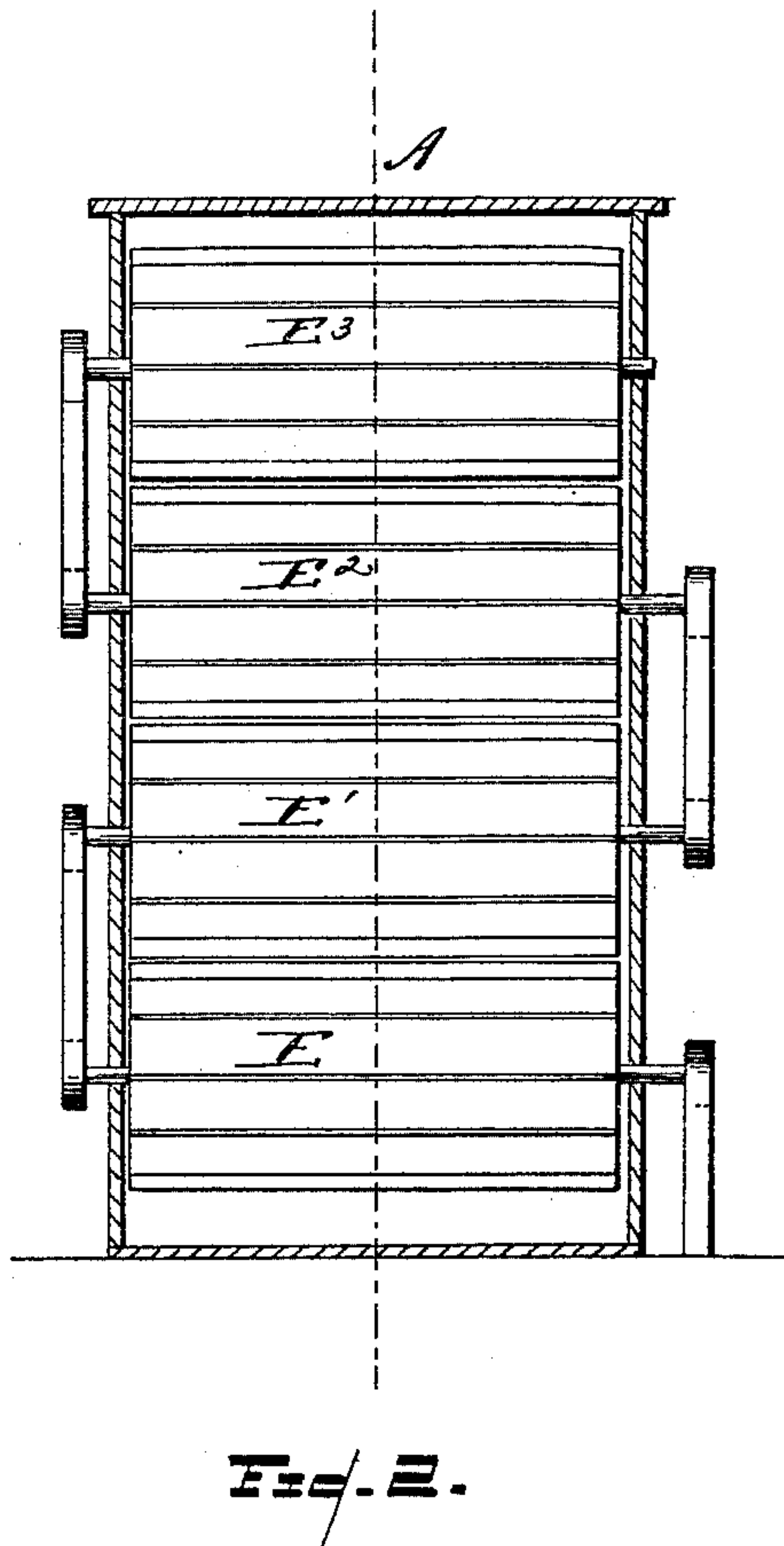
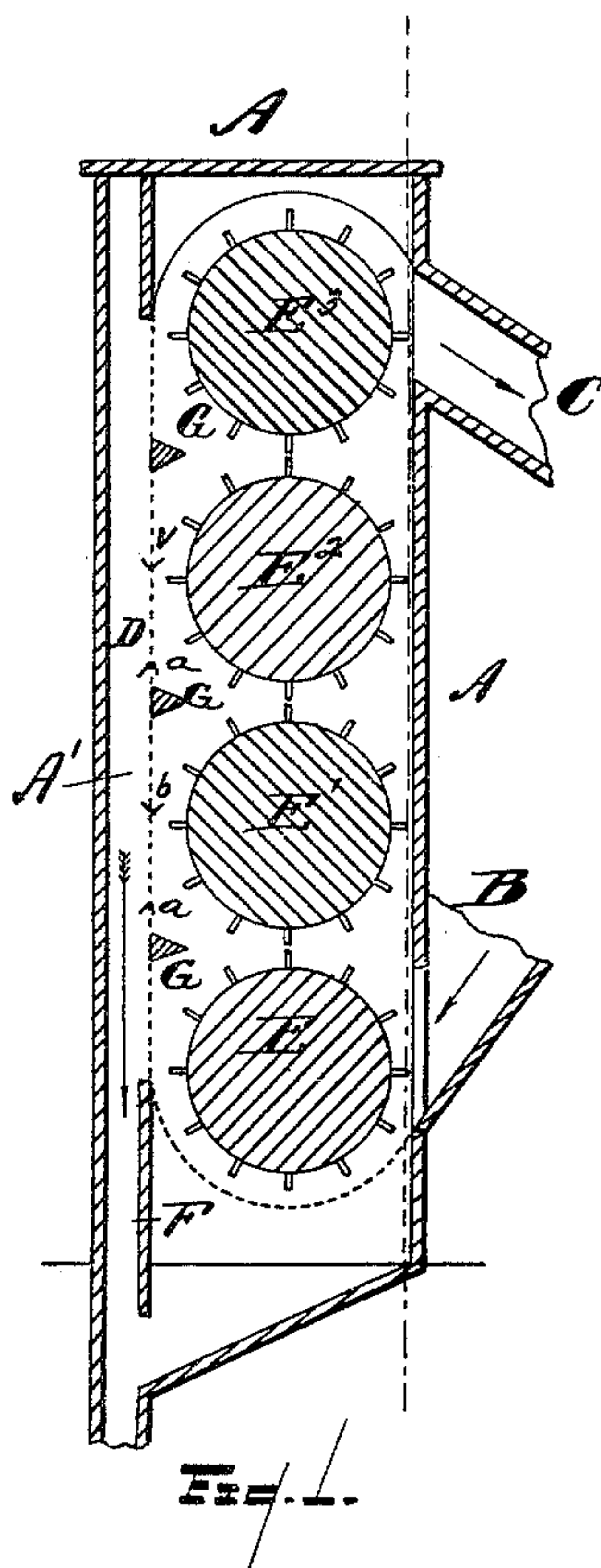


(No Model.)

J. M. FINCH.
MACHINE FOR BOLTING FLOUR.

No. 460,915.

Patented Oct. 6, 1891.



WITNESSES

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JOHN M. FINCH, OF CROCKETT, CALIFORNIA, ASSIGNOR TO MILFORD
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MACHINE FOR BOLTING FLOUR.

SPECIFICATION forming part of Letters Patent No. 460,915, dated October 6, 1891.

Application filed April 11, 1891. Serial No. 388,559. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FINCH, of
Crockett, in the county of Contra Costa and
State of California, have invented a new and
5 useful Machine for Bolting Flour, of which
the following is a specification.

In the annexed drawings, making part of
the specification, Figure 1 is a vertical trans-
verse section of the machine. Fig. 2 is a ver-
10 tical longitudinal section of the machine.

The same letters are employed in all the
figures in the designation of identical parts.

A is a chest substantially air-tight, except
15 where openings are formed for feed and dis-
charge.

B is the feed-opening, and C the discharge-
opening for the escape of the unbolted portion
of the chop or material under treatment.
These openings extend lengthwise of the
20 chest and should be approximately of the
full length of the screen and cylinders, to be
described, and are placed in such position
that the chop shall be fed to the first of the
series of cylinders, and the tailings or un-
45 bolted portions discharged after it has been
subjected to the action of the last of the se-
ries. Any suitable chop-feeder may be em-
ployed, that one being preferable which will
most evenly distribute the chop along the
30 length of the cylinder, so that it may have a
uniform subjection to the action of the screen.

D is a single flat screen formed of bolting-
cloth placed in front of a series of rapidly-ro-
tating cylinders E E' E², &c., arranged in the
35 same plane, axially, and driven in the same
direction. While cylinders, these need not
necessarily be true cylinders, for they may be
solid or hollow, or they may be polygonal or
corrugated, bladed, or otherwise roughened.

The screen D is placed so as to form a par-
40 tition between the body of the chest in which
the cylinders are placed and a chamber A',
into which the flour is delivered and from
which it is discharged at F. The entire chest
45 is therefore substantially air-tight, except as
to the openings B, C, and F.

The cylinders in rotating will entrain—that
is to say, draw with themselves currents of
50 air, which form belts of air revolving with
the cylinders. As all the cylinders revolve

in the same direction, the air-belts at the point
of nearest approach of the cylinders will be
moved in opposite directions. There is suffi-
cient space between the cylinders to prevent
an undue disturbance of these currents; but 55
while it is difficult to ascertain precisely
what takes place as to the currents, the fact
is demonstrated that the chop is thrown
against the screen and almost all the bolting
work is performed on those portions of the 60
screen which are between arrow-heads,
(marked *a* and *b*.) As the chop passes each
cylinder it receives an additional impulse, the
result of which is that it is moved along the face
of the screen toward the tail. The strength 65
of the rotating currents depends upon the
velocity of rotation of the cylinders, and they
are generated by the rapid rotation of an en-
tirely smooth cylinder; but by using narrow
radial blades it is thought that the same effi- 70
ciency may be attained with less speed given
to the cylinders. These blades do not act, as
do those of a rotary fan, to draw in air at the
center and deliver it tangentially at the pe-
riphery, as they are too narrow and too near 75
together to produce such action, and the solid
surface to which they are attached will pre-
vent the indraft of air. Their effect is to
roughen the periphery and promote the fric-
tional action in drawing the air into rotary 80
belts moving with the cylinders. Nor are they
intended to act mechanically as "chop-toss-
ers" to catch the chop and dash it against
the screen. The air-belt intercepts the chop
and carries it forward with a centrifugal im- 85
pulse, delivering it against the screen as it
passes from the influence of one cylinder to
another. The flour as it is sifted through the
meshes falls by gravity through the still air of
the chamber A', while the unbolted portion of 90
the chop, constantly diminishing in quantity,
passes from cylinder to cylinder until the
coarse particles which cannot pass through
the meshes are delivered into the tailings-
spout C. 95

In the machine illustrated in the drawings
the chop is fed to the lowest one of the series
of cylinders, and in such case its action will
be somewhat different from that as above de-
scribed appertaining to the subsequent cyl- 100

inders. As the chop is fed into the bottom of the chest the cylinder wallows in the chop, and there the blades perform the mechanical function of throwing it upward into the air-belt which surrounds and travels with the next cylinder in the series. In this case the bottom underneath the feed-opening may be made of a semi-cylindrical form and may be composed of bolting-cloth, through which the flour will be sifted before the chop comes to the flat screen D, and be delivered into the flour-spout with the other. As the flour should fall away from the screen D and not back through it, it may be placed in any position which will permit this escape. As the forward impulse by which the chop is delivered against and carried along the screen is due to the rotation of the cylinders generating the rotary air-belts the feed may be delivered to the lowest cylinder in the series, and I have now in operation machines in which the chop is fed into the bottom and the tailings delivered after passing to the top-most cylinder. In this case the machine acts as an elevator as well as a separator, and by multiplying the number of cylinders the tailings may be carried as high as may be desired. In such case, of course, shorter cylinders will be used with a long narrow vertical screen, the relative proportions being preserved, so as to give the necessary amount of bolting-surface, whether the distance traveled vertically, horizontally, or obliquely be much or little. So far as this work of elevation or conveying is concerned independently of the specific use of the cylinders in combination with the screen for bolting the essential elements will be made the subject of a concurrent application and the claims of this patent limited to combinations in which a screen is an element, reserving the right to make broader claims in the other application and patent.

Baffle-strips G, arranged across the screen between the cylinders, are intended to give inward direction to the current of chop, so as to bring it more directly into the action of the rotating belts of air, which gives it continued forward movement with fresh impulse as it passes from one to the other. I have not been able to ascertain from careful observation that any part of the chop after it has left the first cylinder of the series penetrates the rotating air-belt to come in contact with the cylinder or blades; but if it should be the case such particles will be thrown out mechanically by the centrifugal action of the blades. For this reason the cylinders are placed near to the surface of the screen—say at a distance of three-fourths of an inch—whereas if the blades acted mechanically to throw the chop the distance might be quite considerable, dependent largely upon the gravity of the particles.

While I have given to the best of my knowledge the precise effect produced by the different parts of the machine, I do not wish

to be held to the correctness of my theories; but I stand upon the description of the machine which is now in practical operation as being sufficient to enable persons skilled in the art to construct and operate it, which can be done whether my theories are correct or not.

I am aware that various devices have been proposed for throwing the chop against the surface of stationary screens inclosing the chop-throwing devices, sometimes in the form of screens surrounding a bladed cylinder in whole or in part, and in others the screens were flat and placed face to face, so that the chop was thrown first against one and then against the other, thus passing down in a zig-zag course from top to bottom; but in all these machines the action of chop-throwing was purely mechanical and the currents of air, where developed at all, were intended to pass through the meshes with the flour, neither of which actions is contemplated in my machine. In the machine in which rotary brushes or fans are employed between two screens, they necessarily revolve in opposite directions, and any rotary current which may be generated will be in opposite directions, counteracting one another and incapable of producing continuous forward movement along one screen, as in my machine, in which the movement of the chop under treatment is due to the rotation of all the cylinders of the series in one and the same direction.

Any suitable cloth-cleaning device may be employed for keeping the meshes of the cloth open by sweeping or jarring the screen.

Instead of a single chest and a single cloth a series of compartments may be formed end to end by intermediate partitions, and cloths of different grades may be employed, and the unbolted residue of the first may be delivered to the bottom of the next compartment and the work of separation continued on cloths of different texture as far as it is desired to continue it.

The cylinders may be driven by an open belt extending from a pulley on the shaft of one to a pulley on the shaft of the next, and so on through the series, to give them motion in the same direction.

No broad claim is made herein to the combination, in an elevator or conveyer, of a trunk having a feed-opening at one end and a discharge-opening at the other and a series of cylinders having rotation in the same direction and arranged in proximity to one of the sides of the trunk, as this is embraced in my pending application, Serial No. 388,558.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a casing provided with a feed-opening at one end and a tailings-discharge opening at the other, a series of cylinders having rotation in the same direction and a single screen placed in front of the cylinders, substantially as set forth.

2. In combination with a casing provided with a feed-opening at one end and a tailings-discharge opening at the other, a series of bladed cylinders having rotation in the same direction and a single screen placed in front of the cylinders, substantially as set forth.

3. In combination with a casing provided with a feed-opening, a tailings-discharge opening, and a flour-discharge opening, a series of cylinders having rotation in the same direction, a single screen placed in front of the cylinders and forming a partition between the chamber in which the cylinders operate, and another chamber into which the flour passes and from which it is discharged, substantially as set forth.

4. In combination with a casing and feed and tailings discharge openings at opposite ends, a series of cylinders having rotation in the same direction, a single screen placed in front of the cylinders, and baffle-strips along the screen, substantially as set forth.

5. In combination with a casing provided with a feed-opening at the bottom and a tailings-discharge opening at the top, a series of cylinders placed one above the other and

having rotation in the same direction and a screen placed in front of said cylinders, substantially as set forth.

6. In combination with a casing provided with a feed-opening at the bottom and a tailings-discharge opening at the top, a series of cylinders rotating in the same direction, the lower one of said cylinders being constructed with radial blades, and a screen placed in front of said cylinders, substantially as set forth.

7. In combination with a casing provided with a feed-opening at the bottom and a tailings-discharge opening at the top, a series of cylinders rotating in the same direction, the lower one being constructed with radial blades, a screen H, placed under the lower cylinder, and a screen D, placed in front of the series of cylinders, substantially as set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two attesting witnesses.

JOHN M. FINCH.

Witnesses:

ALEX. L. BADT,
JOHN P. POOLE.