

No. 768,212.

PATENTED AUG. 23, 1904.

N. M. BOWEN.
FANNING MILL.

APPLICATION FILED DEC. 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

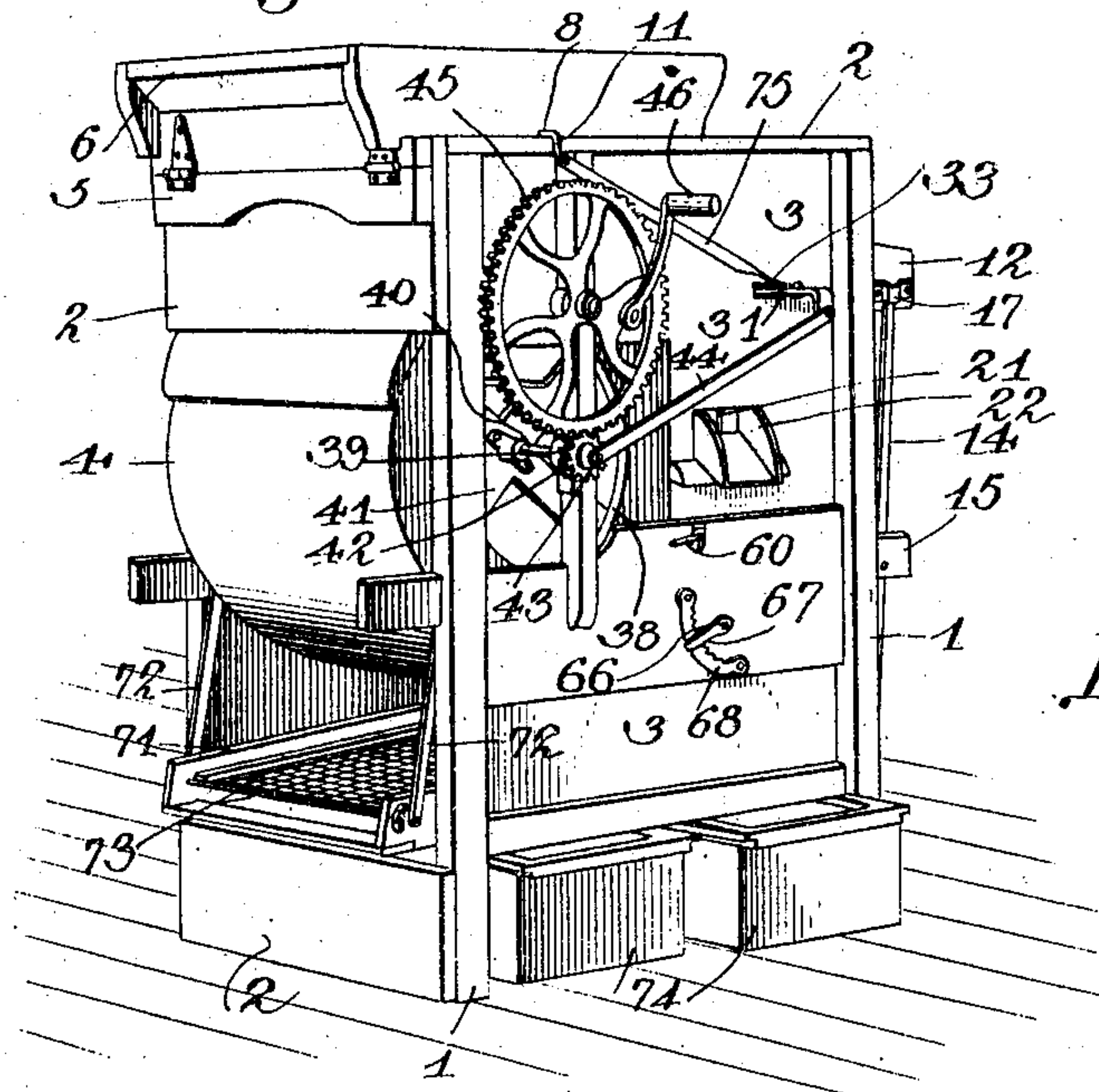


Fig. 7.

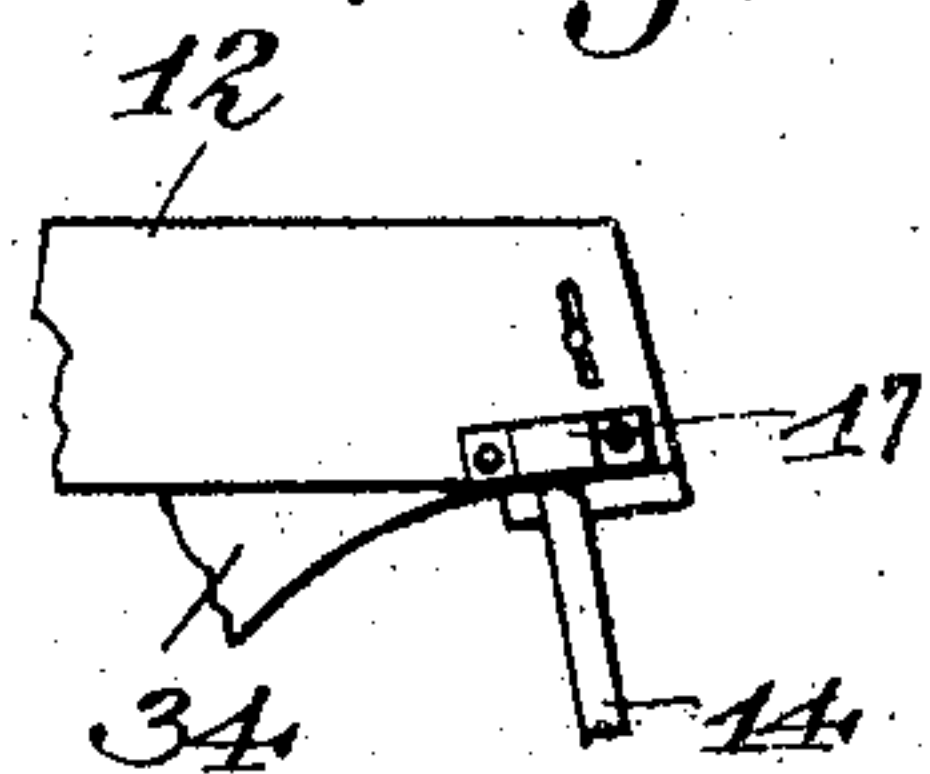


Fig. 8.

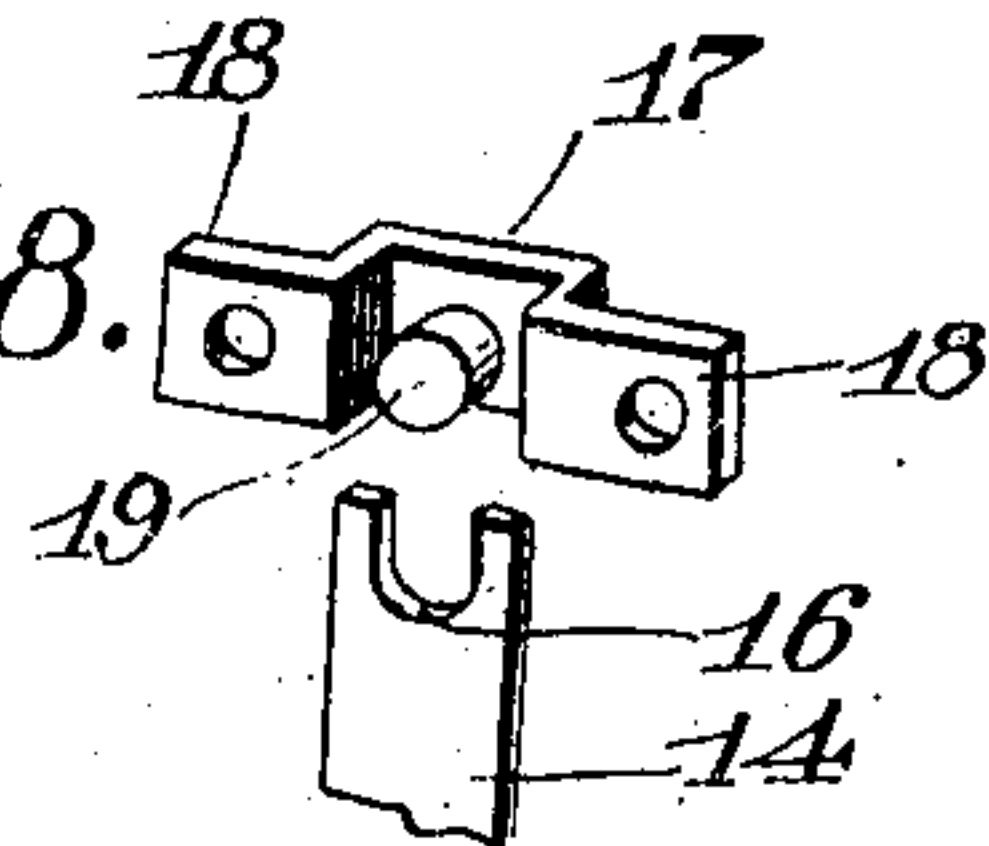


Fig. 9.

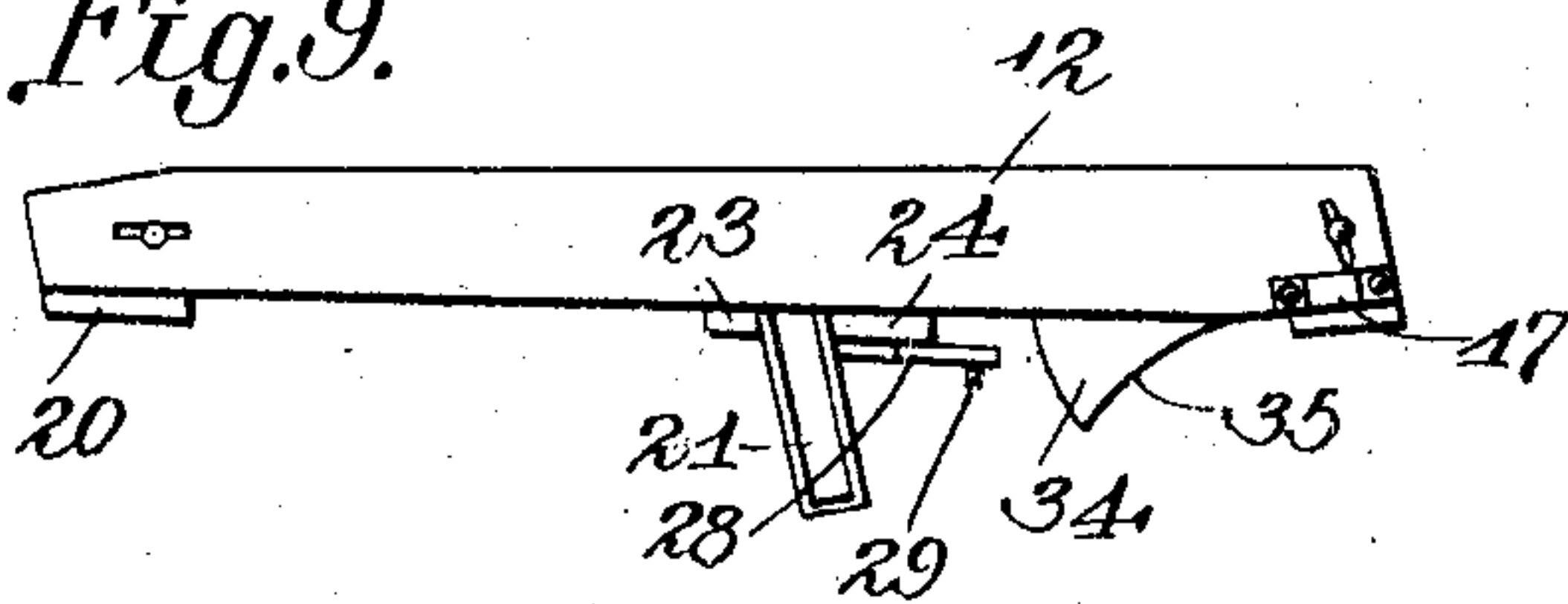


Fig. 10.

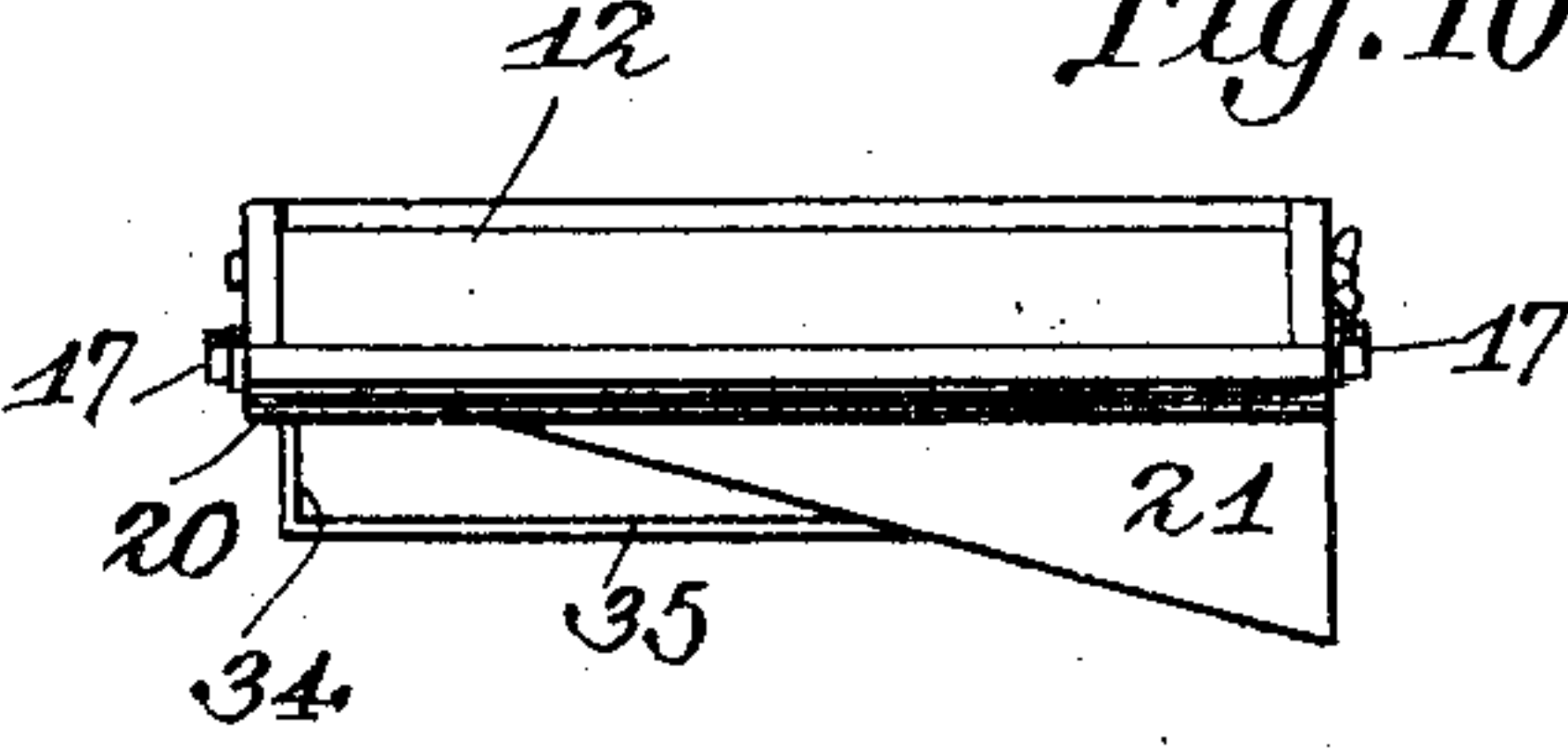


Fig. 11.

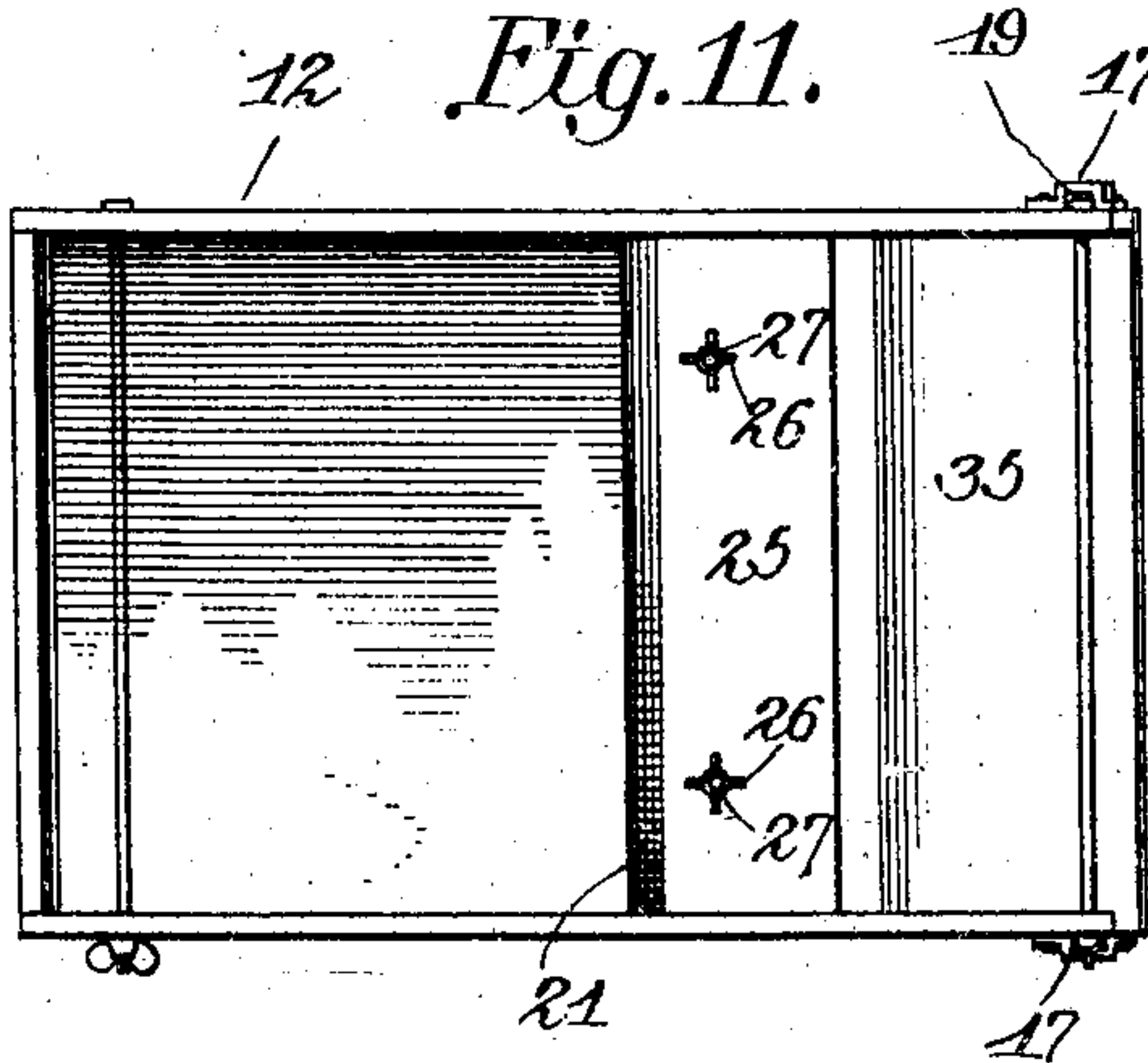
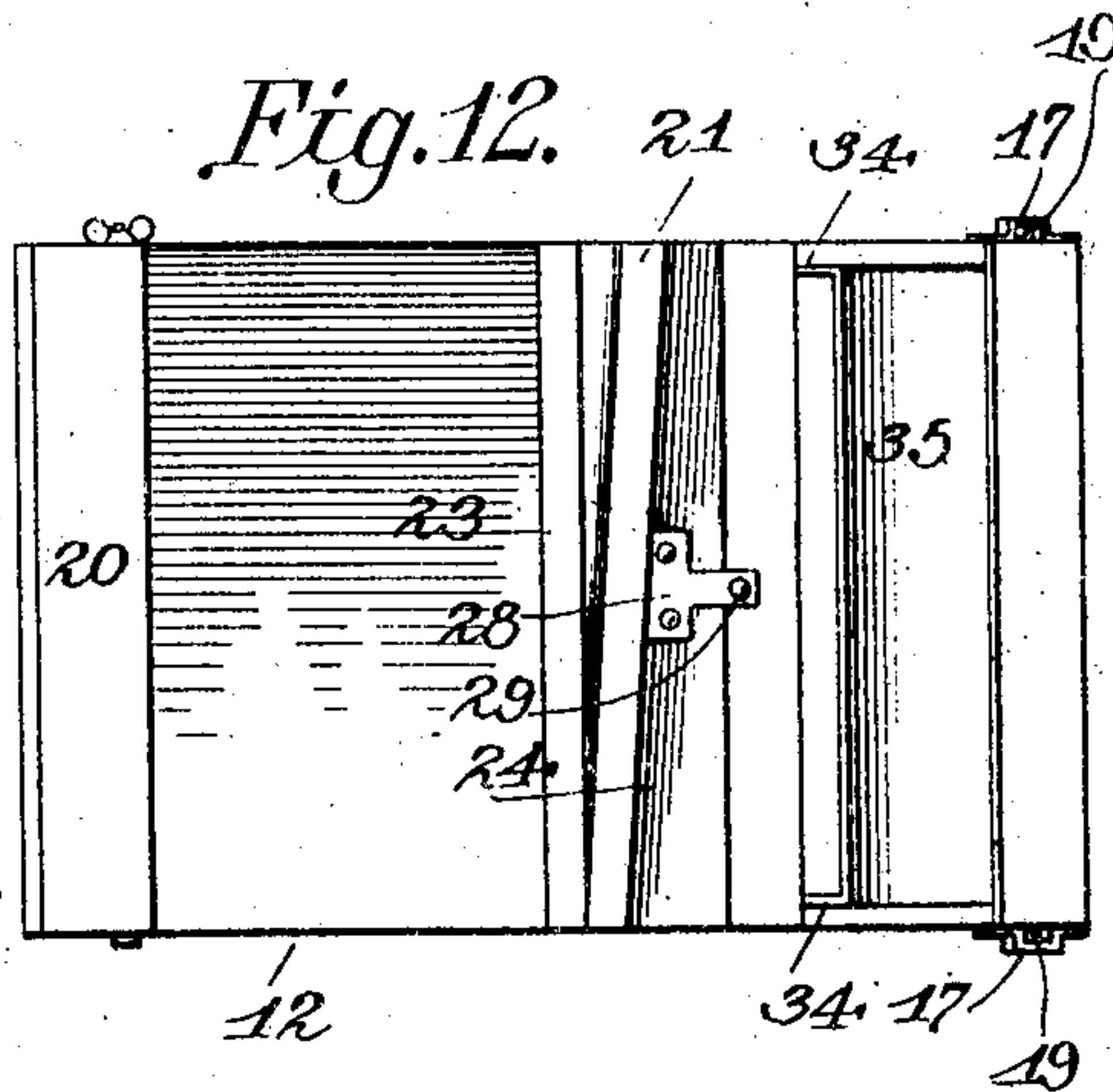


Fig. 12.



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2 SHEETS—SHEET 2.

Fig. 2.

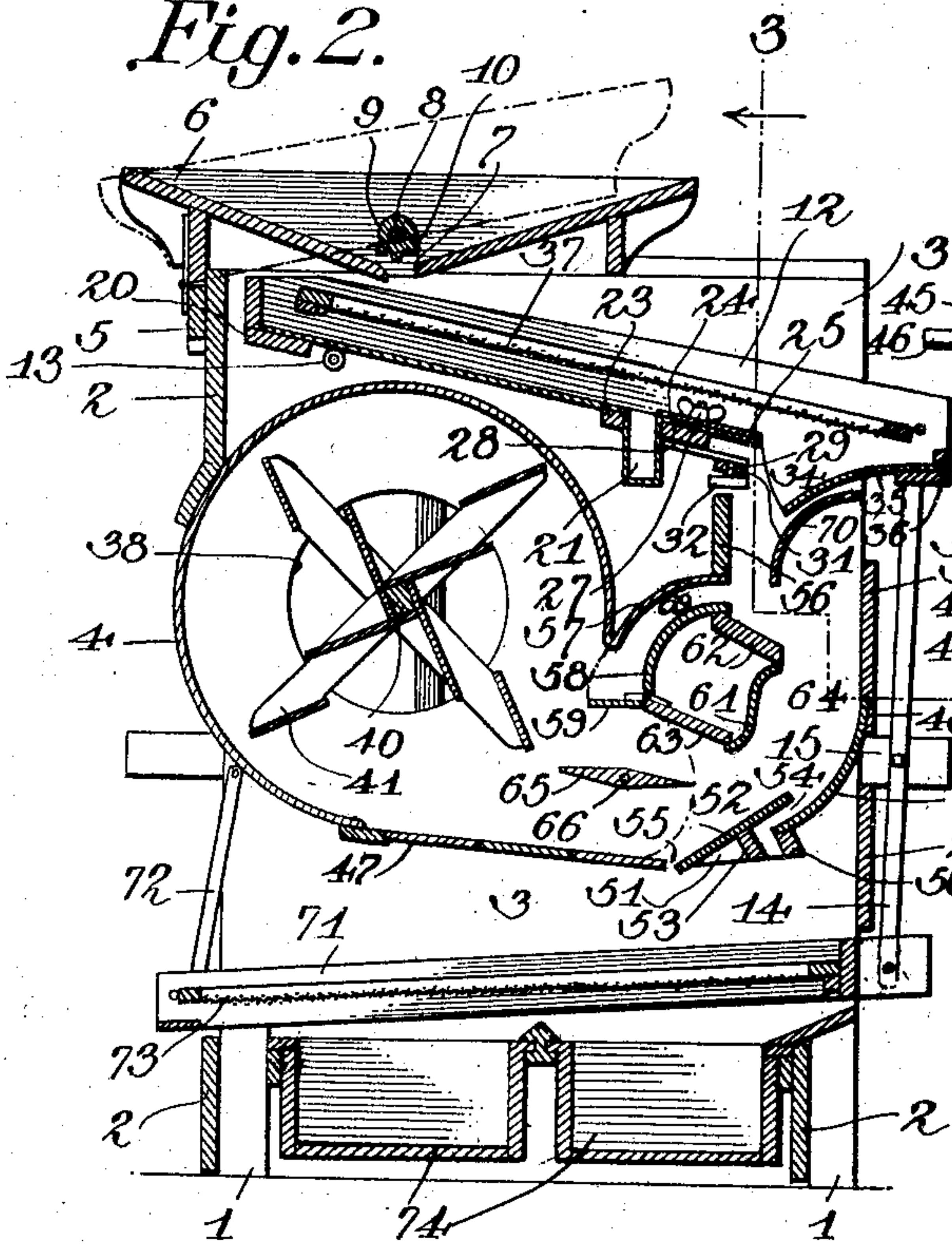


Fig. 3.

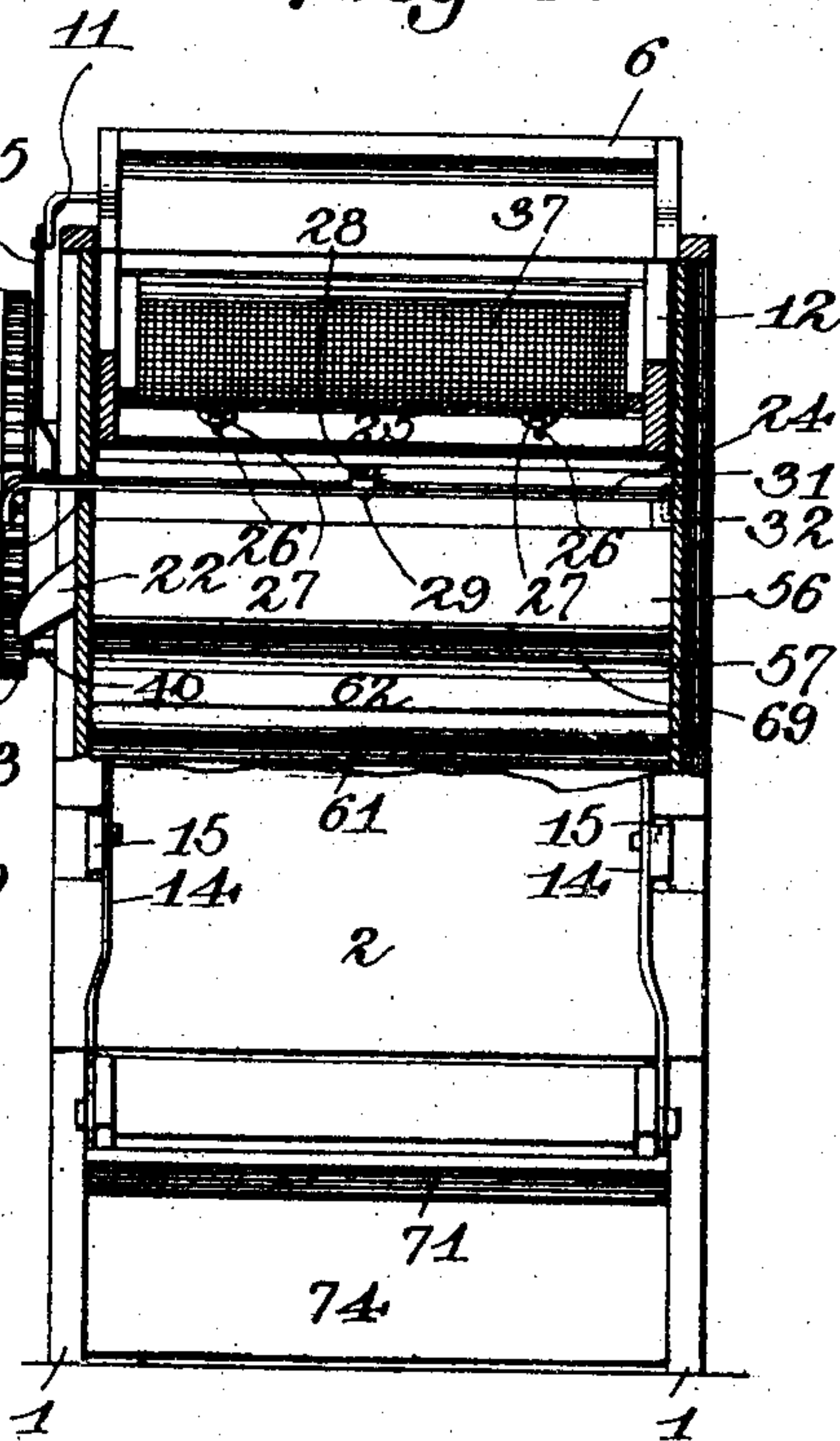


Fig. 4.

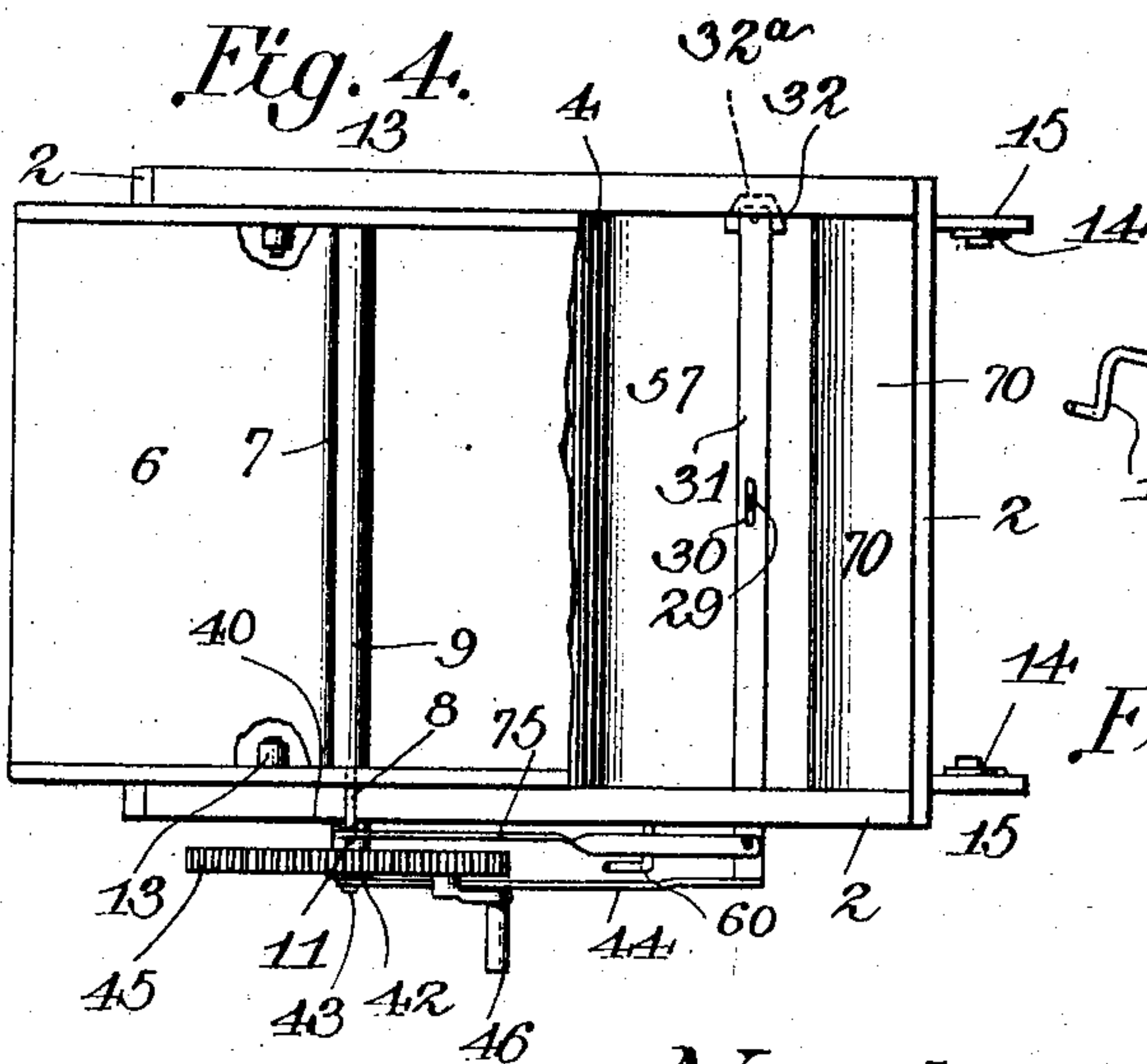


Fig. 5.

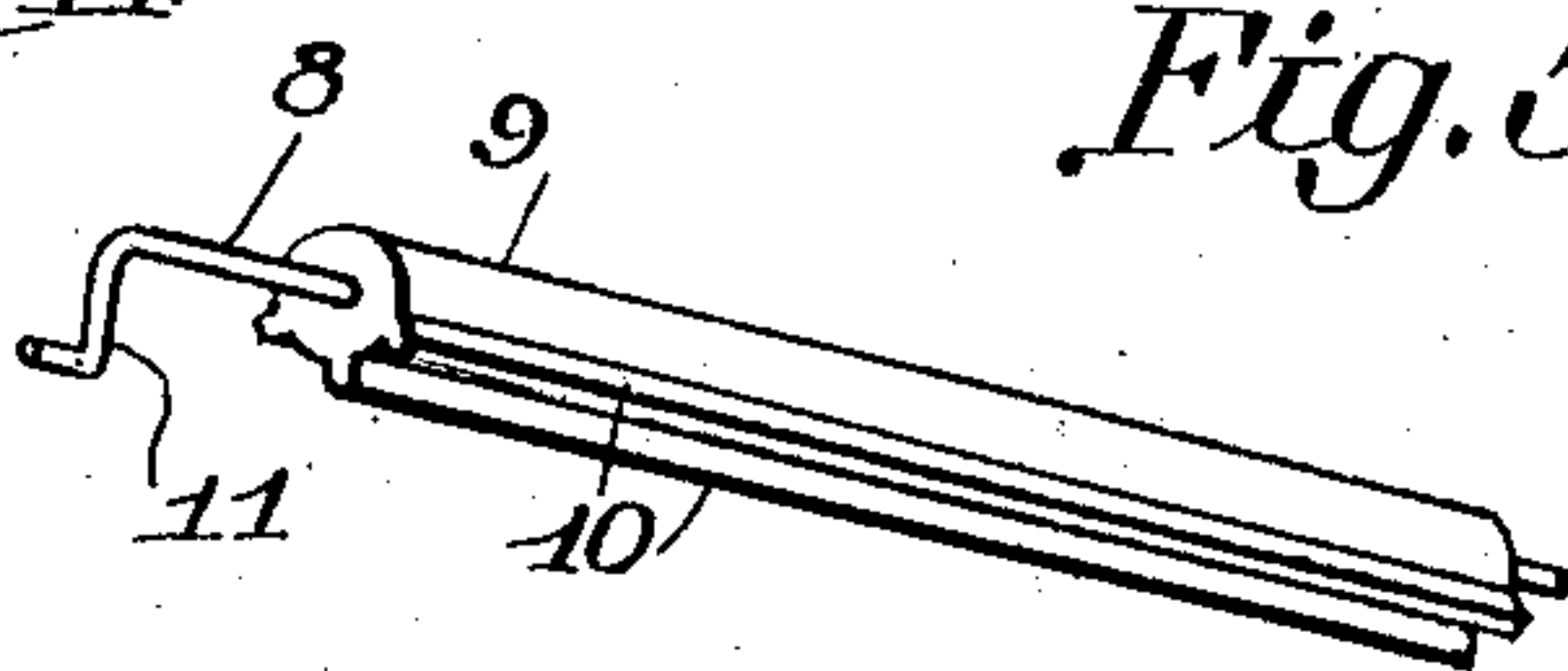
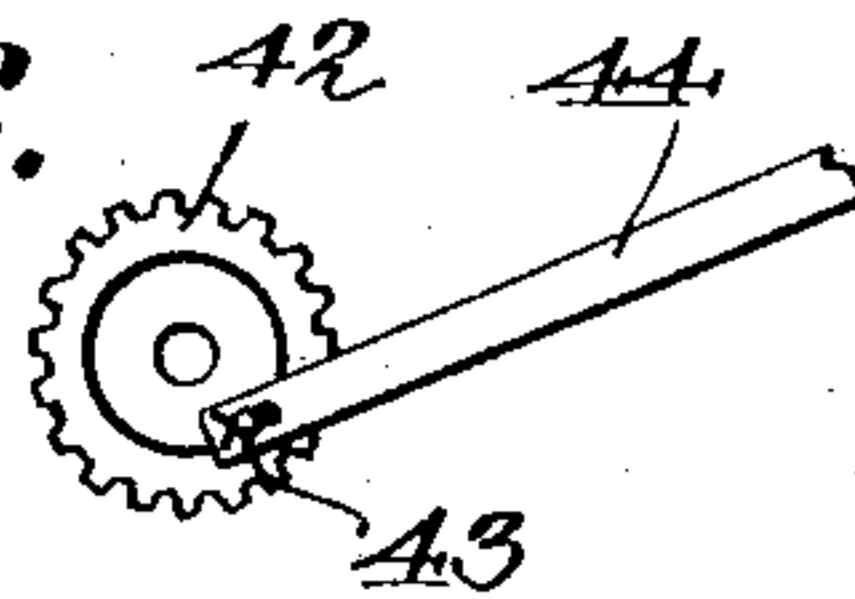


Fig. 6.



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UNITED STATES PATENT OFFICE.

NEWTON M. BOWEN, OF INDIANAPOLIS, INDIANA.

FANNING-MILL.

SPECIFICATION forming part of Letters Patent No. 768,212, dated August 23, 1904.

Application filed December 22, 1903. Serial No. 186,195. (No model.)

To all whom it may concern:

Be it known that I, NEWTON M. BOWEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Fanning-Mill, of which the following is a specification.

This invention relates to grain and seed cleaning devices of the class which is commonly known as "fanning-mills;" and it has for its object to provide a device of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency.

With these ends in view the invention consists in certain improvements in the construction and arrangement of the constituent parts of the device, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated one form of embodiment of my invention, it being understood that changes may be made with regard to size, proportion, and exact manner of assemblage within the scope of my invention and without departing from the spirit or sacrificing the utility of the same.

In said drawings, Figure 1 is a perspective view of a fanning-mill constructed in accordance with the principles of my invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a sectional elevation taken on the line 3-3 in Fig. 2. Fig. 4 is a top plan view showing the machine with a portion of the feed-hopper removed. Fig. 5 is a perspective detail view of the force-feed roll. Fig. 6 is a detail side view of the pinion on the fan-shaft and a portion of the connecting-rod. Fig. 7 is a side elevation of the front portion of the upper shoe, showing also the upper end of one of the walking-beams extending downward therefrom. Fig. 8 is a perspective detail view showing the upper end of one of the walking-beams and the means for connecting it with the shoe. Fig. 9 is a side elevation of the upper shoe. Fig. 10 is a rear elevation of the same. Fig. 11 is a top plan view of said upper shoe. Fig. 12 is a bottom plan view of the same.

Corresponding parts in the several figures are indicated by similar numerals of reference.

In the construction of my improved fanning-mill I employ a frame comprising four corner posts or uprights 1, which are suitably connected and spaced apart at their upper and lower ends by means of cross-pieces, as 2, and the sides of which, where necessary, are filled with paneling 3. This main casing contains the fan-casing 4 and the other elements of the invention, which are now to be more fully described.

The upper rear cross-bar 2 of the main frame supports the cleat 5, with which is hingedly connected the feed-hopper 6. Said hopper is provided in the bottom thereof with a transverse slot 7. In the sides of the hopper a short distance above said slot is journaled a transverse shaft 8, upon which is mounted a roll or cylinder 9, provided with a plurality of radially-extending ribs or flanges 10, said ribs being formed upon the under side of the roll, facing the slot 7. The shaft 8 is extended at one end and provided with a crank 11, whereby it is operated, by means to be hereinafter described, to rock and oscillate the roll within the hopper, thereby agitating the contents of said hopper and causing it to escape downwardly through the slot 7. The sides of the hopper 6 normally rest upon the top of the main frame; but owing to its hinge connection with said main frame it may be conveniently raised, as shown in dotted lines in Fig. 2, to enable access to be had to subjacent parts of the machine.

12 designates the main or upper shoe, which is supported at its rear end upon rollers 13, journaled to the sides of the casing. The front end of the shoe is supported by means of uprights, which I term "walking-beams" 14. The latter are secured pivotally to brackets 15, extending forwardly at the sides of the machine, and their upper ends are provided with U-shaped recesses 16. (Shown clearly in Fig. 8 of the drawings.) The connection of these uprights or walking-beams with the upper shoe 12 is effected by means of caps or clips 17, having laterally-extending flanges 18 perforated to receive screws or bolts whereby they are firmly secured to the sides of the shoe. These caps or clips are provided with inwardly-extending pins 19,

the inner ends of which are in contact with the sides of the shoe, and they are of sufficient width to admit the upper ends of the walking-beams, the U-shaped recesses of which engage the pins 19, the caps being sufficiently wide to permit the necessary play. The recesses 16 are of sufficient depth to safely retain the pins 19 when the machine is in operation; but it will be seen that the parts may be easily and very quickly disconnected or re-assembled, as may be desired. Thus when it shall be desired to remove the shoe from the machine for any purpose whatever it will be only necessary to raise the front portion thereof until the pins 19 are disengaged from the recesses in the walking-beams. The shoe may thus be readily lifted off the supporting-rollers 13 and removed from the casing. To replace it, the operation is simply reversed.

The shoe 12 is provided near its rear edge with a cross-piece 20, forming a shoulder or flange which while it does not interfere with the necessary reciprocating movement of the shoe will prevent it from becoming accidentally disengaged from the supporting-rollers.

The shoe 12 when in proper position for operation is inclined downwardly and forwardly, and the bottom thereof is provided with a transversely-inclined trough 21, discharging into a spout 22, which is secured in a slot or opening in one side of the machine, said spout being of sufficient width to accommodate the discharge end of the trough 21 during the vibratory movement of the shoe 12 when the machine is in operation.

The transversely-inclined trough 21 is reinforced at the sides thereof by cross-pieces 23 and 24 upon the under side of the bottom of the shoe, and the latter supports in front of the trough 21 a slide 25, having slots 26, through which set-screws 27 extend downwardly into the cross-bar 24 for the purpose of securing at any desired adjustment the slide 25, which latter may be utilized, when desired, to cover the trough 21, thus preventing the passage of grain into and through the latter. To the under side of the cross-bar 24 is secured a bracket 28, having a downwardly-extending pin 29, which engages a slot or opening 30 in a bar 31, which latter is mounted pivotally at one end thereof upon a block 32, secured to one side of the frame of the machine, while its opposite end extends through a slot 33 in the opposite side of said frame. The pivoted end of the bar 31 extends into a recess 32^a in the side wall of the machine-casing, whereby it is securely retained against upward displacement, which might otherwise be caused by the upward draft or blast caused by the fanning mechanism to be hereinafter described. The bar 31 does not form a supporting means for the shoe, but serves to impart to the latter a vibratory motion by the

engagement of the pin 29 and slot 30 when the machine is in operation.

The sides of the shoe 12 are extended forwardly in front of the casing, as will be clearly seen in Figs. 1 and 2, and said sides near their front ends have downward extensions 34, at the inner ends of which the forwardly and downwardly inclined bottom of the shoe terminates. To the under sides of the depending or bracket portions 34 is secured a downwardly and rearwardly curved or inclined bottom portion 35, forming a chute which receives the discharge from the main portion of the bottom of the shoe and discharges the same in a rearward and downward direction. At the front end of the chute 35 is a cross-piece forming a flange 36 to prevent material being spilled over the front edge.

In the shoe 12 is mounted a sieve or riddle 37, which extends rearwardly under the feed-hopper and forwardly over the chute 35. This riddle may be supported detachably in the shoe in the usual well-known manner to enable a riddle of any desired mesh to be used in connection with the device.

The main frame of the machine contains, as already stated, the fan-casing 4, the cylinder or body of which is of ordinary construction. At the ends of said fan-casing are provided the air-inlets 38, and bearings 39 are likewise provided for the shaft 40, carrying the fan 41. The fan-shaft is provided at one end thereof with a pinion 42, having a wrist-pin 43, which is connected by a pitman 44 with the end of the vibratory bar 31, which projects through the slot 33 in the casing. Motion is imparted to the fan-shaft by means of a gear-wheel 45, journaled upon the side of the casing, meshing with the pinion 42 and having a crank 46, whereby it may be conveniently manipulated, although it is obvious that power of any kind may be utilized for driving the machine by providing proper means for conveying motion to the gear-wheel 45 from any suitable source of power.

The fan-casing 4 has a flat bottom portion 47, which is inclined slightly in a downward and forward direction and which terminates at some distance from the front of the main casing of the machine, which is closed by paneling, as will be clearly seen in Fig. 2. The said paneling is recessed, as will be seen at 48, for the reception of the upper edge of a curved shield portion 49, the lower end of which is supported upon a cross-bar 50 and is elevated above the lower front edge of the inclined floor portion 47, between which and said shield 49 is an opening or slot 51, which is bridged by an inclined bottom board 52, supported upon a cross-bar 53. It will be observed that by the relative arrangement and disposition of parts, as just described, the parts 47, 52, and 49 conjointly operate to constitute the floor or bottom of the fan-casing,

the blast being deflected first against the inclined part 52 and then against the curved portion 49, the upper edge of which being set in the recess 48 is flush with the inner side of the casing formed by the paneling 3, whereby the blast is directed upwardly, as will be readily understood. The openings 54 and 55 are for the passage of grain into the shoe below the fan-casing, said opening 54 being between the upper edge of the board 52 and the curved portion 49, while the opening 55 is between the lower portion of the inclined board 52 and the floor portion 47:

56 is a transverse vertical partition, the lower edge of which is connected with the upper edge of the mouth of the cylindrical portion of the fan-casing by means of a curved shield 57, which may be integral with the fan-casing, as shown in Fig. 2 of the drawings, and the inner convex side of which co-operates with the members 52 and 54 to constitute what may be termed the "discharge-opening" of the fan-casing. In this discharge-opening is situated a deflecting device comprising a curved plate 58, which is somewhat eccentric with relation to the curved portion 57, the lower ends of said curved plates being spaced somewhat farther apart than their upper ends. These plates or members 57 and 58 thus coöperate to form a passage-way the contracted discharge end of which is practically horizontal and in a forward direction, as will be readily seen in Fig. 2. The space between the lower ends of the members 57 and 58 is capable of being closed by a damper 59, operable by means of a lever 60, which extends through the side of the casing.

61 designates an ogee-shaped plate disposed forwardly of the plate 58, connected with the latter by transverse boards or partitions 62 and 63 and facing the curved portion 49, between which and said ogee-shaped plate is formed a passage-way 64.

65 designates a valve or damper which is mounted upon a shaft 66, extending through one side of the casing and provided with a lever or handle 67, engaging a toothed segment 68, whereby it will be retained at any desired adjustment. This damper may be closed while the damper 59 is open, so as to direct the blast from the fan through the passage-way 69 between the plates 57 and 58, or the damper 59 may be closed and the damper 65 opened, so as to direct the blast through the passage-way 64 only, or the said dampers may be adjusted in any desired manner so as to distribute the blast from the fan through the passage-ways 64 and 69 and to regulate the intensity of the blast through either passage-way. The final discharge of the blast takes place over the upper edge of the front paneling 3, above which is secured a curved deflector 70, which is disposed a short distance under the curved chute

35 of the shoe 12 and the lower edge of which terminates a short distance above the front edge of the board 62, which, together with the board 63 and the plates 58 and 61, constitutes the deflector in the mouth of the fan-casing.

71 designates the lower shoe, the rear of which is suspended by means of straps 72 and the front end of which has pivotal connection with the lower ends of the walking-beams 14, whereby the front end of said shoe is supported. It is obvious that when the machine is in operation a vibratory or reciprocatory movement reversely to that of the upper shoe is imparted to the lower shoe through the medium of the walking-beams 14. The lower shoe contains a sieve or riddle 73, and below it are arranged troughs, as 74, for the reception of the seed or grain to be operated upon by the machine.

A pitman or connecting-rod 75 connects the free end of the vibratory bar 31 with the crank 11 of the force-feed roll 9, which is thereby oscillated.

From the foregoing description, taken in connection with the drawings thereto annexed, the operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. By the rotation of the gear-wheel 45 motion is imparted to the fan, from the pinion upon the fan-shaft through the pitman 44 to the vibratory bar 31, which operates the upper shoe, by means of the walking-beams 14 from the upper to the lower shoe, and by the connecting-rod 75 to the force-feed roll. Material being fed into the hopper is permitted to escape through the slot 7 in the latter onto the riddle 37 in the upper shoe. When the slide 25 is adjusted to leave the trough 21 open, the seed escaping through the riddle above the seed-trough will pass into the latter and be discharged over the spout 22 at the side of the machine without being operated upon by the air-blast. When the condition of the grain or seed requires that it should be operated upon by the air-blast, the slide 25 is closed, and all of the grain passing through the sieve will then be discharged over the bottom shoe onto the chute 35, which likewise receives such grain as may be discharged over the front end of the screen. The grain and chaff are discharged by the chute 35 into the channel or passage-way between the transverse partition 56 and the curved shield 70, dropping from said passage-way onto the board 62, which is forwardly and downwardly inclined, as shown. In dropping from said passage-way the material is subjected to the horizontal blast coming through the passage-way 69 and is thereby driven directly into the upward vertical current coming through the passage-way 64. This current serves to drive the chaff and lighter particles against the under convex side of the shield 70 and out through the discharge-

opening, while the grain floats downwardly and escapes through the openings 54 and 55 onto the riddle of the lower shoe.

The ogee-shaped plate 61 will serve to deflect the upward current of the blast in a forward direction below the point at which it is intersected by the current coming horizontally through the passage-way 69, and tendency for the chaff to accumulate in and block the passage-way between the partition 56 and the shield 70 will thus be defeated. This is considered an extremely-important feature of my invention, and I have found that by the construction and arrangement of the parts as herein described grain and all kinds of seeds may be thoroughly and satisfactorily cleansed from all impurities in a rapid, practical, and economical manner.

Having thus described my invention, I claim—

1. In a machine of the class described, a fan-casing having an outlet provided with opposite concave sides and obstructing means disposed in said outlet forming in the latter air-channels or passage-ways intersecting each other at an angle, one of said channels being approximately vertical and the other disposed to discharge an air-blast laterally into the current of air ascending through the approximately vertical channels, and means, beyond the sphere of influence of the air-currents, for feeding grain into the air-currents approximately at their point of intersection.

2. In a machine of the class described, a fan-casing having an outlet provided with opposite concave sides, obstructing means disposed in said outlet and cooperating with the upper portion thereof to form a gradually-contracting upper air-passage and a lower approximately vertical air-passage intersected thereby, and means beyond the sphere of influence of the air-currents for feeding grain into the air-currents approximately at their point of intersection.

3. In a machine of the class described, a fan-casing having an outlet provided with opposite concave sides and obstructing means disposed in said outlet, said obstructing means cooperating with the concave sides to form intersecting air-passages relatively vertical and horizontal, the latter passage-way being contracted at its discharge end and adapted to discharge an air-blast transversely into the former, and means beyond the sphere of influence of the air-currents for feeding grain into the air-currents approximately at their point of intersection.

4. In a machine of the class described, a fan-casing having an outlet, obstructing means in said outlet, dividing the latter into two separate air-passages intersecting each other at an angle and including means for independently closing said passage-ways for the passage of air, and means beyond the sphere of influence of the air-currents for feeding grain into the

air-currents approximately at their point of intersection.

5. In a machine of the class described, a fan-casing having a bulging outlet, obstructing means in said outlet, whereby the latter is divided into two separate passage-ways intersecting each other at an angle, a damper hingedly connected with said obstructing means to close one of said passage-ways, a damper adapted to close the passage between the obstructing means and the bottom of the casing, and means beyond the sphere of influence of the air-currents for feeding grain into the air-currents approximately at their point of intersection.

6. In a machine of the class described, a fan-casing having a bulging outlet, obstructing means disposed in said outlet and dividing the latter into two separate intersecting passage-ways, said obstructing means including an ogee-shaped plate to deflect in a forward direction an ascending column of air, and means beyond the sphere of influence of the air-currents for feeding grain into the air-currents approximately at their point of intersection.

7. In a machine of the class described, a fan-casing having a bulging outlet, obstructing means in said outlet, whereby the latter is divided into two intersecting passage-ways, one for an ascending column of air and the other disposed to discharge into said ascending column an intersecting volume of air, and means beyond the sphere of influence of the air-currents for feeding grain into the air-currents approximately at their point of intersection.

8. In a machine of the class described, a fan-casing having a bulging outlet terminating in a lateral discharge-opening, a curved shield disposed above said opening and deflecting air therethrough, obstructing means in the bulging outlet, including two inclined, approximately parallel plates, a curved plate, and an ogee-shaped plate connecting the edges of said inclined plates; a plate extending upwardly from the terminal of the upper side member of the bulging outlet, cooperating with the shield above the blast-outlet to form a grain-passage, the discharge-opening of which is directly above the upper inclined plate of the obstructing means, the same constituting means, beyond the sphere of influence of the air-currents, for feeding grain into the air-currents approximately at their point of intersection.

9. In a machine of the class described, a grain-duct and air-blast passages below said grain-duct, one of said passages carrying an ascending current and the other passage carrying a divergent current of air, laterally intersecting the material dropping through the grain-duct and driving the lighter particles separated therefrom into the ascending air-current, and obstructing means for slightly deflecting the latter prior to its coming under the influence of the intersecting current.

10. In a machine of the class described, a fan-

5 casing having a bulging outlet with opposite
concave sides and an obstruction disposed in
said outlet, said obstruction including a curved
plate disposed eccentrically with relation to the
upper side of the outlet to form a gradually-
contracting air-passage, an ogee-shaped plate
spaced from the lower curved side to deflect
in a forward direction an ascending air-cur-
rent, and cross-pieces connecting the said
10 curved and ogee-shaped plates.

11. In a machine of the class described, a
main frame or casing, a fan-casing having a
bulging outlet with opposite concave sides, a
cross-piece in the main frame connected with
15 the outer edge of the upper concave side, panel-
ing in the main frame constituting an upward
continuation of the lower concave side, an out-
let in said paneling, a curved shield disposed
above said outlet and extending in the direc-
20 tion of the transverse frame-piece, a shoe hav-
ing a discharge-chute above said curved shield,
and obstructing means in the bulging throat of
the fan-case, said obstructing means including
a curved plate disposed eccentrically with re-

lation to the upper curved side, an ogee-shaped 25
plate spaced from the lower concave side, and
cross-pieces connecting the edges of said
curved and ogee-shaped plates.

12. In a machine of the class described, a
main casing, a fan-case having a bulging throat 30
with an outlet in the front side of the main cas-
ing, a curved shield above said outlet, a shoe
having a rearwardly-facing discharge-chute
above said shield, and obstructing means dis-
posed in the bulging throat of the fan-casing 35
to divide the blast into two intersecting cur-
rents, said obstructing means including an
ogee-shaped plate whereby the ascending cur-
rent shall be deflected forwardly prior to its
coming under the influence of the intersecting 40
current.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

NEWTON M. BOWEN.

Witnesses:

NETTIE GROFF,
W. N. READ.