

(No Model.)

2 Sheets—Sheet 1.

C. E. McNEAL.
GRAIN SEPARATOR.

No. 300,621.

Patented June 17, 1884.

Fig. 1.

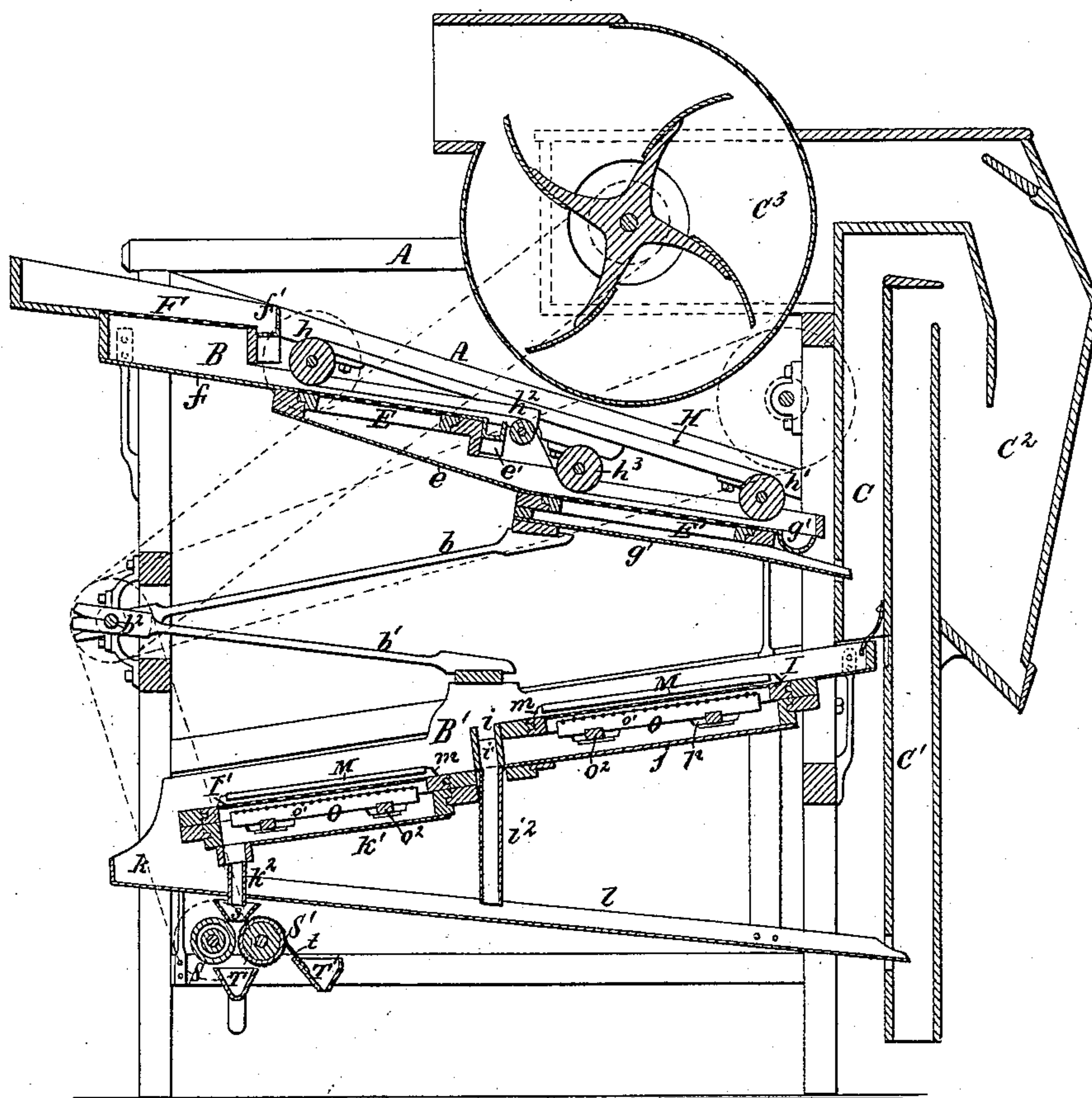
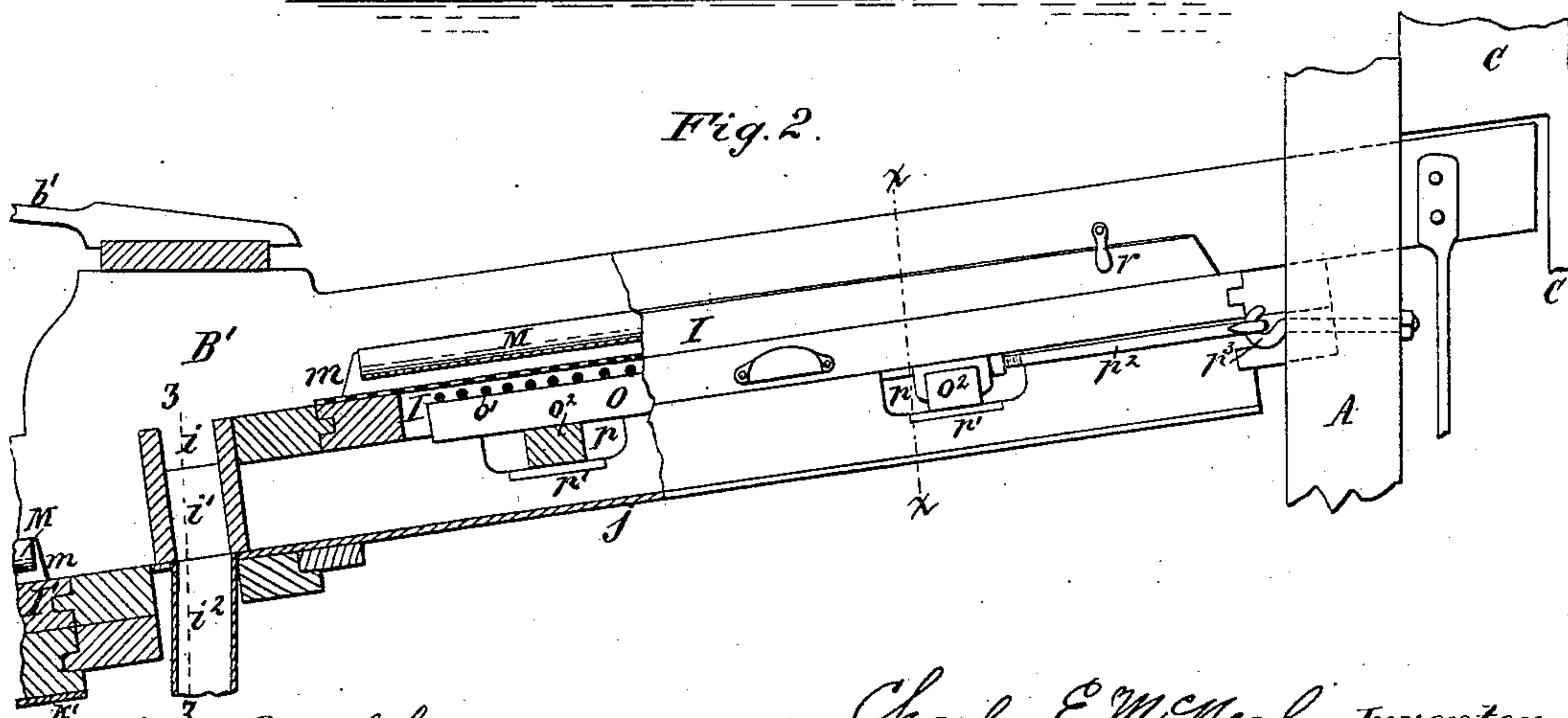


Fig. 2.



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By Wilhelm & Bonner
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2 Sheets—Sheet 2.

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Fig. 3.

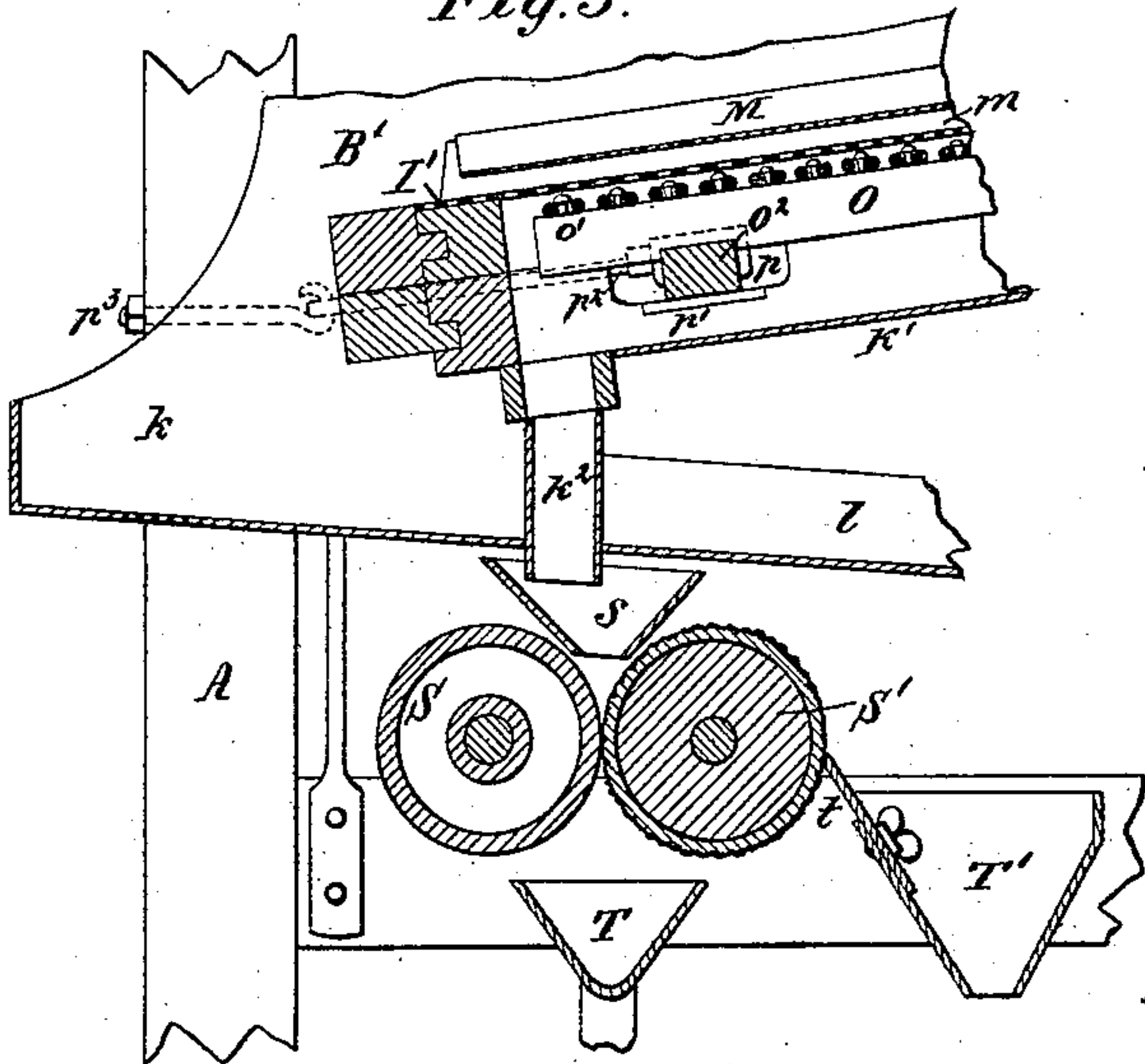


Fig. 4.

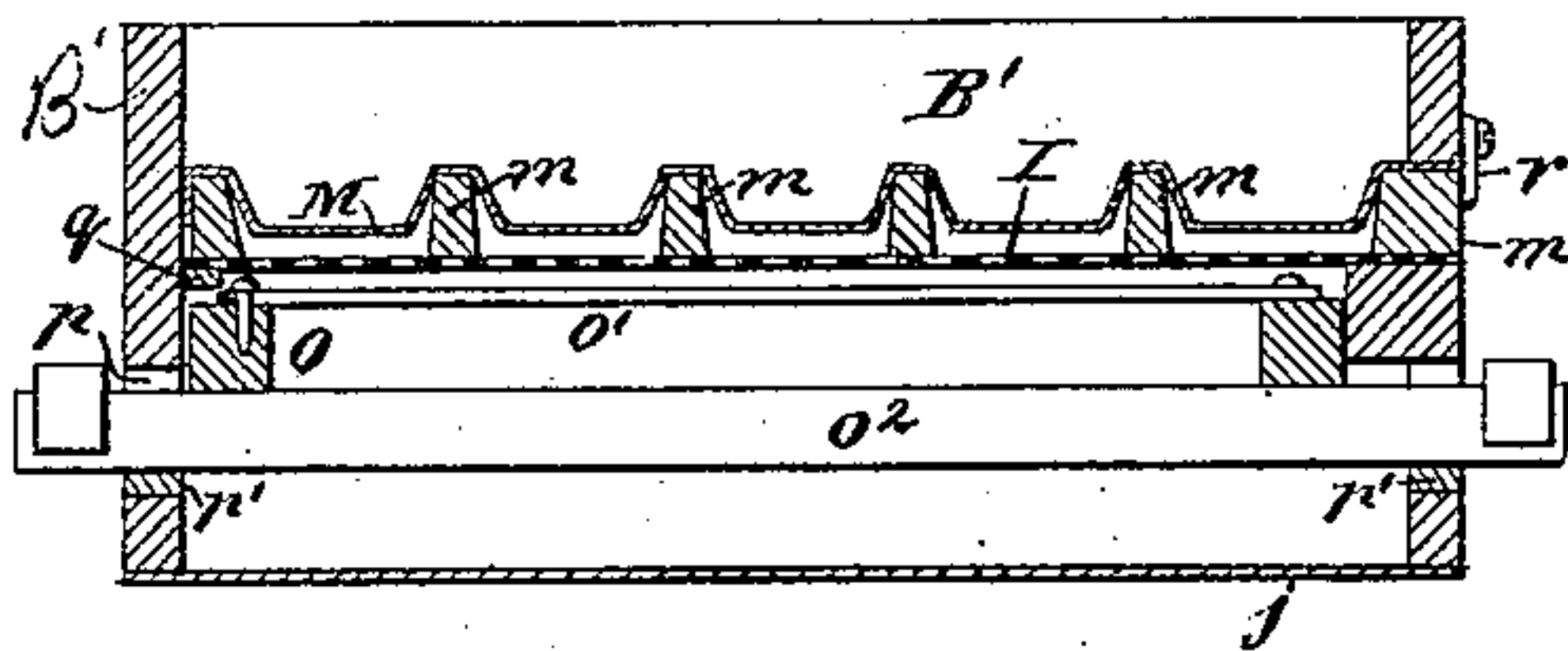


Fig. 6.

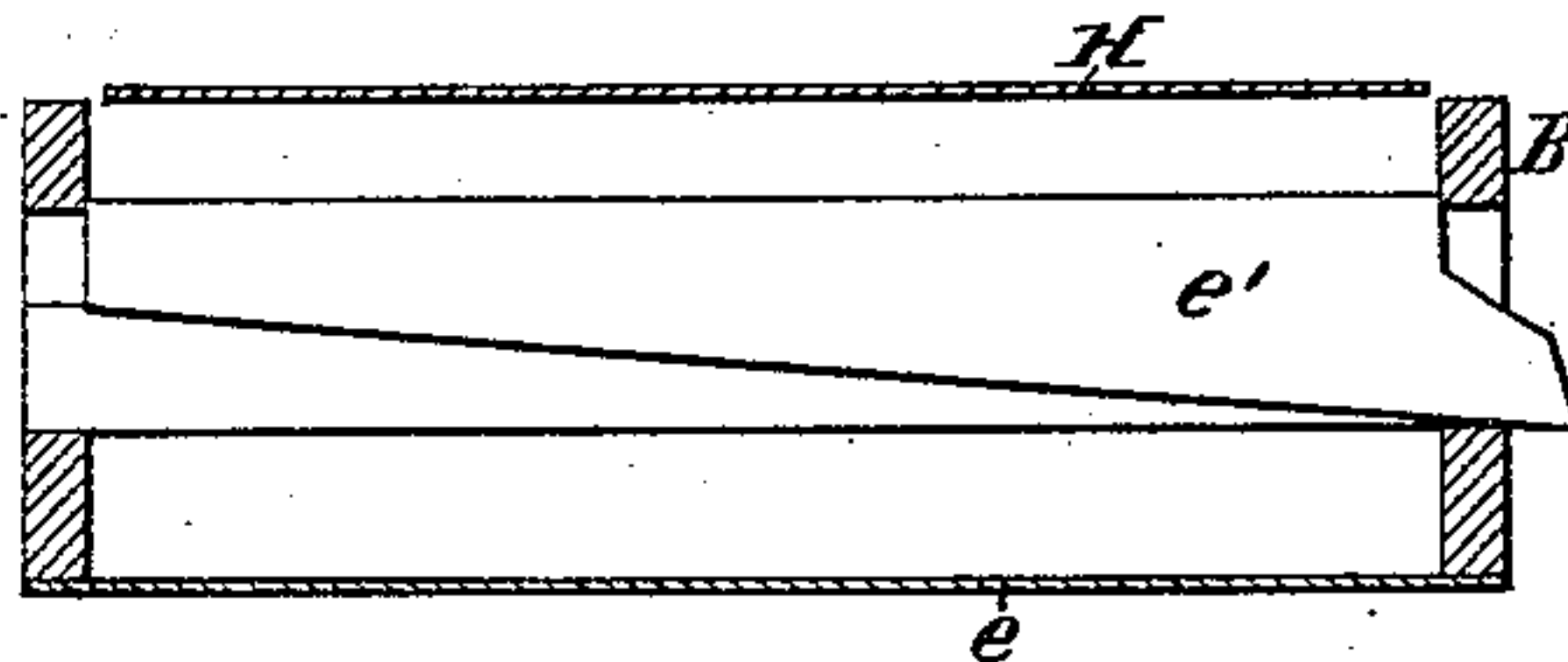


Fig. 5.

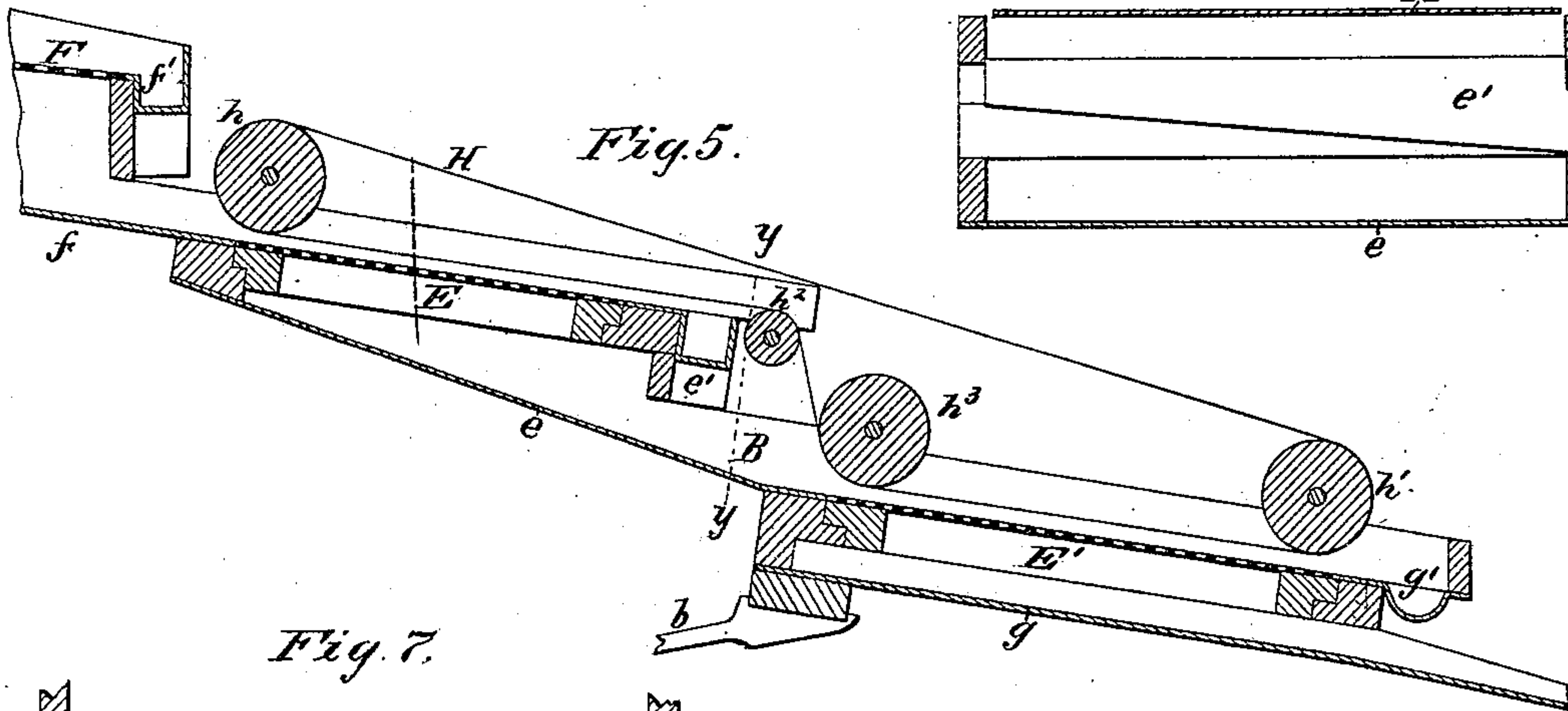


Fig. 7.

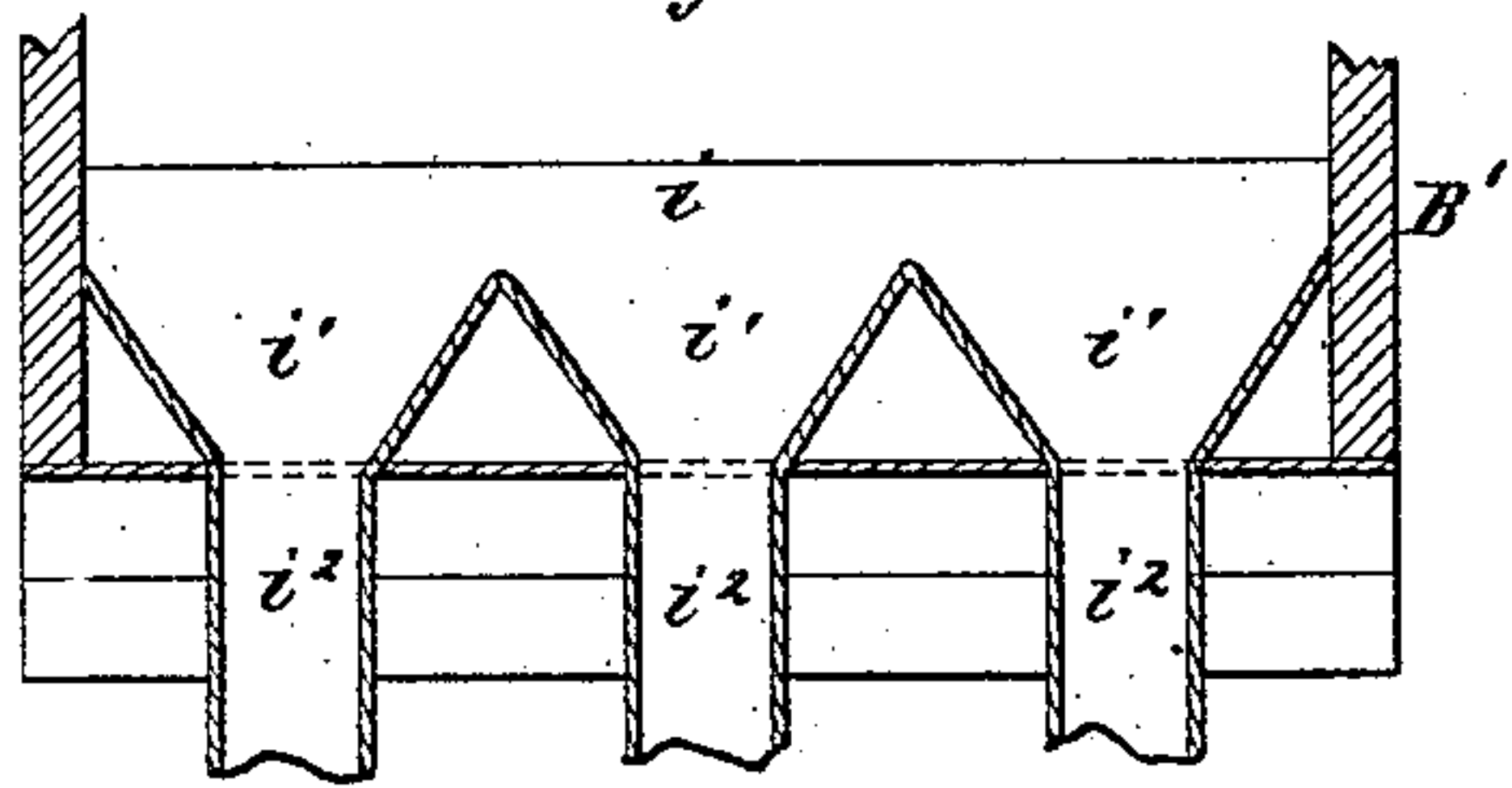
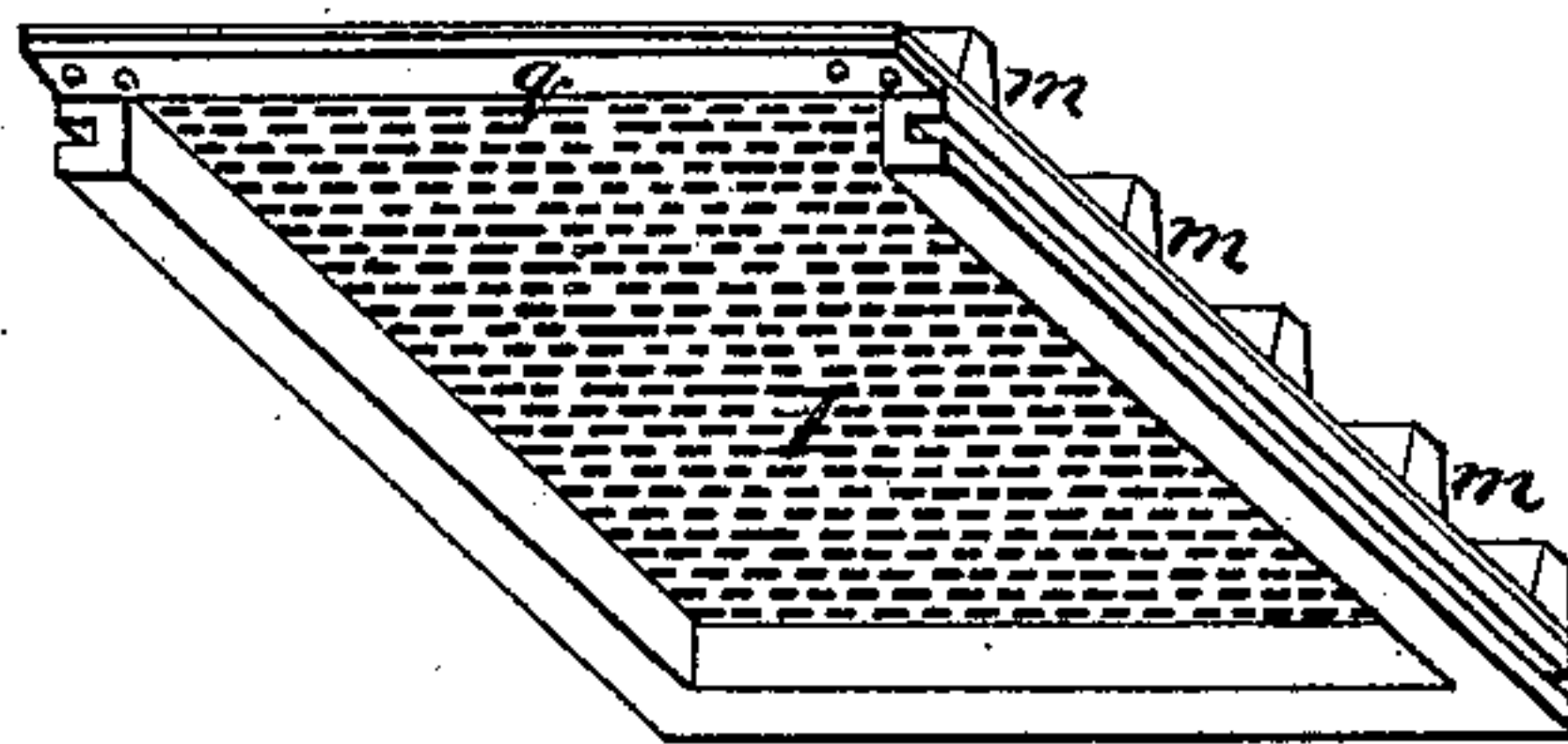


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES E. McNEAL, OF SILVER CREEK, NEW YORK.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 300,621, dated June 17, 1884.

Application filed February 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. McNEAL, of Silver Creek, in the county of Chautauqua and State of New York, have invented new and
5 useful Improvements in Grain-Separators, of which the following is a specification.

This invention relates to an improvement in that class of grain-separators which are employed for separating oats, cockle, and other
10 foreign seeds and impurities from wheat by means of shaking-sieves.

The object of this invention is to construct a machine in which this separation is effected more completely and expeditiously than heretofore; and my invention consists of the improvements in the construction of the machine which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting
20 of two sheets, Figure 1 is a longitudinal sectional elevation of a machine provided with my improvements. Fig. 2 is a side elevation, partly in section, of one of the lower sieves on an enlarged scale. Fig. 3 is a longitudinal section, on an enlarged scale, of the tail portion of the lower sieve. Fig. 4 is a cross-section in line *xx*, Fig. 2. Fig. 5 is a longitudinal section, on an enlarged scale, of the upper sieves. Fig. 6 is a cross-section in line *yy*, Fig. 5. Fig. 7
25 is a cross-section in line *zz*, Fig. 2. Fig. 8 is a perspective view of one of the lower sieves.

Like letters of reference denote like parts in the several figures.

A represents the stationary main frame of
35 the machine.

B is the upper shaking-shoe, and B' the lower shaking-shoe, both operated, respectively, by rods *b b'*, connected with eccentrics on the shaft *b²*.

40 C represents the ascending air-trunk, which receives the grain escaping from the tail end of the upper shoe, B, and C' is a similar air-trunk, which receives the grain from the lower shoe, B'.

45 C² represents the chess-hopper connected with air-trunks CC', and C³ is the fan whereby air-currents are drawn through said trunks and the chess-hopper.

50 E E' represent two sieves inclined in the same direction, and arranged in the upper

shoe, B, at different elevations, the head of the lower sieve, E', being arranged below the tail end of the upper sieve, E.

F represents a preliminary screen arranged in the upper portion of the shoe B, whereby
55 sticks, stones, and other coarse impurities are separated from the grain before it passes upon the upper sieve, E.

f represents a tight plate arranged underneath the preliminary sieve F, to receive the
60 grain passing through said sieve and conduct the same to the sieve E.

f' is a trough which is arranged below the tail end of the sieve F, and receives the coarse impurities and discharges the same on one
65 side of the machine.

e represents a tight inclined plate secured in the shoe B underneath the sieve E, so as to receive the grain which passes through the sieve E and conduct the same to the head of
70 the sieve E'.

e' is a trough arranged below the tail end of the sieve E, to receive the impurities which have passed over the sieve and discharge
75 same on one side of the machine.

g represents a tight inclined plate secured in the shoe B underneath the sieve E', to receive the grain which has passed through this sieve and conduct the same to the head of the lower shoe, B'. In passing from the upper
80 shoe to the lower shoe, the grain falls through the air-current in the wind-trunk C, whereby it is freed from the dust, chess, and other light impurities.

g' represents a trough arranged below the
85 tail end of the lower sieve, E', to receive the material which has escaped over the sieve and discharge the same on one side of the machine. The sieves E and E' are constructed of perforated metal of the proper mesh or size
90 of perforations to permit all the grain excepting oats to pass through the same. The oats and straw pass over the sieves, and are discharged by the spouts *e'* and *g'*. By arranging the two sieves E E' in different planes and
95 discharging the oats from the upper sieve separately, the lower sieve is relieved from the oats so discharged and better enabled to effect a complete separation of the remaining oats from the wheat.

H represents an endless apron or belt arranged to travel with its lower portion downwardly over the sieves E E' in such close proximity to their upper surfaces as to compel the kernels of oats to lie flat on the sieves, thereby preventing the oats from tipping up and passing through the perforations of the sieves. The apron or belt H passes around a head-pulley, *h*, a tail-pulley, *h'*, and intermediate guide-pulleys, *h² h³*, whereby the belt is conducted from the tail end of the upper sieve, E, downward to the head of the lower sieve, E'. The shafts of these pulleys are supported in bearings secured to the frame A, and the belt or apron H is driven by a belt running around a pulley secured to the shaft of the head-pulley *h*.

I represents the upper sieve of the lower shoe, B', and I' the lower sieve, arranged in said shoe with its head below the tail of the sieve I. The upper sieve, I, is constructed of perforated metal of the proper kind to permit the small wheat and cockle to pass through the sieve, while the large wheat passes over the sieve into a trough, *i*, from which it is discharged through tubes *i'* into spouts *i²*.

j is a tight inclined plate arranged below the sieve I, to receive the small wheat and cockle which have passed through the sieve and conduct the same to the head of the lower sieve, I'. The latter is constructed of perforated metal having such openings that the small wheat will pass over the tail of the sieve I' into a receptacle or trough, *k*, while the cockle will pass through the sieve and fall upon an inclined tight plate, *k'*, by which it is conducted to spouts *k²*. The small wheat passes from the receptacle *k* upon an inclined chute, *l*, which receives also the large wheat from the spout *i²*, and conducts both to the air-trunk C', where the wheat is again subjected to the action of an air-current. The sieves I I' are provided on their upper sides with longitudinal parallel strips *m*, to which the perforated metal is secured, and which prevents the latter from bagging or sagging between the sieve-frames. In order to compel the grain to lie flat on the sieves I I' in passing over the same, these sieves are covered with aprons or curtains M, which rest on the grain between the ribs *m*.

O represents stationary racks or grates arranged underneath the sieves I I' in such close proximity to the under sides of these sieves that they will come in contact with the ends of any kernels of wheat which may have lodged in these sieves, and force such kernels upwardly upon the sieves, while they permit the cockle to pass through. The rack O under the sieve I is arranged so far below the sieve as to permit the small wheat to pass through the screen with the cockle, while it prevents the large wheat from passing through. The racks O consist of rectangular frames provided with cross-bars of wire, *o'*, which extend across the under sides of the sieves I I'.

The frames of the racks O are supported in the side pieces of the shoe B' by cross-pieces *o²*, which are secured to the under sides of the side frames, and extend outwardly through elongated openings *p* inside pieces of the shoe B', and rest on metallic wear-plates *p'*, secured in said openings. The frames O are secured to the stationary frame A by links *p²* and eyebolts *p³*, whereby the rack-frames are held stationary with reference to the longitudinal shaking motion of the shoe, but permitted to rise and fall with the shoe when the latter changes its position in the machine. It sometimes happens that the shoe settles in the frame, or that one of its sides settles more than the other. Such a displacement of the shoe changes the relative positions of the sieves to the rack-frames when the latter are supported on the stationary frame, which was heretofore the usual practice. By supporting the rack-frames on the shoe itself the proper position of the frames to the sieves is maintained under all circumstances and the proper working of the machine insured. Each of the sieves E E' and I I' is fitted in grooves or ways in the respective shoes, having an opening through one of the side pieces of the shoe, so that the sieves are laterally removable from the shoe, thereby permitting the sieves to be easily exchanged for sieves having finer or coarser perforations, as may be required. The frames of the sieves I I' are each constructed with a rear piece, *q*, which is thinner than the front and side pieces, as represented in Fig. 8, so that these sieves can be inserted into the shoe B' over the rack-frames O. In order to secure the necessary strength, the rear piece, *q*, is preferably constructed of iron, while the front and side pieces can be constructed of wood. The screen-frames are secured in the shoes by turn-bolts *r*. The cockle discharged from the lower sieve I' is delivered into a hopper, *s*, from which it passes between two rollers, S S', revolving with their adjacent faces upwardly. The roller S is constructed of iron or other smooth material, and the roller S' is covered with sheep-skin or other adhesive material which will retain the cockle and elevate the same.

t is an inclined scraper-plate bearing against the roller S' to remove the cockle therefrom, and T T' are two hoppers or spouts, the former arranged below the adjacent faces of the rollers, to receive the grain escaping from the same, and the latter arranged below the scraper *t*, to receive the cockle. The kernels of cockle are rough and adhere to the sheep-skin, while the kernels of small wheat or other valuable grains or seeds which may still be mixed with the cockle do not adhere to the roller S' and pass through between the rollers and fall into the receptacle T. As but a small percentage of valuable grains are mixed with the cockle, the bulk having been removed by the screens, the final separation by the rollers is rendered very complete and effective. If the grain to

be separated contains no cockle, the screens I I' may be dispensed with, and if the grain contains no oats the sieves E E' may be dispensed with; but ordinarily both sets of screens 5 will be required to effect a complete separation.

I claim as my invention—

1. The combination, with two screens—one arranged with its head below the tail of the other and both inclined in the same direction— 10 of an endless belt or apron arranged to travel in close proximity to the upper surfaces of both screens, substantially as set forth.

2. The combination, with two screens—one arranged with its head below the tail of the other and both inclined in the same direction— 15 of an endless belt or apron arranged to travel in close proximity to the upper surfaces of both screens, and guide-rollers whereby the lower side of said belt or apron is guided from 20 the tail of the first screen to the head of the second screen, substantially as set forth.

3. The combination, with a shaking-shoe containing a screen or sieve, of a stationary rack or grate supported in said shaking-shoe 25 underneath said sieve, substantially as set forth.

4. The combination, with a shaking-shoe containing a screen or sieve, of a rack or grate supported in said shoe underneath the screen 30 or sieve, and held stationary with reference to the shaking motion of the shoe, while being capable of adjusting itself vertically with the shoe, substantially as set forth.

5. The combination, with the stationary frame A and a shaking-shoe containing a sieve, 35 and provided with side openings, p , of a rack or grate, O, having cross-pieces o^2 , projecting through the openings p , and bars p^2 , whereby the rack or grate is attached to the stationary frame, substantially as set forth. 40

6. The combination, with the two screens inclined in the same direction, and one arranged with its head below the tail of the other, of a tight plate whereby the material passing through the first screen is collected and con- 45 ducted to the head of the second screen, a trough arranged below the tail of the first screen to collect the material escaping from the tail of the first screen, and tubes extending downwardly from the said trough through said 50 tight plate, for discharging the material from said trough, substantially as set forth.

7. The combination, with a shaking-shoe provided with an opening in its side, of a rack or grate supported in said shoe, and a screen 55 or sieve adapted to be inserted and removed through said opening in the side of the shoe, and constructed with a thin rear piece, q , to clear said rack or grate, substantially as set forth. 60

In testimony whereof I have hereunto set my hand this 13th day of February, 1884.

CHARLES E. McNEAL.

In presence of—

JNO. J. BONNER,

F. L. BROWNE.