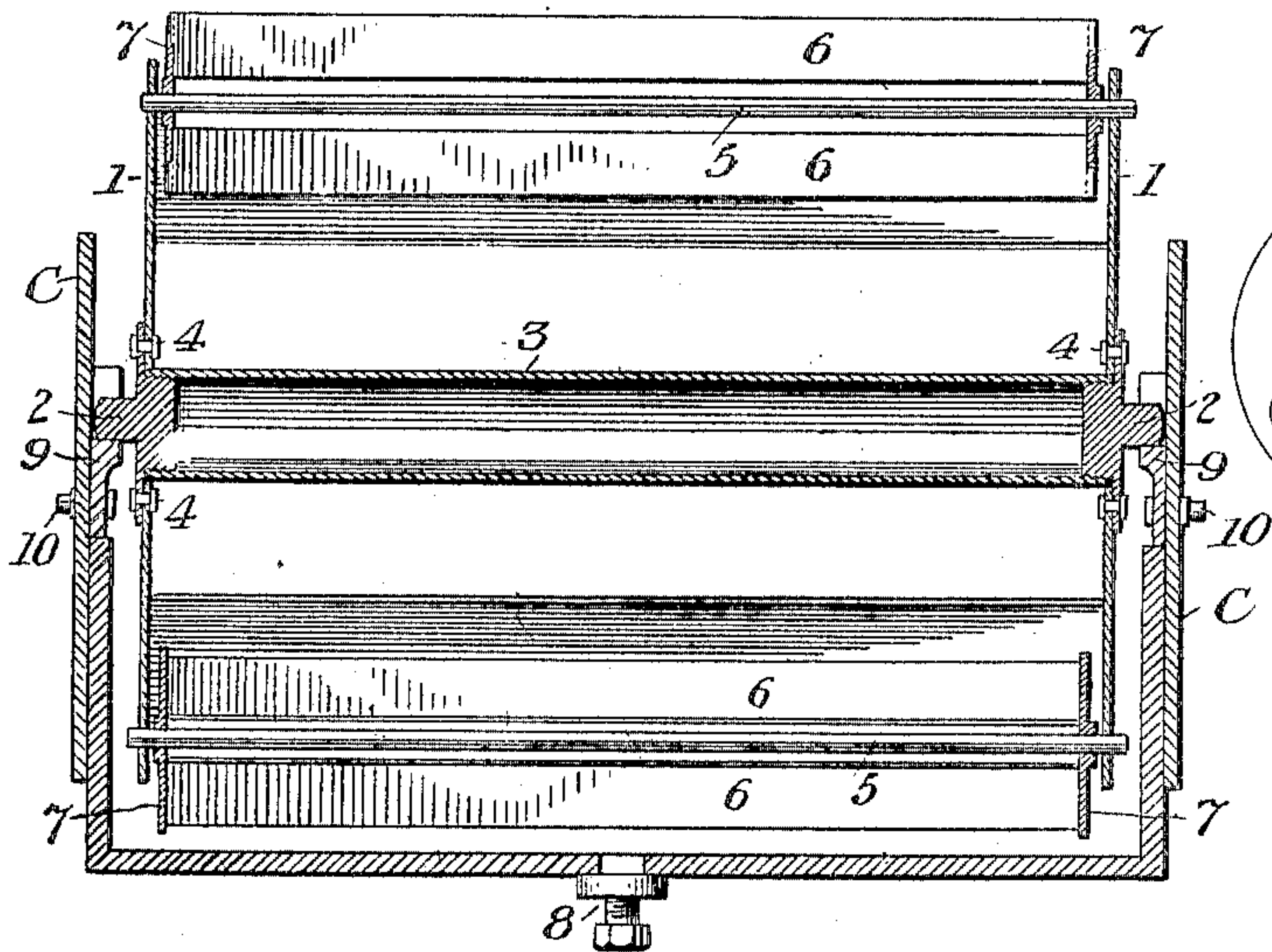


Fig. 3.

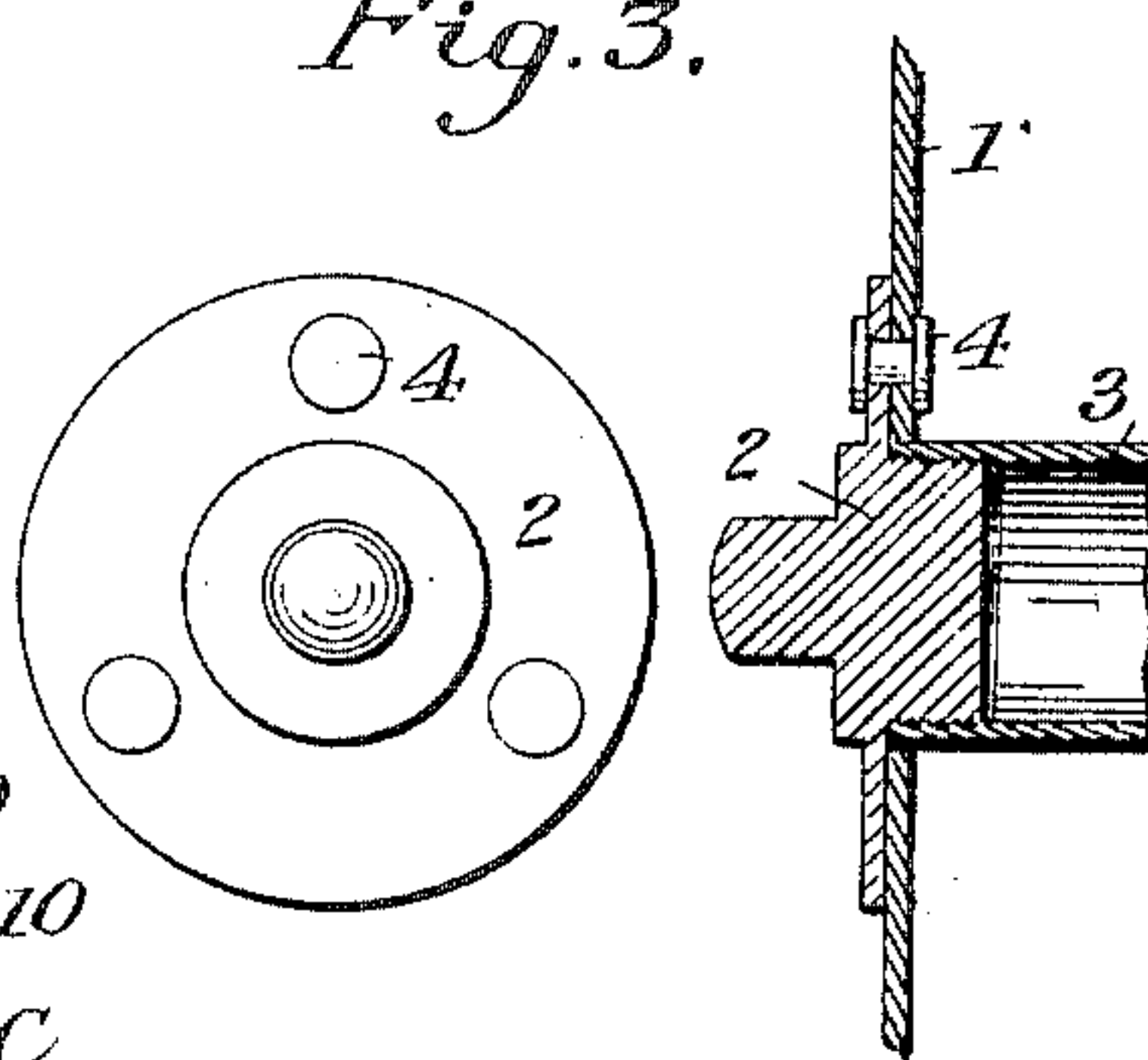


Fig. 4.

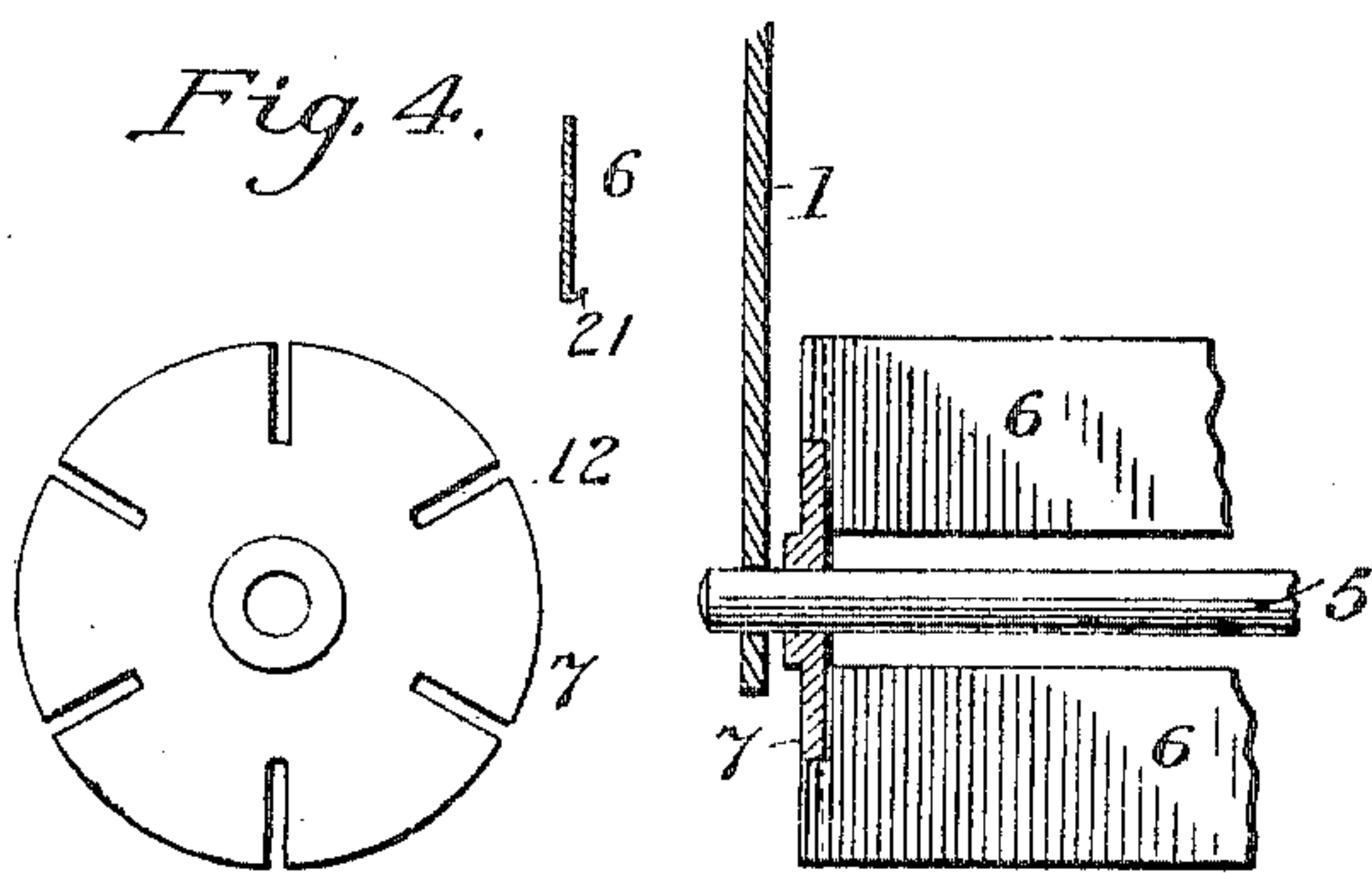
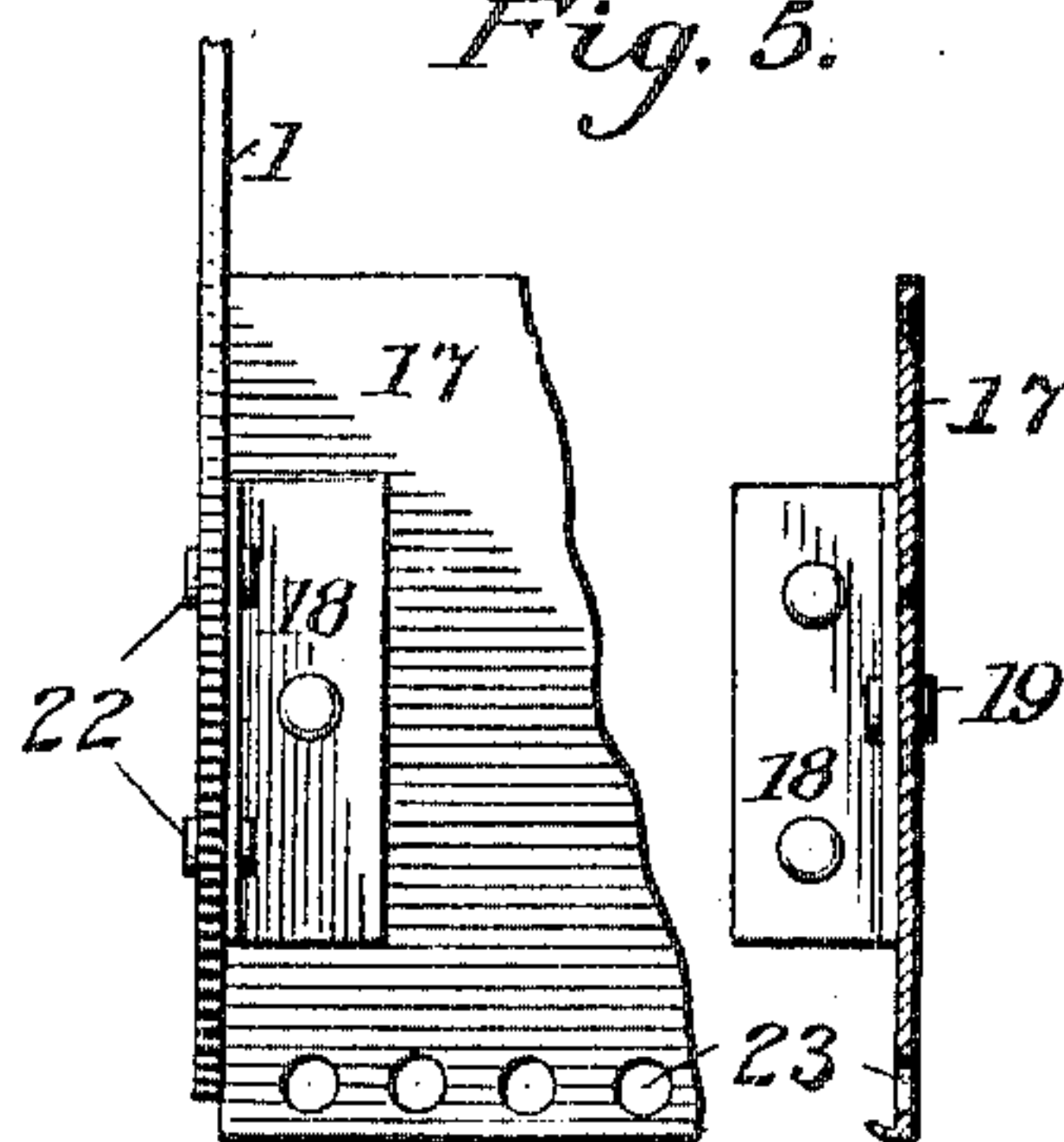


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

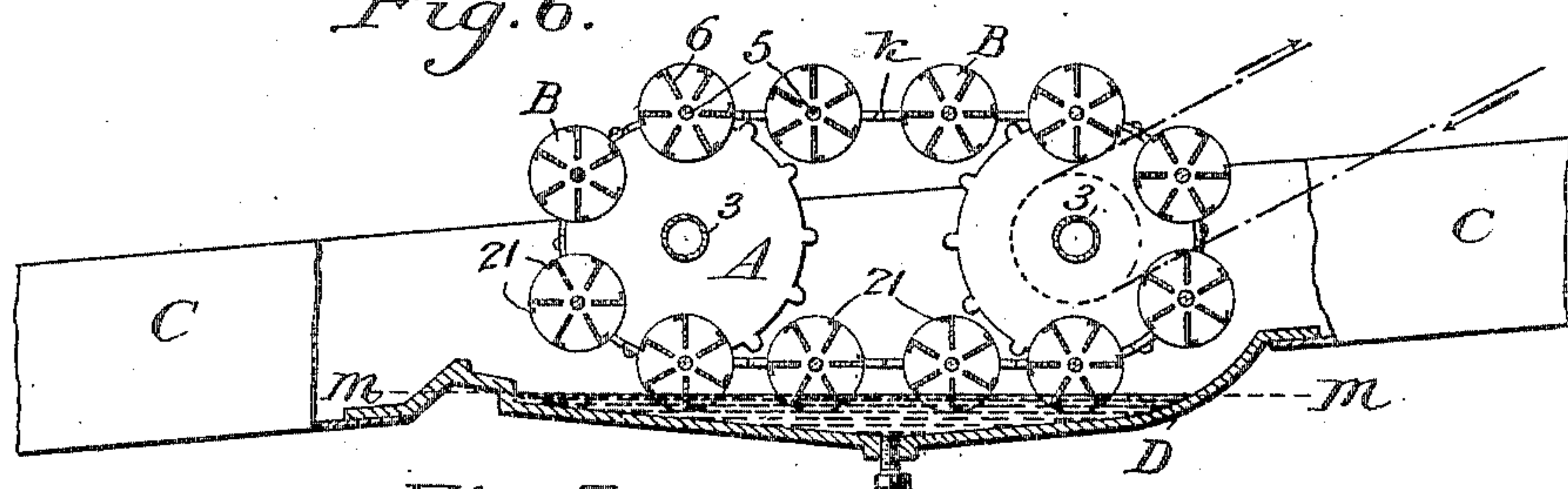


Fig. 7.

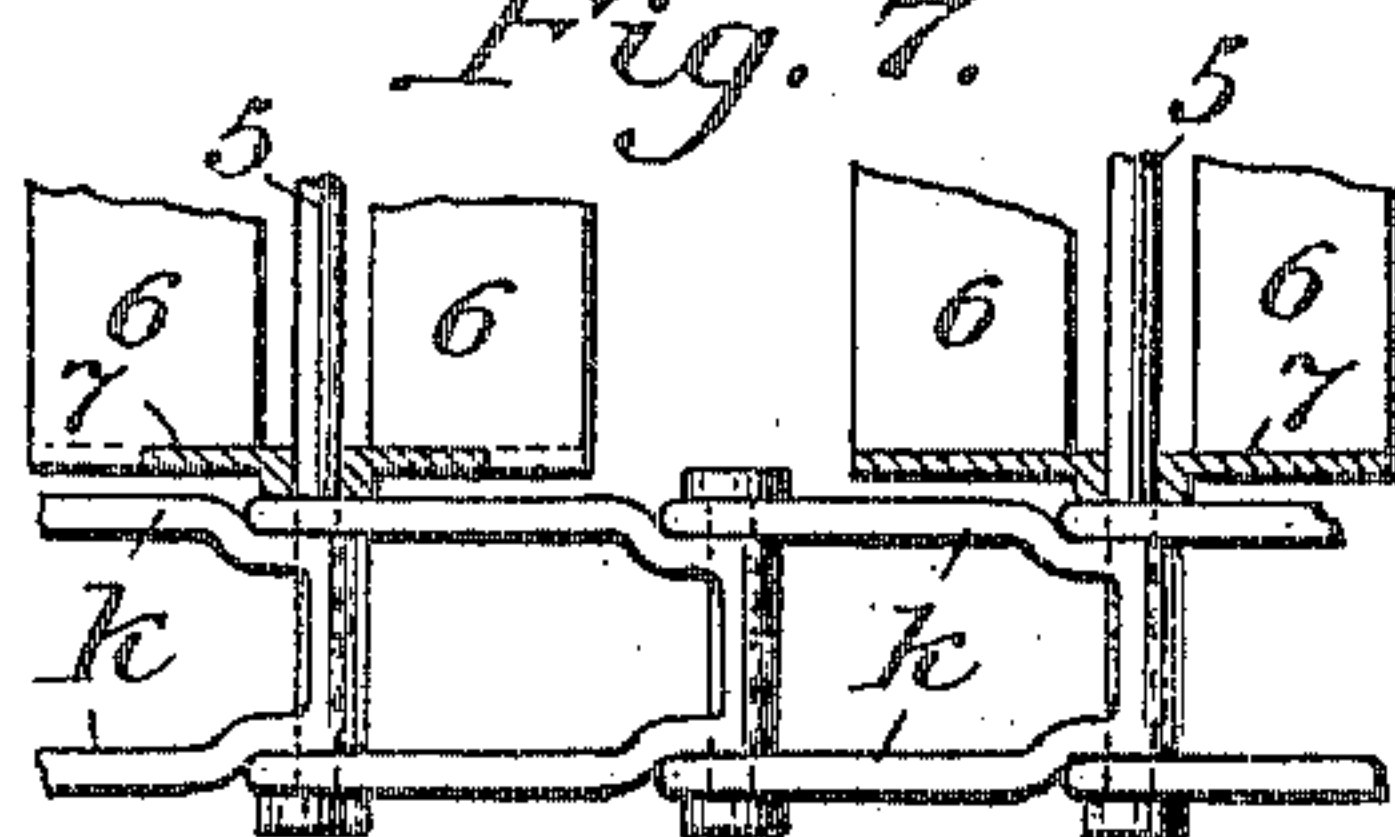


Fig. 8.

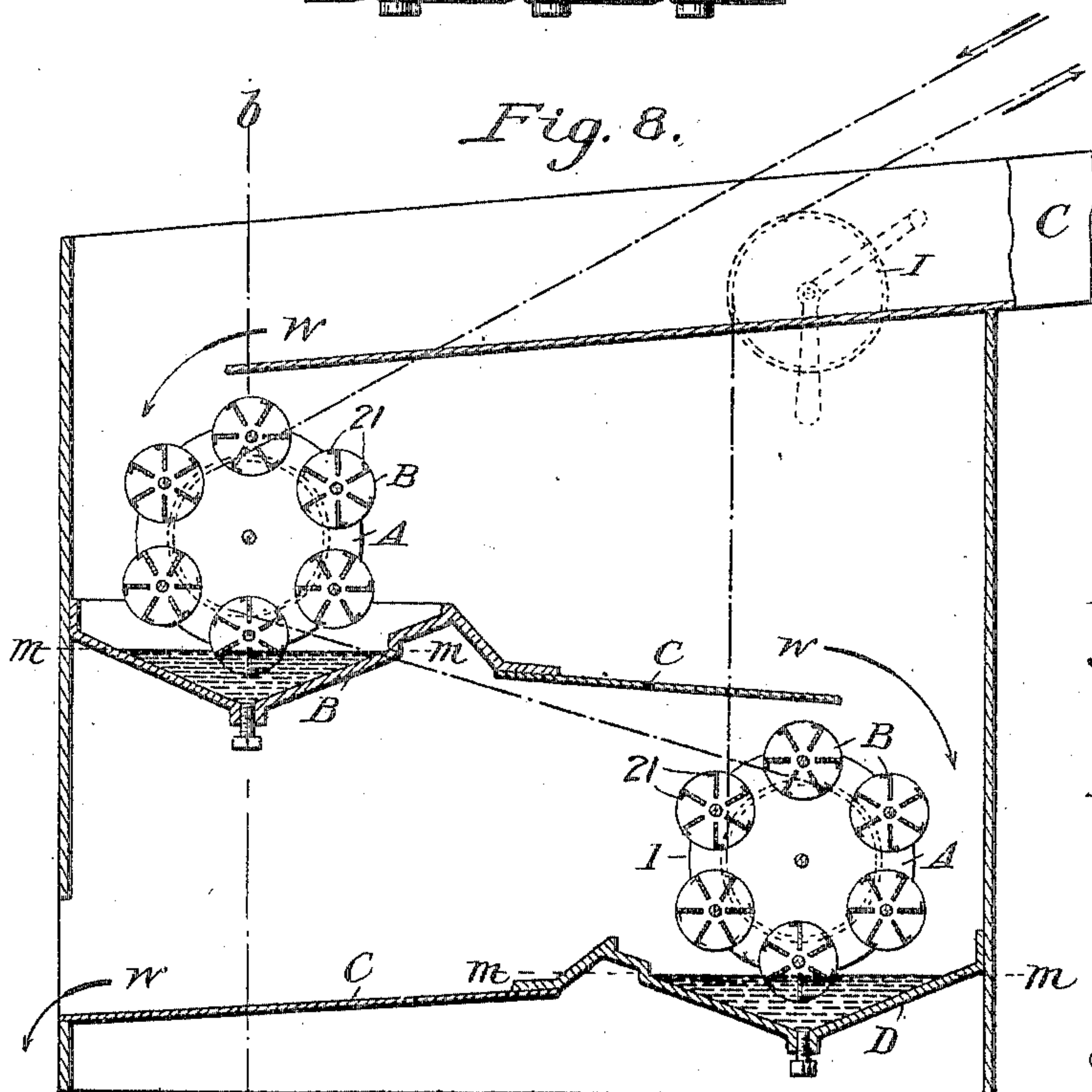
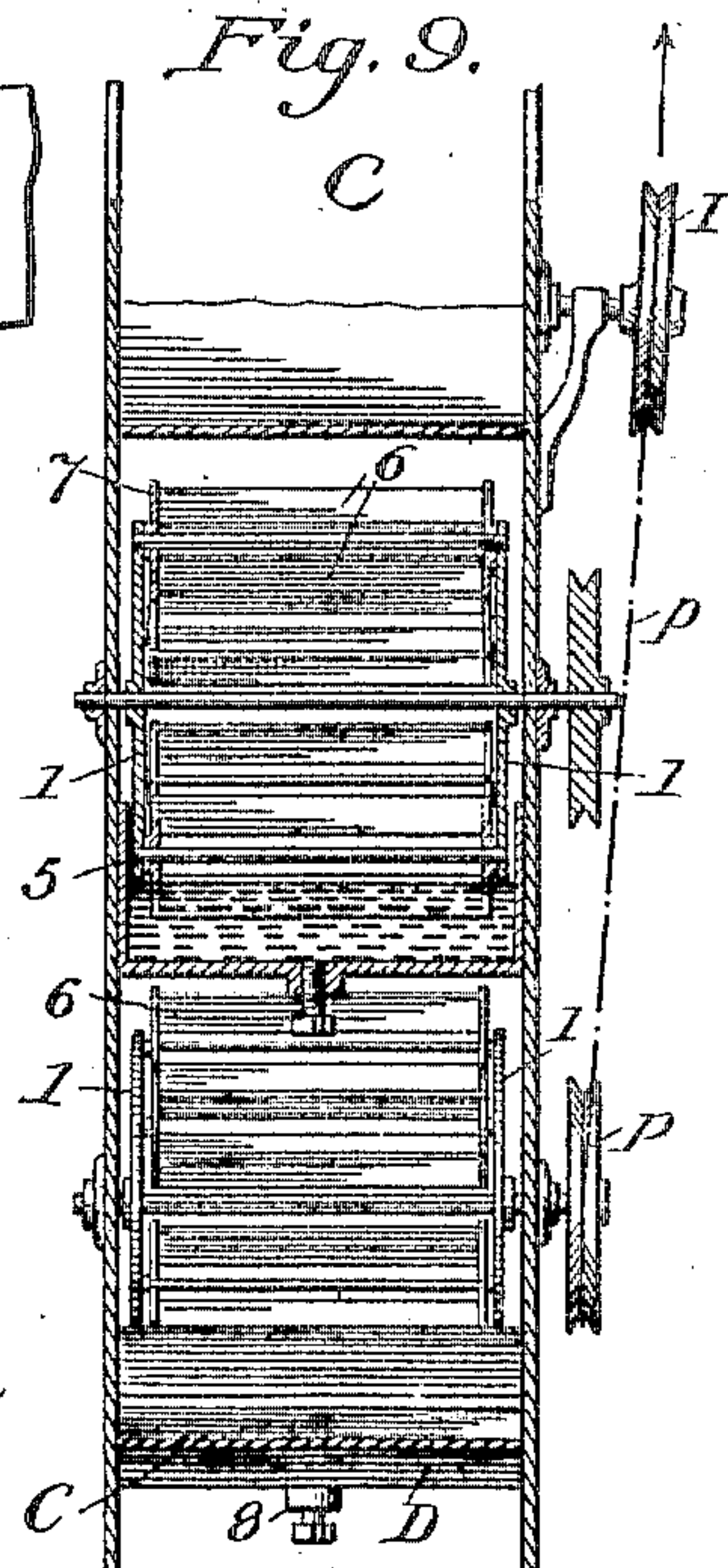


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDMUND S. MOSS, OF CHICAGO, ILLINOIS.

AMALGAMATOR.

No. 797,740.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed March 23, 1903. Serial No. 149,159.

To all whom it may concern:

Be it known that I, EDMUND S. MOSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Amalgamators, of which the following is a specification, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding characters of reference in the different figures indicate like parts.

The object of my invention is to provide a simple and inexpensive amalgamator which shall be so constructed as to enable the amalgamated plates to be continuously and automatically recharged by contact with the mercury as well as to be brought into active contact with the slimes or material passing through the sluice in such a way as to present a maximum area of amalgamated surface to said material while tending but little to impede its passage, thereby enabling the maximum values to be saved while increasing the amount of material passed through the machine, all of which is hereinafter more particularly described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a portion of a sluice-box, partially broken away to show in vertical section an amalgamator and mercury-trough. Fig. 2 is a sectional view thereof, taken upon the line E F, Fig. 1. Fig. 3 is an elevation and section of a shaft-pin of the main frame. Fig. 4 is a like view of an end of one of the amalgamated wheels, showing its disposition with reference to the perimeter of the main frame. Fig. 5 is an elevation and section, respectively, showing the manner of attaching the supplemental paddles to the main frame. Fig. 6 is an elevation, partly in section, of a sluice and amalgamator, showing a modification of said invention. Fig. 7 is a plan view, partly in section, of a portion of the amalgamated wheels and driving-chain shown in Fig. 6. Fig. 8 is a vertical sectional view of a modified form of amalgamator; and Fig. 9 is a transverse vertical sectional view thereof, taken upon the line *b a*, Fig. 8.

Referring to the drawings, A, Fig. 1, designates generally the main frame of the revoluble amalgamator, which is provided with supporting-trunnions 2, Figs. 2 and 3, preferably screwed into the ends of a hollow shaft 3. Disks 1 are attached, by means of rivets

4, to the trunnioned fittings. The trunnions 2 are mounted in suitable notched bearings 9, attached, by means of bolts 10, to the inner faces of the side walls of an inclined chute C. In the bottom of said chute below said revoluble frame is a depression or trough D for the reception of mercury, which is intended to fill said depression to the level of the line *m m*, Fig. 1. A screw-plug 8 is placed in the bottom to draw off the amalgam when desired.

A riffle 25 is formed in the chute below the amalgamator for the purpose of raising the water or slime to the desired level above the mercury, said riffle being secured in place by means of bolts 15. The level or surface and fall of the slime over the riffle is indicated by the line *w w*.

In the perimeter of the disks 1 are formed a series of holes, into which are loosely inserted wheel-shafts 5 for the support of a series of wheels, (generally designated by B, Fig. 1.) Said wheel-shafts 5 are located at equal distances from each other and in a circle concentric with the shaft 3. Upon the shafts 5 are mounted end disks 7, having slots 12 therein, (better shown in Fig. 4,) into which are rigidly secured amalgamated plates 6, the width of which is preferably such that when said revoluble frame is in the position shown in Fig. 1 the lower plates of the lowermost wheel will be wholly or substantially immersed in mercury. I prefer also and recommend that the height of the riffle 25 be such as to cause the lowermost wheel of the series to be immersed substantially or entirely in the body of mercury and slime, as indicated in Fig. 1. Each one of the blades 6 is preferably provided with a lip 21 upon its lower edge for the purpose hereinafter stated.

At equal distances from each other within the main frame and midway between the wheels B are preferably located a series of plates 17, (see Figs. 1 and 5,) which are rigidly attached to the disks 1 by means of angle-irons 18 and rivets 19 and 22. Said plates are provided with flanges or lips upon their lower edges, as shown, adjacent to which, near the outer edge of the plate, are located a series of perforations 23 for the purpose hereinafter specified.

The operation of said amalgamator is as follows: The current in the sluice serves to rotate the main frame. When the blades of one of the wheels B is first brought into contact

with the moving material, the lower portion of the wheel is caused to move or rotate with the current; but as soon as the wheel is sufficiently immersed to cause the lower blades to enter the mercury the direction of rotation is reversed, as indicated by the arrow in Fig. 1, and again upon emerging from the material another reversal takes place. This action not only causes each of the amalgamated blades to be immersed in the mercury and to be freshly charged thereby with each rotation of the main frame, but to be brought into contact with the water and sand or slime in such a way and to such an extent as to stir and thoroughly agitate the latter and bring it into direct and positive contact with the fresh mercury, thereby presenting to the material a very large amalgamated surface without interfering with the ready flow of said material.

This construction instead of requiring a very small and attenuated flow of material permits of a large one while affording every facility for the saving of values.

The plates 17, which are amalgamated, are preferably used in connection with the revoluble wheels, inasmuch as they add to the amalgamated surface while acting as rigid paddles to aid in the rotation of the main wheel. The lips thereon take up a supply of mercury which as the main wheel is rotated is distributed over the plate, a portion thereof passing through the perforations 23 to the opposite side of the plate. Said plates are also useful where a thin sheet of water is desired in the sluice, and they are so adjusted that only a sufficient quantity of mercury is picked up to charge both sides thereof. The lips 21 upon the plates 6 serve in a similar manner to pick up an excess of mercury.

A series of amalgamators may be placed in a given sluiceway, and their compactness and efficiency is such as to enable the sluiceway to be shortened at least one-half, while saving a large percentage of the float-gold which usually escapes. The mercury in the pockets may be dispensed with and the plates charged by hand; but the results would not be as satisfactory as they would be were the plates automatically and regularly charged as described.

In Figs. 6 and 7 I have shown a modified construction in which the mercury-pocket is enlarged to enable the revoluble frames to be used in pairs, in which case the end disks are provided with sprockets adapted to receive sprocket-chains $\frac{1}{2}$, which serve to carry the shafts 5 of the amalgamated wheels B. Where space is not available for a long sluiceway, two or more amalgamators may be used in connection with oppositely-inclined sluices placed one above the other. Such a construction is shown in Figs. 8 and 9. The speed of the revoluble frames may be increased and regulated by applying power to the end of

the main shafts, to which pulleys p , Fig. 9, may be attached, the driving-belts being indicated in dotted lines in Figs. 6 and 8.

I do not confine myself to the exact construction shown, as it is obvious that it may be varied without departing from the principle involved.

Having thus described my invention, I claim—

1. An amalgamator comprising a sluice having a depression for mercury, a movable supporting-frame mounted over said depression, a series of wheels revolubly mounted in said frame, each of said wheels being provided with a series of longitudinal amalgamated blades, the adjustment of said frame being such as to cause one or more of said blades to be immersed in said mercury when said frame is actuated, and a riffle adjusted to raise the level of the passing slimes substantially to the top of the lowermost wheel, whereby the blades of each wheel may be freshly amalgamated and rotated within the slimes while permitting a substantially unobstructed passage of the latter.

2. An amalgamator comprising a sluice having a depression therein for the retention of mercury, means for raising the surface of the material to be passed through the sluice a predetermined distance above that of the mercury, a revoluble frame journaled in bearings above said depression, a series of revoluble wheels journaled in said frame at equal distances from each other in a circle concentric with the axis of said frame, each of said wheels being provided with longitudinal amalgamated blades, said revoluble frame being so adjusted within the sluice and its diameter bearing such a ratio to that of the small wheels, as to cause the latter to be nearly or entirely immersed in said material and mercury as they successively pass said depression thereby enabling each blade to receive a fresh charge of amalgam and to lift and distribute the same thereon while moving in the material to be acted upon.

3. The combination with a sluice provided with a depression for the reception of mercury, of a revoluble wheel having radial blades over said depression and carrying between each pair of blades a revoluble wheel provided with radial amalgamated blades, substantially as described.

4. The combination with a sluice provided with a depression for the reception of mercury, of a revoluble wheel between the sides of said sluice over said depression carrying revoluble wheels provided with radial lipped amalgamated blades, substantially as described.

5. The combination with a sluice provided with a depression for the reception of mercury, of a revoluble wheel having radial lipped blades over said depression and carrying between each pair of blades a revoluble

wheel provided with radial amalgamated blades, substantially as described.

6. The combination with a sluice having a depression for mercury, of a revoluble wheel between the sides of said sluice over said depression carrying revoluble wheels provided with radial lipped amalgamated blades and having fixed axes concentric with axis of carrier, substantially as described.

7. The combination with a sluice provided with a depression for the retention of mercury, of a revoluble wheel having radial lipped perforated blades over said depression and carrying between each pair of blades a

revoluble wheel provided with radial amalgamated blades, substantially as described.

8. An amalgamator comprising a sluice provided with a depression for the retention of mercury, a carrier-wheel revoluble within said sluice and provided with holes arranged concentrically with its axis, a series of smaller revoluble wheels journaled into said holes and radial amalgamated blades secured to said smaller wheels, substantially as described.

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