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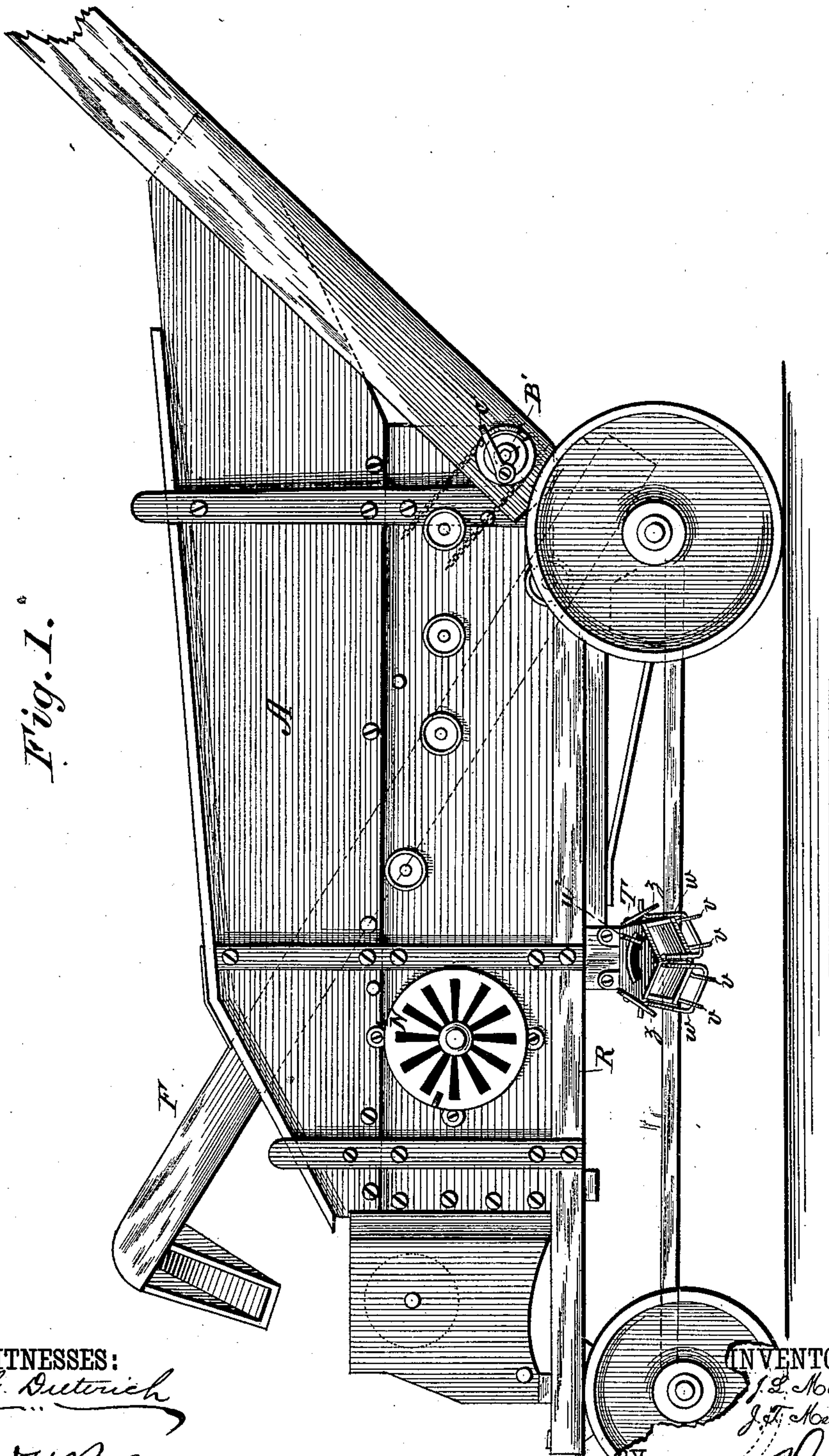
J. L. & J. T. METCALFE.

GRAIN SEPARATOR.

No. 247,092.

Patented Sept. 13, 1881.

Fig. 1.



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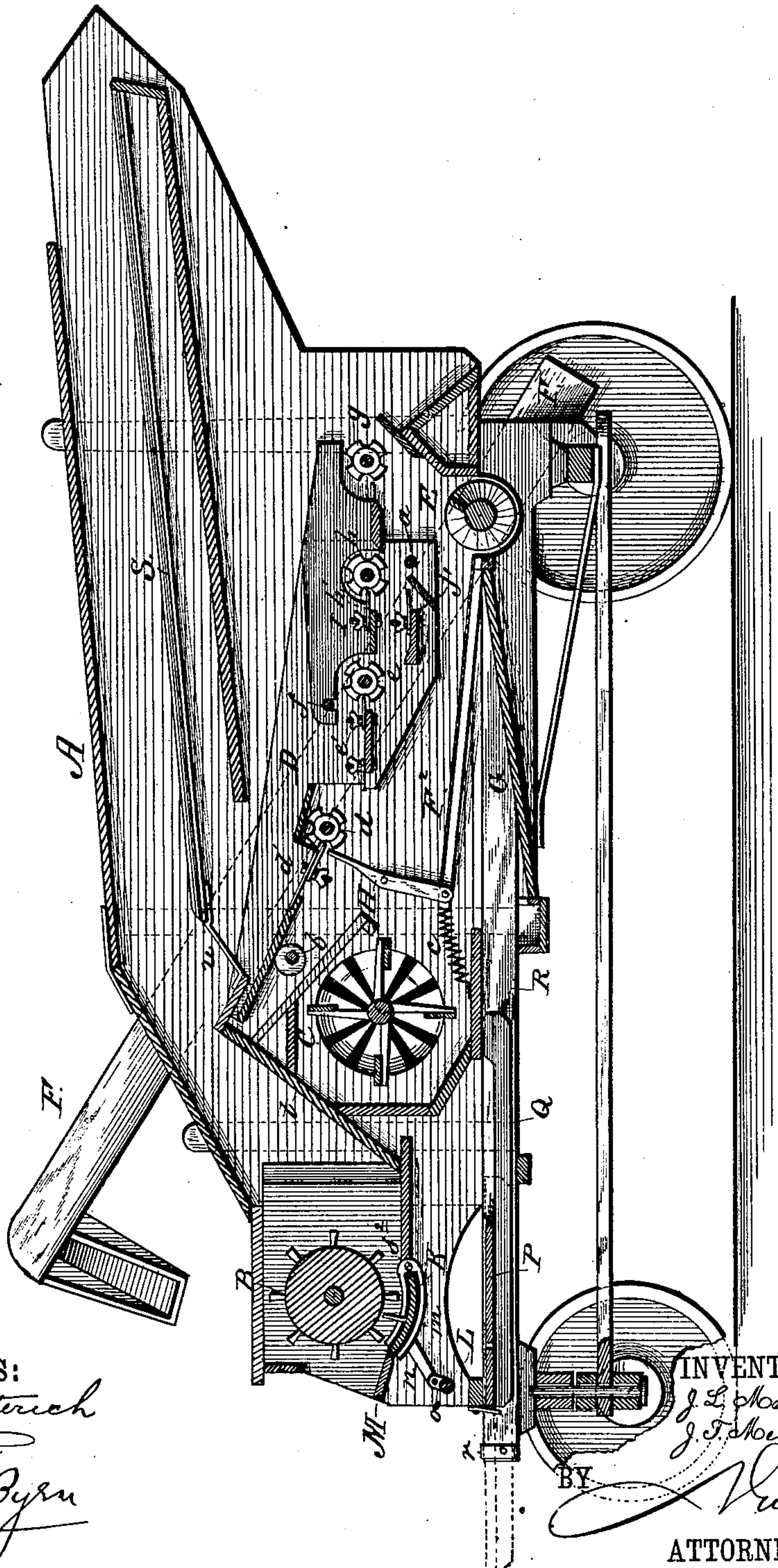
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Fig. 2.



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Fig. 3.

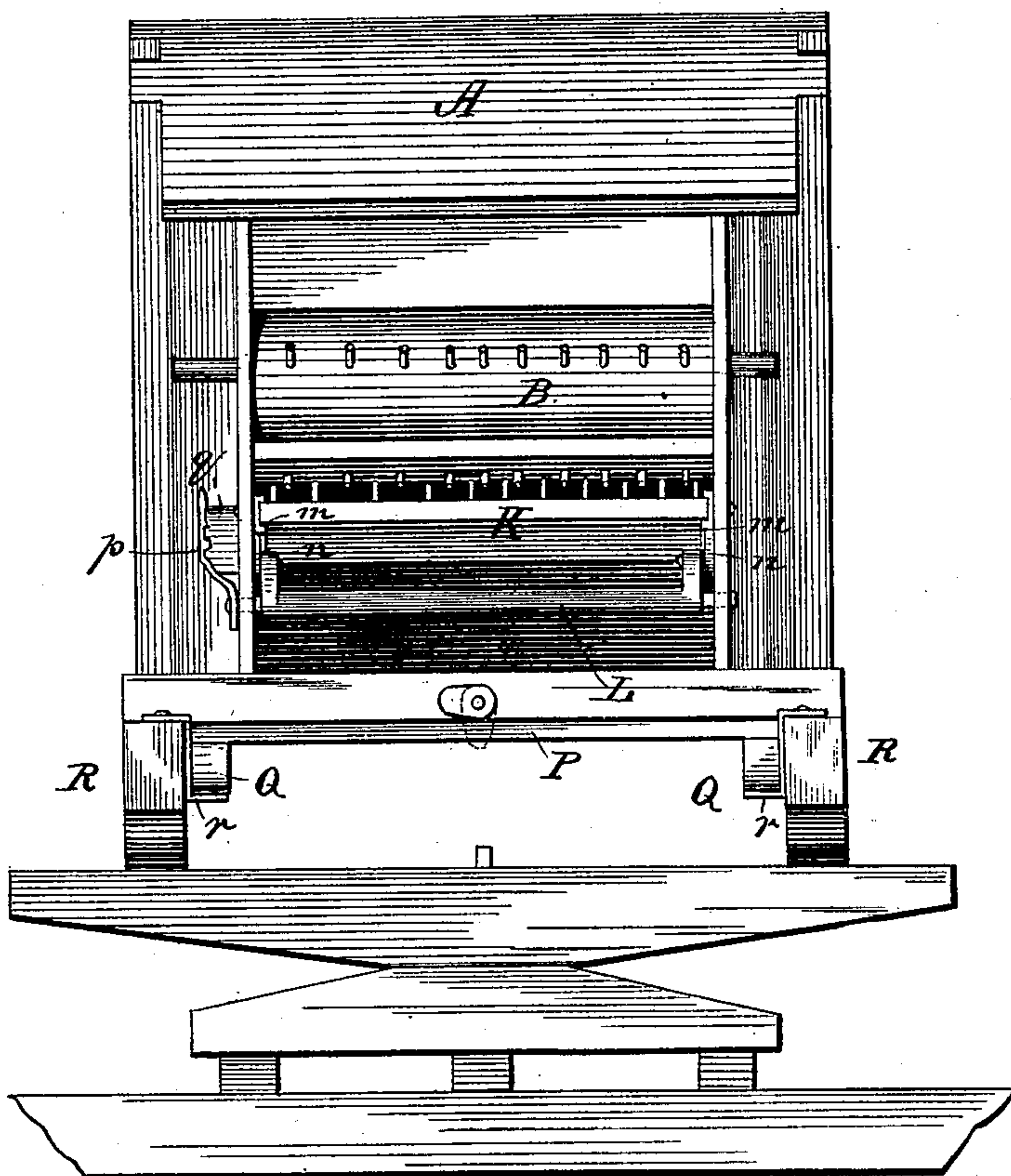


Fig. 4.

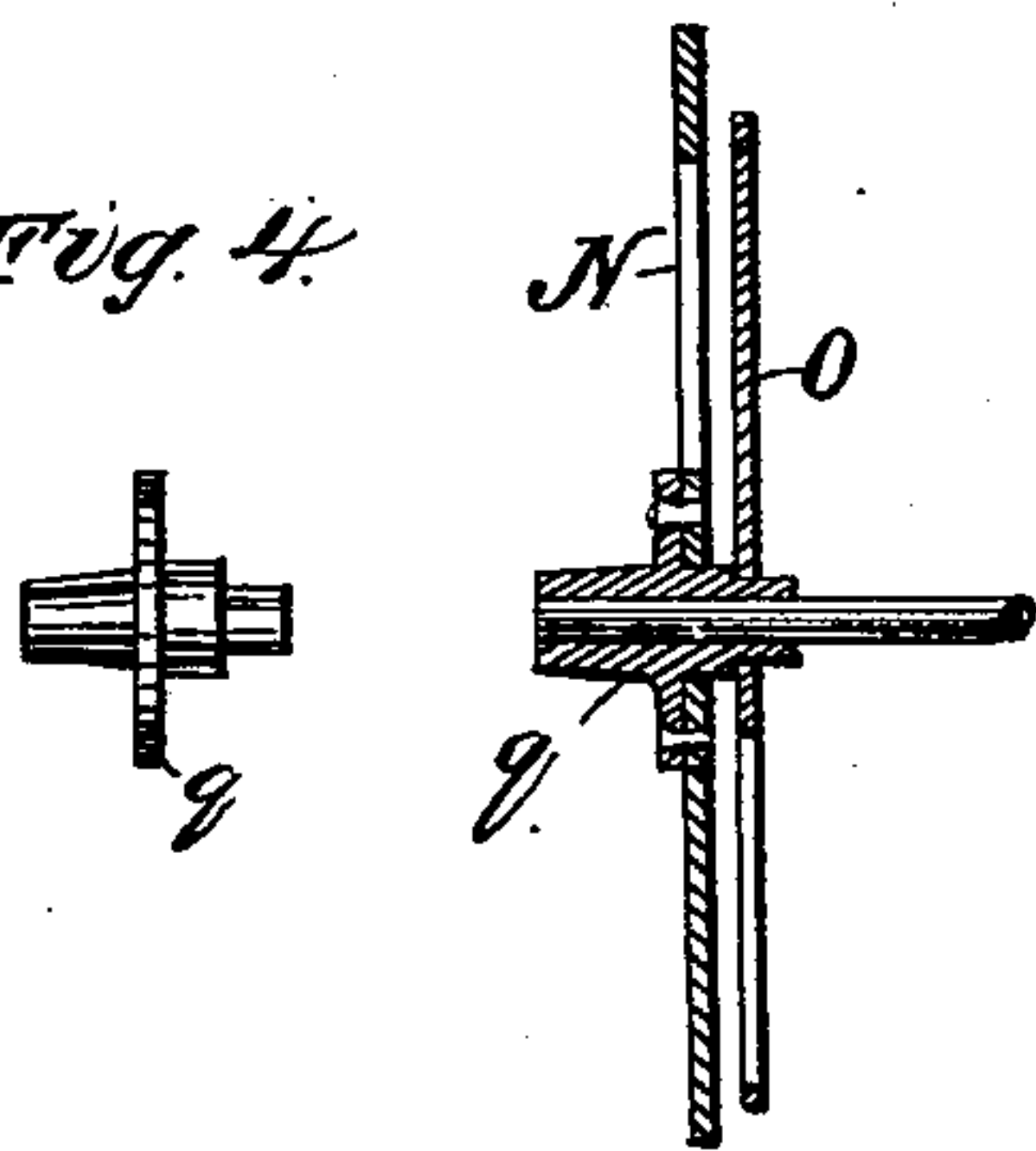
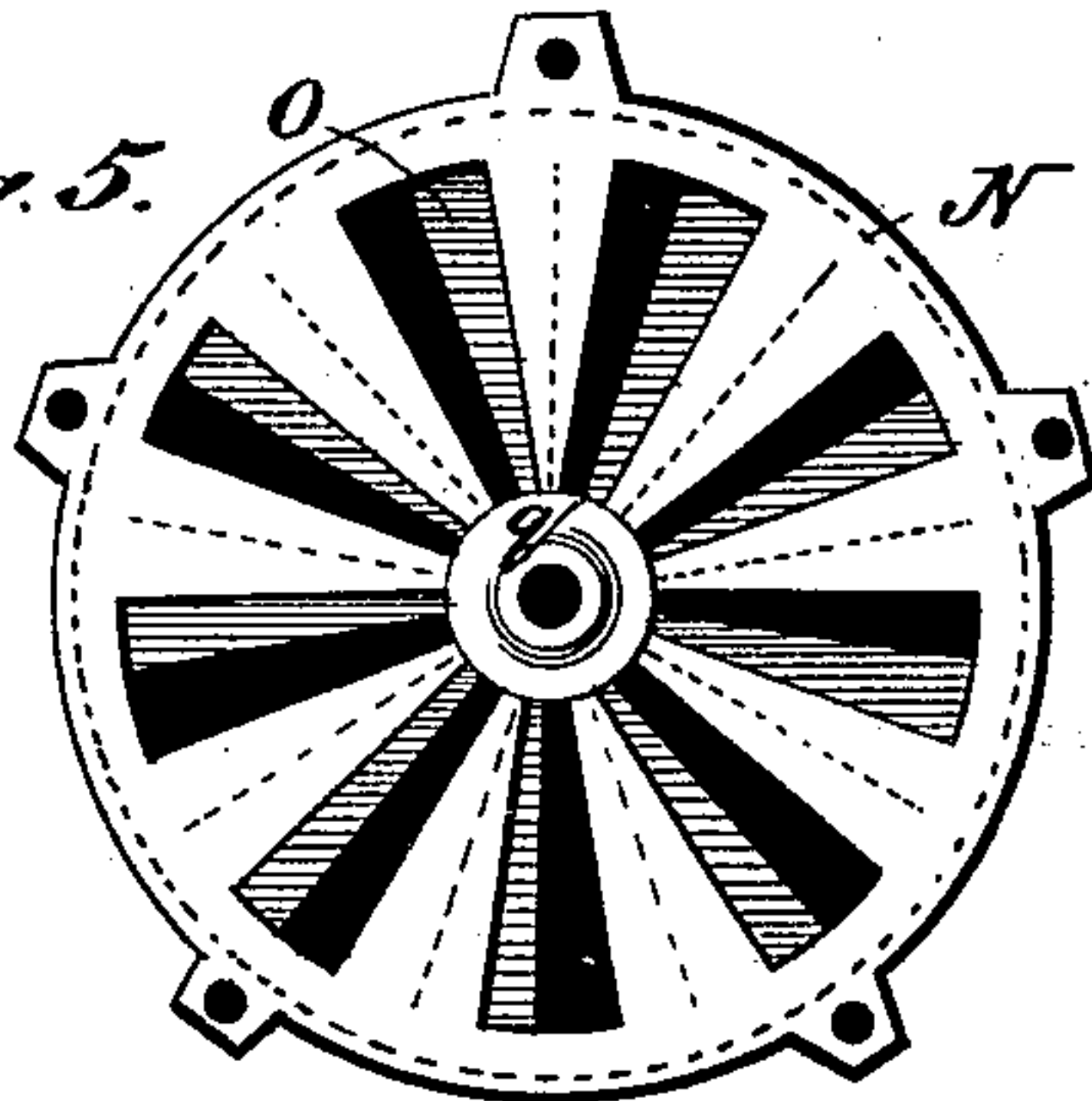


Fig. 5.



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J. L. & J. T. METCALFE.

GRAIN SEPARATOR.

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Fig. 6

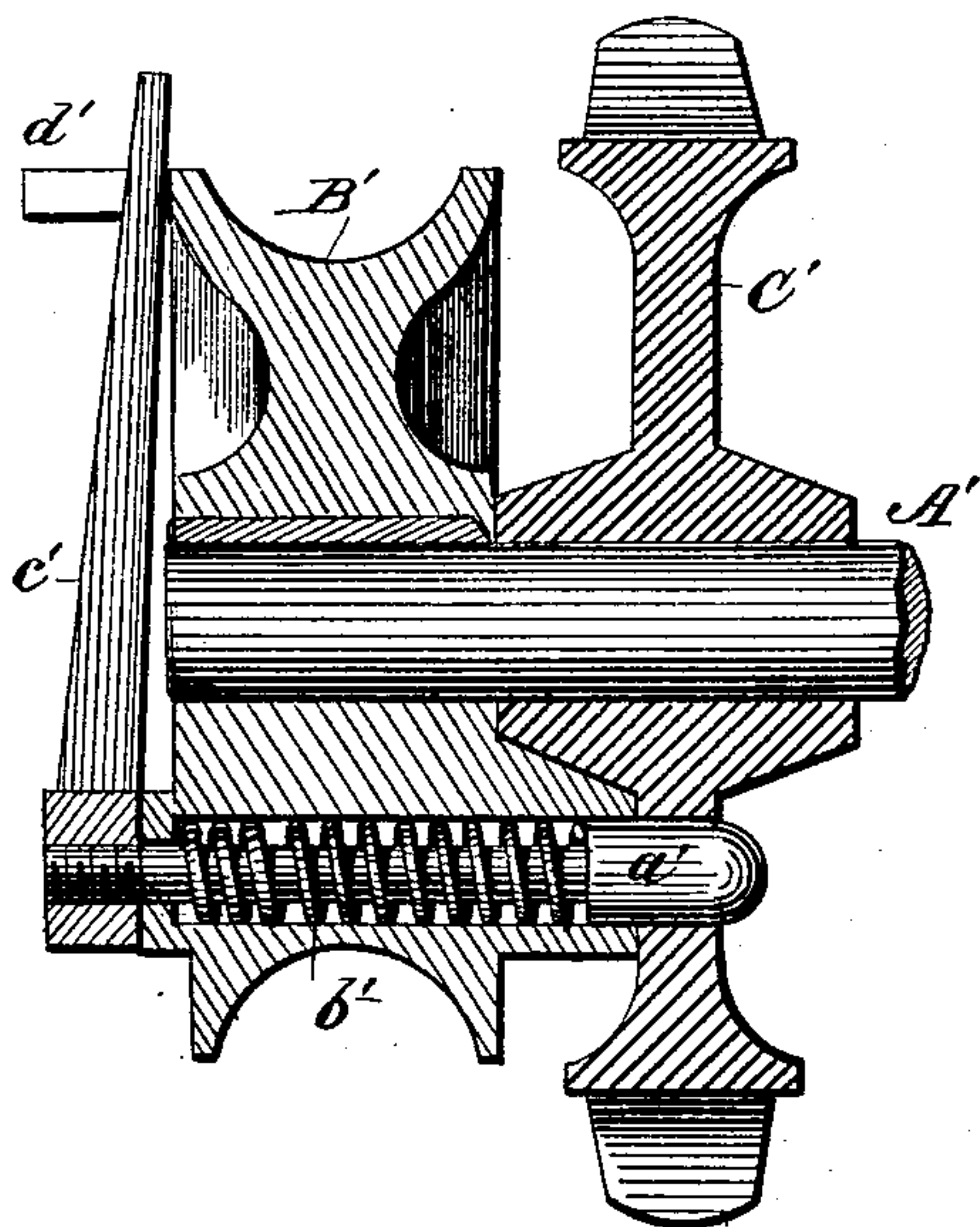


Fig. 7.

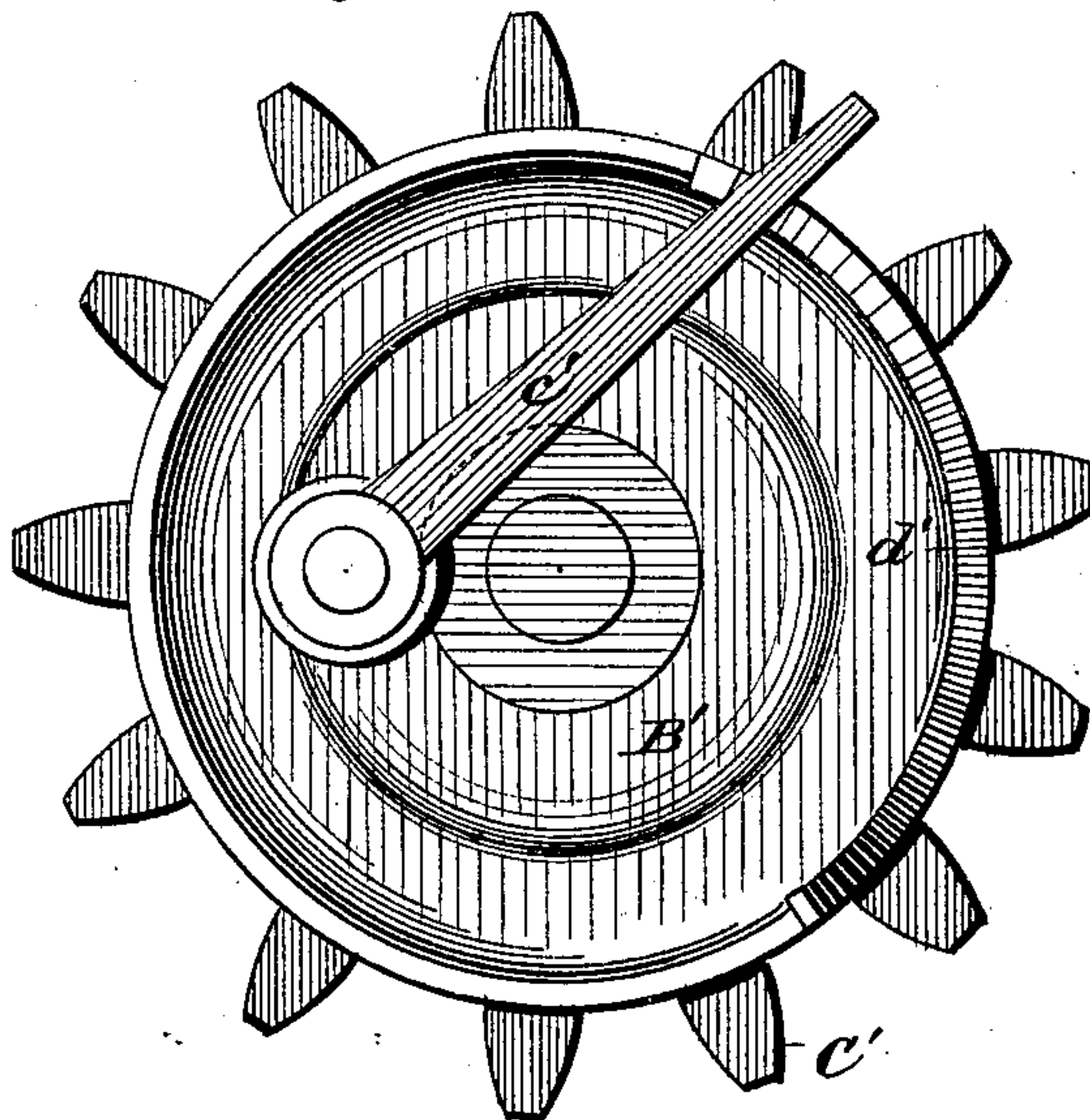
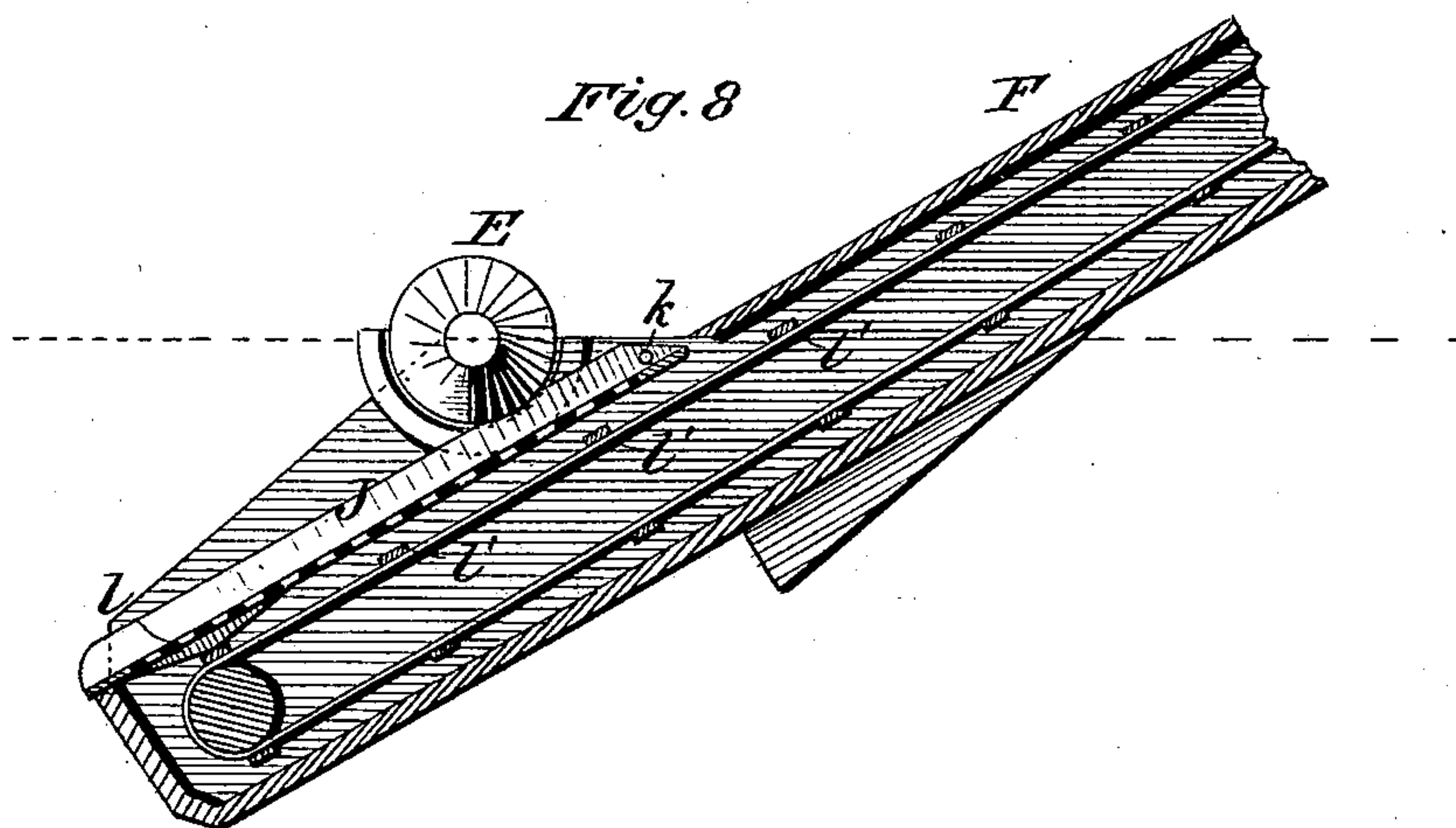


Fig. 8



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UNITED STATES PATENT OFFICE.

JOHN L. METCALFE AND JOHN T. METCALFE, OF QUINCY, PENNSYLVANIA

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 247,092, dated September 13, 1881.

Application filed January 25, 1881. (No model.)

To all whom it may concern:

Be it known that we, JOHN L. METCALFE and JOHN T. METCALFE, of Quincy, in the county of Franklin and State of Pennsylvania, have invented a new and Improved Grain-Separator; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, a vertical longitudinal section; Fig. 3, a front-end elevation, the wheels and axle being broken off. Figs. 4 and 5 are respectively a central section and side view of the fan-head and register. Figs. 6 and 7 are respectively a central section and side view of the devices for coupling and uncoupling the straw-carrier. Fig. 8 is a sectional view of the lower end of the elevator.

Our invention relates to certain improvements in grain-separators, designed to increase the efficiency of this class of machines.

The principal features of our improvement are, first, the peculiar construction and arrangement of the slatted bed through which the rakes operate; secondly, in the novel construction and arrangement of a supplemental shaker-shoe connected to the main shoe and designed to secure a better separation of the grain; thirdly, in the construction and arrangement of the bearings for the fan; fourthly, in the peculiar arrangement and combination of a shaking screen with the elevator-belt in the tailings-elevator; and, fifthly, in the peculiar construction of a clutch and its combination and arrangement with the working parts of the straw-carrier, whereby the latter may be disconnected from the separator without stopping the latter, all as hereinafter more fully described.

In the drawings, A is the body of the separator mounted upon running wheels. B is the thrashing-cylinder; C, the fan; D, the shoe, and E the worm for carrying off the tailings to the elevator F, which returns them to the cylinder, to be rethrashed. The shoe D is fulcrumed on bar *a*, (see Fig. 2,) and is shaken by tappets on a roller, *d*; and the degree of shake is regulated by a cam, *b*, which raises or lowers the shoe for longer or shorter contact with the tappets of the roller.

Just beneath the shoe is arranged inclined sieve *F*², having meshes of a size which permits the clean grain to pass through to the reversely-inclined chute-board G, leading to the bagging-spout. The rear end of the sieve leads to the tailings-screw, where the relatively large tailings, &c., which do not pass through the sieve, are delivered to the worm and elevator, for rethrashing, and the upper and forward end of this sieve is supported by the rear end of lever H, and is oscillated by the conjoint action of the spring *c* and tappets on the roller *d*.

The roller *d*, with its comb *d'*, and the roller *e*, with its comb *e'*, are constructed substantially as described in our previous patent, No. 191,991, granted July 12, 1877, and serve to effect the separation of the clean grain from the tailings and large pieces of straw, stalks, &c. At the rear end of the main shoe we employ a second smaller supplemental shoe, I, fulcrumed on pins *f* on the main shoe and shaken by tappets on a roller, *g*, at the tail end of the machine.

We are aware that supplemental shoes have been combined with the main shoe; but our supplemental shoe we make in a peculiar manner—i. e., we slot its bottom transversely to the machine and introduce a roller, *h*, and comb, *h'*, which act substantially as the other rollers and combs. By slotting this shoe and using an independent roller in its slot we obtain a very greatly improved result in the separation of the clean grain and tailings.

A further distinction which characterizes our supplemental shoe is that it is shaken at both its front and rear ends—at its front end by being connected to the main shoe and at its rear end by the independent roller *g*, which cooperates with the roller and slot in the middle of this shoe to produce a better separation.

Just beneath the roller *h* we arrange a converging throat, *j*, with a comb, *j'*. The function of this throat is to direct a current of air up through the space beside the roller *h*, to assist in the separation and transfer of the larger and lighter pieces, while the comb *j'* is only employed when the machine is used for separating oats, in which case the oats pass down the throat in a direction reverse to the wind and pass back to the screen and through the same to the grain-chute.

The several rollers shown in connection with and co-operating with the shoes are carried in journal-bearings in the side of the separator-case, and are revolved by suitable pulleys or gear-wheels on the outside. As the tailings are carried out by the screw they are transferred to the elevator, and are carried up to the cylinder, to be rethashed. As, however, there may be mixed with the tailings sticks, pieces of cornstalk, &c., particularly when raked wheat is being thrashed, we provide means for separating these from the tailings proper before they reach the cylinder. Thus (see Fig. 8) we extend the elevator-box F a short distance below the delivery end of the tailings-screw trough, and at the point where the tailings are delivered to the elevator we arrange an incline sieve, J, (see Fig. 8,) fulcrumed at *k* at its upper end, and provided with a projection, *l*, depending from its lower side, which projection is adapted to be struck by the passing buckets or slats *l'* on the elevator-belt, so as to shake the screen.

The meshes of the screen are of a size large enough to permit the tailings or unshattered wheat-heads to pass through and be carried up to the thrashing-cylinder, while the longer sticks, &c., are dumped outside and over the end of the screen. This prevents sticks, pieces of cornstalks, &c., from passing through the machine a second time, which is a great desideratum, for the reason that if passed through the cylinder again and disintegrated to greater fineness they become more difficult to separate.

In this connection we would state that we are aware that a screen has been placed between the discharge end of the separator and the elevator for this purpose; but we do not know that it has ever been made in the form of a shaking screen which was agitated by the contact of the slats on the elevator-belt.

In constructing and arranging the fan-register we form them, as heretofore, of two pieces, N O, Figs. 4 and 5, having radial slots in them. One of these pieces, N, is permanently fixed to the outer case of the trunk or body of separator, to form the fan-head, and the other revolves just inside the case, to regulate the admission of air to the fan. Instead of journaling the fan-shaft directly in the head or outer register-plate, N, we form a larger opening in the center of the plate than the fan-shaft, and bolt to this plate a detachable hub, *q*, which gives a better bearing, and which hub projects inside the case far enough to receive and carry the movable register-plate. This detachable fan-box can be readily removed when worn and another substituted without the necessity of sacrificing the fan-head or outer register-plate.

S, Fig. 2, is the rake-bed, which is composed of inclined longitudinal slats or bars, which are made of an inverted-V shape, or beveled on their upper edges, so as to facilitate the dropping of the grain from the straw down their inclined sides to the shoe. These bars extend nearly to the upward incline, *t*, from the cylinder,

and are carried at this end by downwardly-bent metal strips *u*, which form a trough or depression between the incline *t* from the cylinder and the incline of the rake-bed. This depression at this point we find very greatly facilitates the early separation of the grain carried up by the straw (which grain passes down between the bars *u* to the shoe) and contributes to the efficiency of the separator. The rakes for operating through this rake-bed we have not shown, as we claim nothing new in them, and it is sufficient to say that we employ two rakes, one above and the other beneath the rake-bed, as has been done heretofore.

In running a grain-separator it sometimes becomes necessary to disconnect the straw-carrier from the rest of the mechanism of the separator, and it is desirable that some convenient means be provided for this disconnection while the machine is in motion. For this purpose we have devised a special mechanism, as shown in Figs. 1, 6, and 7.

A', Fig. 6, is one of the shafts which distends the revolving apron of the straw-carrier, and B' is a pulley, or a simple boss or hub for that matter, rigidly keyed to this shaft.

C' is a sprocket-wheel, which revolves loosely on the shaft A', and connects with a chain passing around another sprocket-wheel on some one of the revolving shafts of the machine. This sprocket-wheel C' and its chain constitutes the medium through which power is applied to the straw-carrier to rotate it. Now, to connect the loose sprocket-wheel C' rigidly to the shaft or disconnect it therefrom at will, a tubular barrel is formed in the pulley or hub B' parallel with the shaft, and a locking-bolt, *a'*, is placed therein. Around this locking-bolt is disposed a spiral spring, *b'*, one of whose ends bears against a shoulder on the said bolt, and whose other end bears against the end of the tube or barrel, so that the tension of the spring serves to force the bolt into engagement with the sprocket-wheel C', which has a hole to receive the said bolt, and which bolt, when entered through said hole, locks the sprocket-wheel rigidly to the pulley and shaft and communicates rotary motion to the latter. Upon the end of this locking-bolt is fastened a rigid arm, *c'*, while the pulley B' or hub, as the case may be, is provided near its periphery with a cam, *d'*. Now, when the machine is running and it becomes desirable to disconnect the straw-carrier, it is only necessary to grasp the arm *c'* or hold it with the finger while the wheels are revolving, and as the cam *d'* comes around it strikes the arm *c'* and draws back the bolt against the tension of the spring and removes the bolt from the sprocket-wheel, disconnecting the latter and allowing the same to turn loosely on the shaft A', so long as the arm *c'* rests upon the high part of the cam.

This device forms a very convenient and effective means for connecting and disconnecting the straw-carrier by the power of the machine, and while the machine is running.

Having thus described our invention, what we claim as new is—

1. The combination of the rake-bed S, the incline *t*, and the bars *u*, the said bars being
5 arranged to support the front ends of the rake-bed, and being bent downwardly from the rake-bed to form a trough between the same and the incline, as and for the purpose described.

2. In a grain-separator, the combination,
10 with the main shaking-shoe D, of a supplemental shoe, I, hung at its front end upon the main shoe, so as to partake of its movement, and constructed with an opening in its middle and a roller, *h*, located therein, and a second
15 shaking-roller, *g*, arranged at the tail end of said supplemental shoe and adapted to impart an independent motion thereto, as and for the purpose described.

3. The combination, with the fan-head or
20 fixed register-plate and the revolving register-plate, of a detachable hub or box, *q*, bolted to the fixed head and extending through and

forming the bearing for the revolving register-plate, substantially as described.

4. The combination, with the elevator-box 25
F, of the screen J, having a projection, *l*, and the elevator-belt, having slats or tappets which strike said projection to shake the screen, as and for the purpose described.

5. The combination, with the driving-chain 30
of a grain-separator and the endless apron of the straw-carrier, of the shaft A', loose sprocket-wheel C', tight wheel B', with cam *d'*, and the spring-seated locking-bolt *a'*, adapted to connect wheels B' and C', as described, and 35
having a rigid right-angular arm, *c'*, for co-operation with cam *d'*, substantially as and for the purpose described.

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