(No Model.)

4 Sheets—Sheet 1.

# J. E. MITCHELL.

## SIFTING MACHINE.

No. 568,915. Patented Oct. 6, 1896.

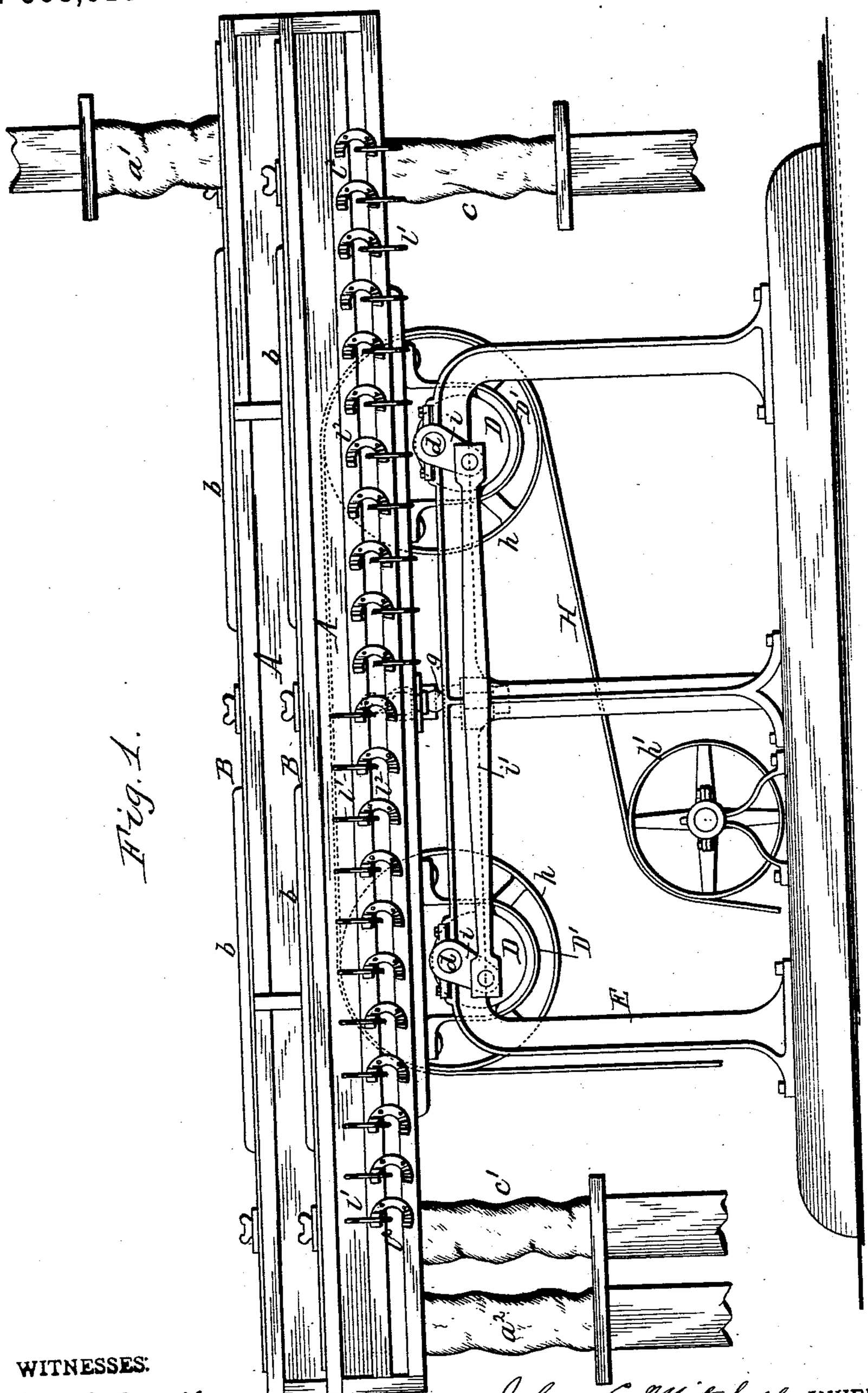


Fig. 1.

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Henry L. Deck.

John E. Mitchell INVENTOR.

By Wilhelm & Bonner. ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

# J. E. MITCHELL.

## SIFTING MACHINE.

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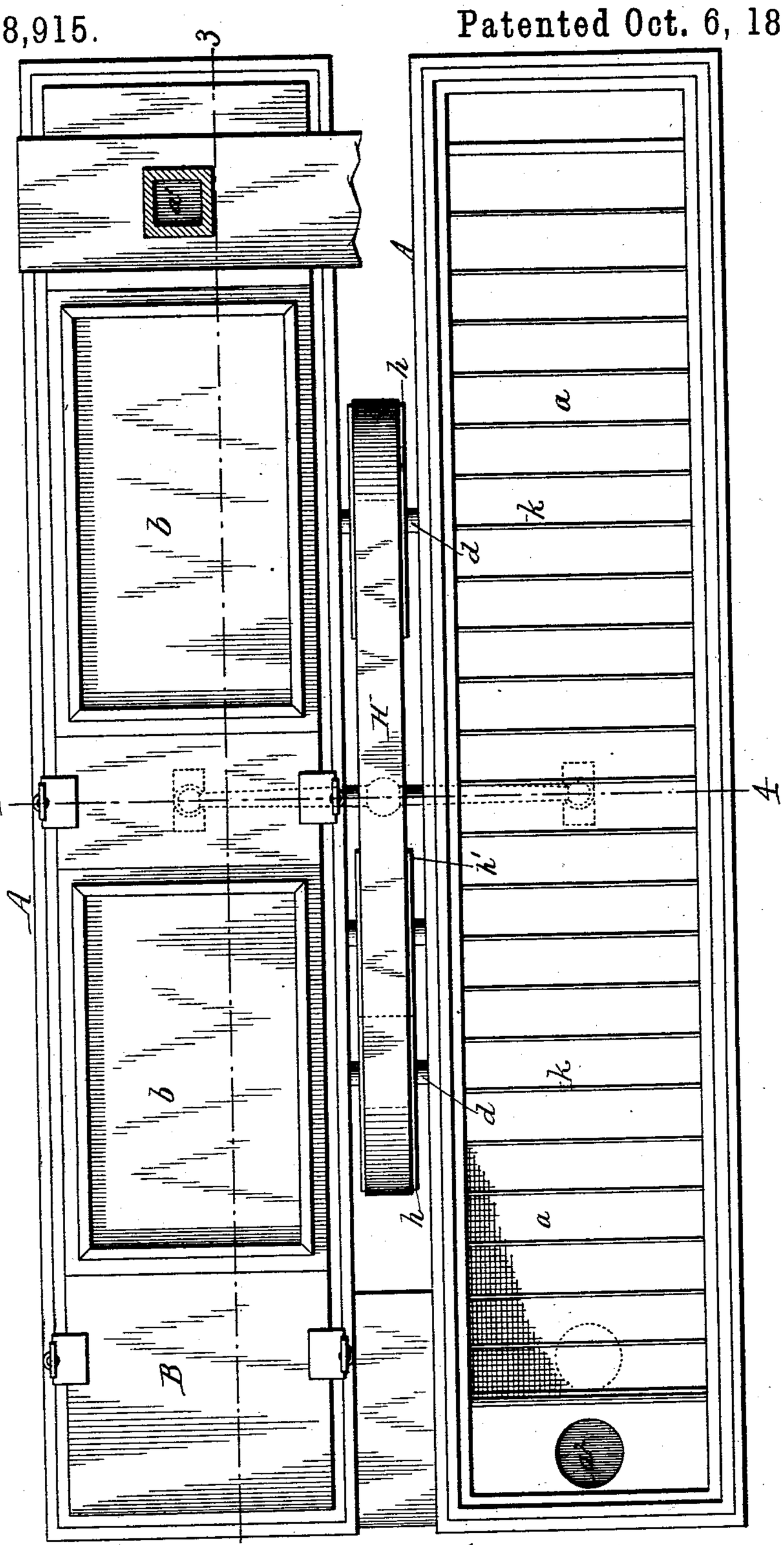


Fig. 2.

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# J. E. MITCHELL.

## SIFTING MACHINE.

No. 568,915. Patented Oct. 6, 1896.

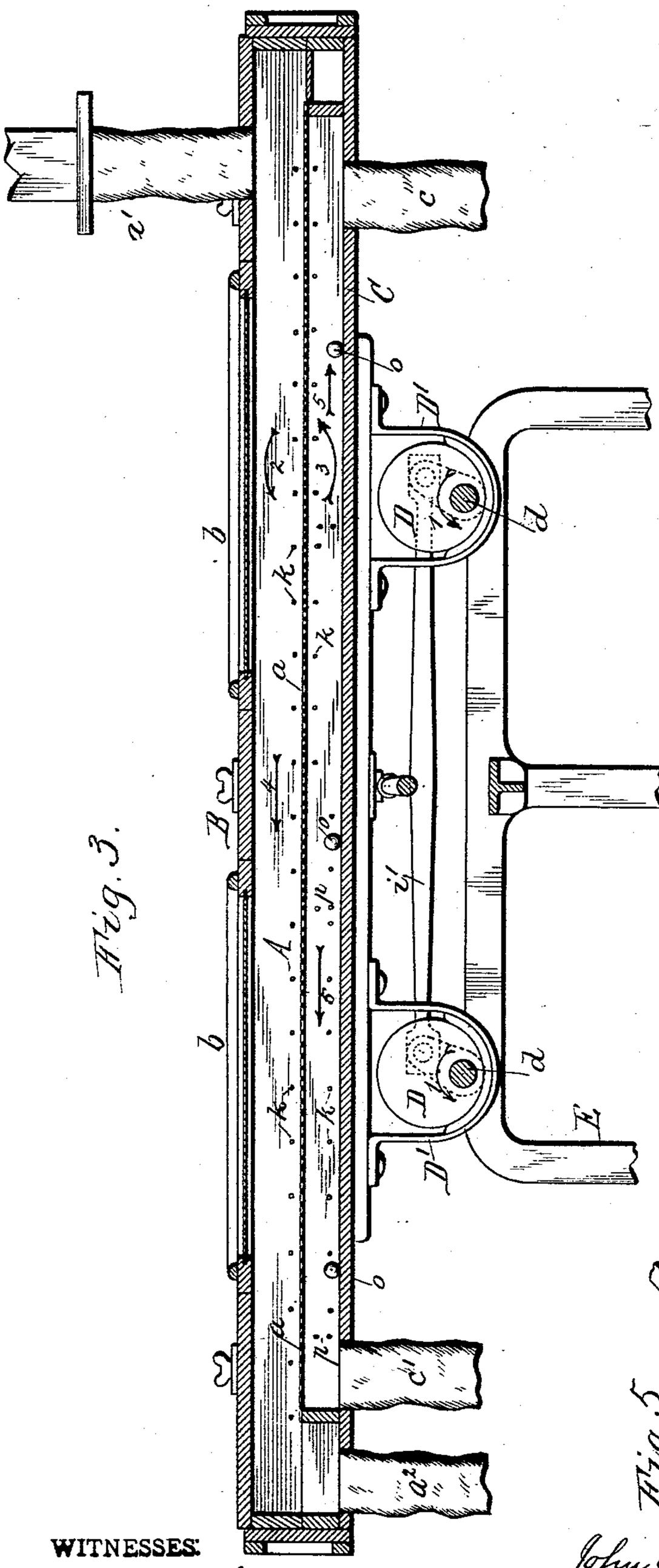


Fig. 3.

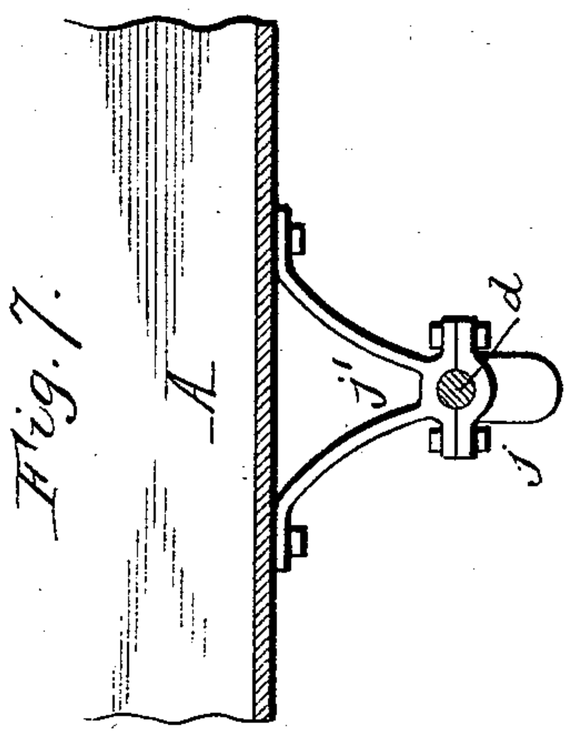


Fig. 7.

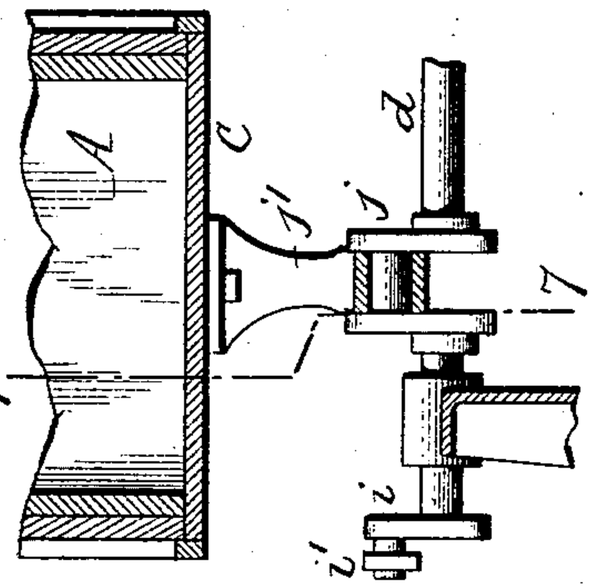


Fig. 6.

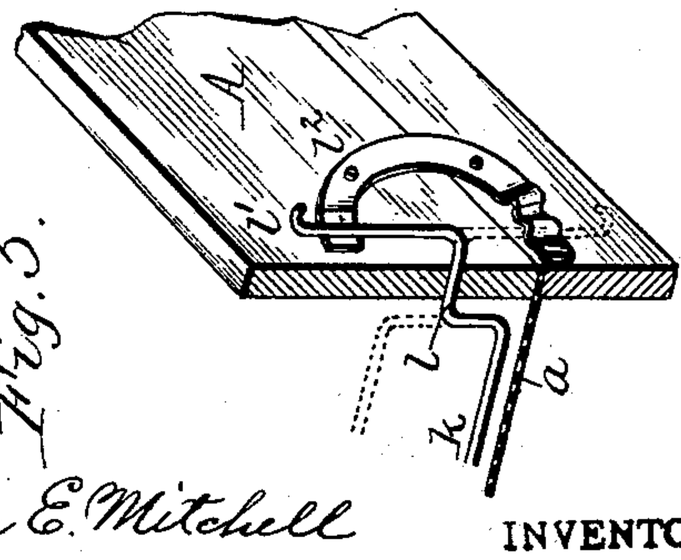


Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

# J. E. MITCHELL.

## SIFTING MACHINE.

No. 568,915. Patented Oct. 6, 1896.

Fig. 4.

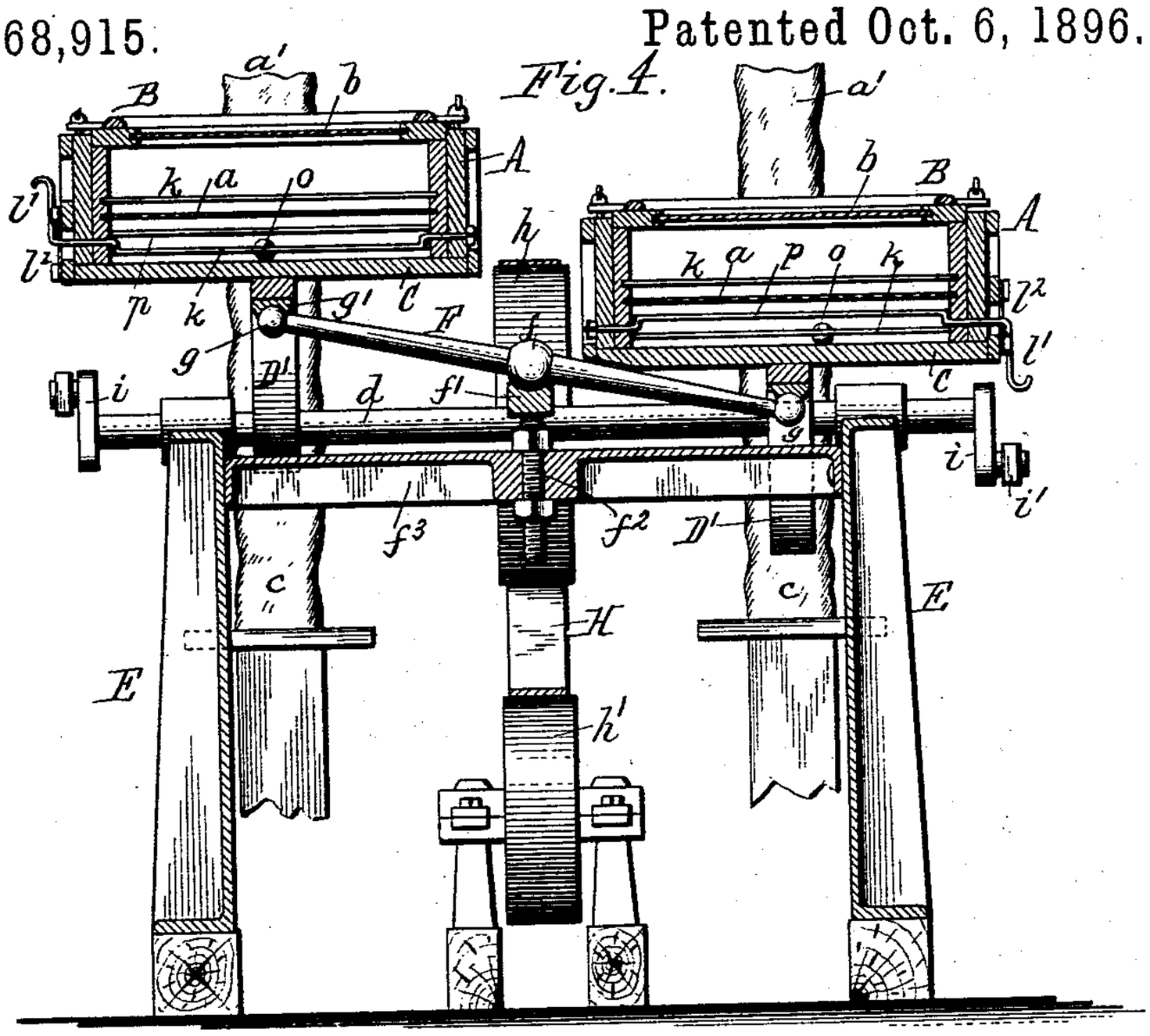



Fig. 8.

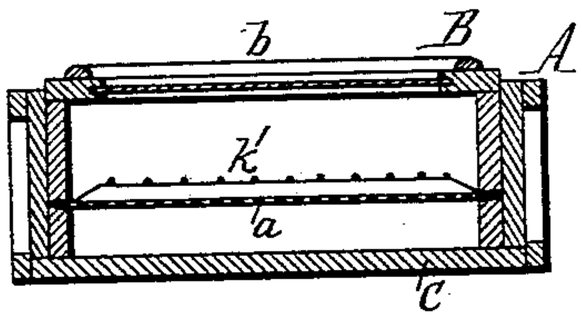



Fig. 9.

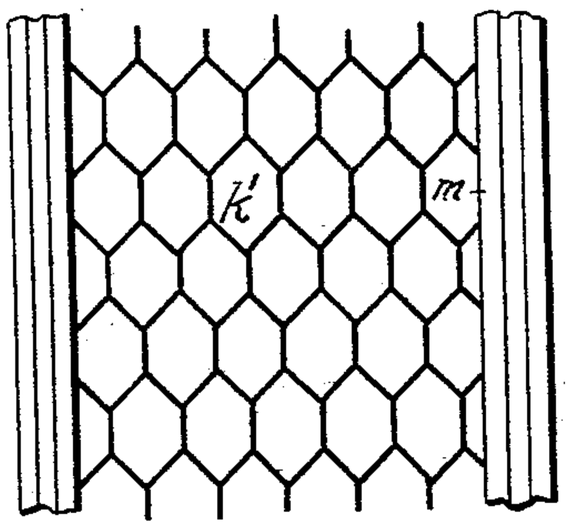
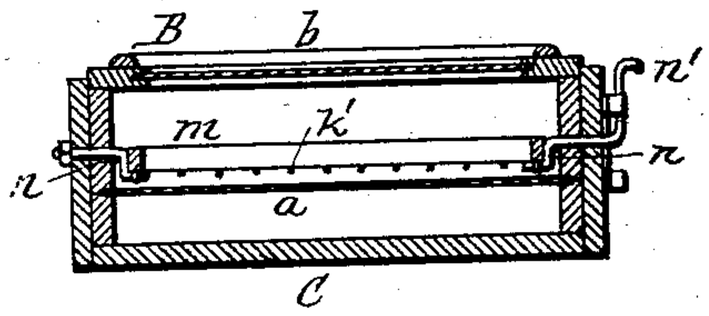



Fig. 10.

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# UNITED STATES PATENT OFFICE.

JOHN E. MITCHELL, OF JACKSON, MICHIGAN, ASSIGNOR TO THE HARMON MANUFACTURING COMPANY, OF SAME PLACE.

## SIFTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 568,915, dated October 6, 1896.

Application filed November 12, 1895. Serial No. 568,674. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. MITCHELL, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Improvement in Sifting-Machines, of which the following is a specification.

This invention relates to a sifting-machine in which a horizontal sieve is employed, and has the object to produce a machine which is simple in construction, which has a large sifting capacity, and in which the direction of the flow of the material over a sifting or other surface can be readily controlled, as desired.

In the accompanying drawings, consisting of four sheets, Figure 1 is a side elevation of my improved sifting-machine. Fig. 2 is a top plan view thereof with the cover of one of the sieves removed. Fig. 3 is a longitudinal section in line 3 3, Fig. 2. Fig. 4 is a vertical cross-section in line 4 4, Fig. 2. Fig. 5 is a fragmentary perspective view of one of the propelling-rods and connecting parts. Fig. 6 is a fragmentary transverse elevation, partly in section, showing a modified means for connecting the sieve-frame with the actuating-shaft. Fig. 7 is a vertical section in line 7 7, Fig. 6. Fig. 8 is a cross-section of the sieve-frame and sieve, showing wire-netting arranged over the sieve. Fig. 9 is a top plan view thereof. Fig. 10 is a cross-section showing the wire-netting mounted in a vertically-adjustable frame.

Like letters of reference refer to like parts in the several figures.

A represents the horizontal box or frame in which the sieve *a* is arranged and which is provided over the head portion of the sieve with a flexible feed-spout *a'* and at the opposite end of the sieve with a discharge-spout $a^2$ for the tailings.

B represents the cover of the sieve-frame, which is arranged at such a height above the sieve that it does not affect the flow of the material over the same. When the material operated upon is of such nature that no dust is liberated during the sifting operation, this cover may be entirely or partially omitted. As shown in the drawings, the cover is provided in the usual way with removable sections *b* for affording access to the sieve when required.

C represents the tight conveyer bottom of the sieve-frame, which is arranged horizontally like the sieve and provided underneath the end portions of the sieve with discharge-spouts *c c'*, through either or both of which the fine material which has passed through the sieve and fallen upon this bottom can be discharged.

The sieve-frame has a vertical and longitudinal gyratory motion or a motion in which each part of the sieve-frame and sieve moves in a circle in a vertical plane lengthwise of the sieve. This motion is imparted to the sieve-frame by two horizontal shafts *d*, arranged transversely underneath the sieve-frame, one behind the other, and provided each with an eccentric D, engaging against the lower portion of a strap or bearing D', secured to the bottom of the sieve-frame. The shafts *d* are journaled in two side frames E E.

In order to relieve the driving mechanism of the greater portion of the weight of the sieve-frame and connecting parts, two similar sieve-frames are arranged side by side, as shown in Figs. 1, 2, and 4, and connected as follows: The eccentrics D underneath one sieve-frame are arranged on the shafts *d* diametrically opposite the eccentrics underneath the other sieve-frame, as shown in Fig. 4, so that one sieve-frame is in its highest position when the other is in its lowest position, and the sieve-frames are supported upon a balancing-lever F, which is supported centrally upon the supporting framework of the machine and engages with its ends underneath the sieve-frames. As shown in the drawings, the supporting-lever F is provided at its middle with a spherical knuckle *f*, which rests in a socket *f'*, supported by a vertical adjusting-screw $f^2$ upon a cross-piece $f^3$, connecting the side frames E. The supporting-lever is provided at its ends with spherical knuckles *g*, upon which the sieve-frames rest by socket-pieces *g'*, secured to the bottoms of the sieve-frames. The weight of one sieve-frame balances the weight of the other by means of this supporting-lever, and the shafts, eccentrics, and straps are thereby to a large extent

relieved of this weight, whereby excessive friction and vibrations are avoided. By adjusting the central socket of the supporting-lever both sieve-frames are simultaneously adjusted, and all four eccentric-straps are also simultaneously adjusted, so that this single adjustment of the supporting-lever effects the adjustment of both sieve-frames and all four eccentrics.

H represents the driving-belt, which runs over two pulleys $h$, mounted centrally upon the two shafts $d$, and also over a guide-pulley $h'$ if the machine is driven from below, as shown. The two shafts $d$ are connected to rotate in unison by cranks $i$ and parallel rods $i'$, arranged at the ends of the shafts, the cranks on one side of the machine being arranged diametrically opposite the cranks on the other side.

The driving-shafts $d$ may be provided with cranks $j$, engaging in depending bearings $j'$ for actuating the sieve-frames, as shown in Figs. 6 and 7, instead of eccentrics and straps, if preferred.

When the driving-shafts $d$ are rotated in the direction of the arrow 1 in Fig. 3, the upper half of the gyratory movement of the sieve-frame takes place in a direction away from the feed-spout $a'$, as indicated by the arrow 2, and the lower half of the gyratory movement takes place in a direction toward the feed-spout, as indicated by the arrow 3. The material resting upon the sieve and upon the tight bottom underneath the sieve is propelled over these surfaces by this gyratory movement in the direction in which the lower half of the gyrating movement takes place, that is to say, toward the feed-spout or head of the machine. In order to cause the material to travel in the opposite direction, that is to say, in the direction in which the upper half of the gyrating movement takes place, or away from the feed-spout, propelling devices are arranged above the surface over which the material travels and in proximity thereto. These propelling devices may be constructed in various ways and forms. For instance, they may consist of wires or rods $k$, which are arranged transversely above the sieve-surface or the tight bottom underneath the sieve-surface and in such proximity thereto as to operate upon the material resting on the sieve or other surface, as shown in Fig. 3, or they may consist of a coarse wire-netting $k'$, arranged in the same way, as shown in Figs. 8, 9, and 10. These propelling devices compel the material to flow in the direction in which the upper half of the gyratory movement takes place and prevent the material from following the lower half of the gyratory movement, which the material would follow in the absence of these devices. When these propelling devices are raised so high above the surface on which the material rests that they have no effect upon the material, the latter flows in the direction of the lower half of the gyratory movement. It is therefore desirable to make these propelling devices vertically adjustable when they are used with surfaces over which the material should flow sometimes in one and sometimes in the opposite direction, as, for instance, the tight conveyer-bottom underneath the sieve. When the transverse rods or wires are used, each wire can be made individually adjustable by bending the rod or wire in the form of a crank-shaft, and journaling the crank portions $l$ in the sides of the sieve-frame and providing the outer end with an arm or hand-crank $l'$, by which the wire can be turned for raising and lowering it. When this hand-crank projects upwardly, as shown in Fig. 5, the wire is in its lowest position nearest the surface over which it is arranged. By turning the hand-crank down, the wire is raised to its inoperative position, as shown in dotted lines in Fig. 5. The wire is held in its various positions by a catch-plate $l^2$, which is provided with depressions or notches, as shown, for holding the hand-crank in its upper and lower positions, and also at slightly different heights above the sieve or other surface, whereby the intensity of the propelling effect can be modified.

When the wire-netting $k'$ is employed, it can be made adjustable by mounting it in a frame $m$, or in several frames, which are connected with the sieve-frame by cranks $n$ and adjusted by hand-cranks $n'$, as shown in Fig. 10.

As shown in Fig. 3, the propelling devices above the sieve are arranged in their operative position above the sieve-surface and the material is propelled over the sieve from the feed-spout to the tail end in the direction of the arrow 4. The propelling devices above the tight bottom are adjusted at two different heights, those over the front portion of the tight bottom being raised to their inactive position and those over the rear portion being in their low or operative position. The material which falls upon the tight bottom, therefore, is divided into two streams which move in opposite directions, that which falls upon the front portion of the tight bottom moving toward the head of the sieve-frame, as indicated by the arrow 5, and being discharged by the spout $c$, and that which falls upon the rear portion of the tight bottom being propelled toward the tail end of the sieve, as indicated by the arrow 6, and being discharged through the spout $c'$. The control which is so obtained over the direction of the flow of the material on the tight bottom permits the sifted material to be cut off at any point and to be directed to separate discharge-spouts.

The propelling devices over the sieve do not only serve to direct the flow of the material, but they also serve to agitate the material and increase the sifting capacity. In the operation of the machine the material flowing over the sieve is quickly separated by reason of the vertical tossing movement, according

to the size and specific gravities of the constituents. When the machine is used for separating middlings from bran, the heavy and fine constituents, such as middlings and flour, quickly assume a position nearest the sieve, and the light and large constituents, such as bran, &c., float upon the heavy constituents, thereby causing the fine and heavy constituents of the mixture of material to reach the sieve quickly and pass through the meshes. As an illustration it may be stated that for separating middlings from bran in the operation which is ordinarily called "scalping" with a sieve having a gyratory motion in circles of four inches in diameter and making about one hundred and sixty turns per minute, the propelling devices will reverse the flow of the material if said devices are arranged from about one-fourth to one-half of an inch above the surface over which the material flows, and will not affect the flow of the material if they are arranged about two inches above such surface.

The sieve is preferably provided with cleaning-balls *o*, of rubber or other suitable material, which are arranged below the sieve and supported in such proximity to the under side of the sieve that the dancing or jumping motion of the balls will cause the same to strike against the under side of the sieve and dislodge any material which may adhere thereto. As shown in the drawings, these balls are supported upon the tight bottom underneath the sieve, and each ball is confined to a certain portion of the sieve by cross rods or wires *p*, which are arranged between the sieve and the bottom so closely together that the ball cannot pass beyond them, while they permit the material to pass without obstruction.

I claim as my invention—

1. In a separating-machine, the combination with a frame having a substantially horizontal sieve or other surface upon which the material rests, of means whereby a vertical longitudinal gyratory motion is imparted to said frame, and stationary propelling devices arranged above said surface and held in such proximity thereto as to be embedded, wholly or partially, in the material flowing over said surface, whereby the material is propelled over the surface in a direction contrary to that in which the lower half of the gyratory movement is performed and in which the material would be propelled in the absence of said propelling devices, substantially as set forth.

2. The combination with a frame having a vertical longitudinal gyratory motion and containing a horizontal surface over which the material flows, of propelling devices arranged above said surface and made adjustable toward and from the same, whereby said propelling devices can be placed in proximity of such surface so as to propel the material in one direction or can be raised to a position in which they allow the material to be propelled in the opposite direction, substantially as set forth.

3. The combination with a frame having a vertical longitudinal gyratory motion, of a horizontal sieve and a conveyer-bottom arranged in said frame, discharge-spouts connected with said bottom, and propelling devices arranged above said bottom and made adjustable toward and from the same, whereby the material falling upon said bottom can be caused to flow in opposite directions, substantially as set forth.

4. The combination with a frame having a vertical longitudinal gyratory motion and containing a horizontal surface over which the material flows, of transverse crank-rods journaled in said frame above said surface and means whereby said rods can be secured in their adjusted position, substantially as set forth.

5. The combination with two sieve-frames arranged side by side, and means whereby a vertical longitudinal gyratory motion in opposite directions is imparted to said frames, of a transverse equalizing-lever on which said frames are supported, substantially as set forth.

6. The combination with two sieve-frames arranged side by side and means whereby a vertical longitudinal gyratory motion in opposite directions is imparted to said frames, of a transverse equalizing-lever on which said frames rest, and a pivotal support for said lever capable of vertical adjustment, substantially as set forth.

7. The combination with two sieve-frames arranged side by side and means whereby a vertical longitudinal gyratory motion in opposite directions is imparted to said frames, of a transverse equalizing-lever provided with knuckles at its middle and at its ends, socket-pieces secured to said frames and resting on the end knuckles of said lever, and a supporting-socket in which the pivotal knuckle of said lever rests, substantially as set forth.

8. The combination with two sieve-frames arranged side by side, of transverse crank-shafts arranged underneath said frames, bearings secured to said frames and engaging with the cranks of said shafts, a transverse equalizing-lever on which said frames rest, and a vertically-adjustable pivotal support for said lever, substantially as set forth.

Witness my hand this 7th day of November, 1895.

JOHN E. MITCHELL.

Witnesses:
M. HARMON,
S. B. COLLINS.