No. 808,724. PATENTED JAN. 2, 1906.

J. M. CASE.

BOLTING MACHINE.

APPLICATION FILED MAR. 21, 1903.

4 SHEETS—SHEET 1.

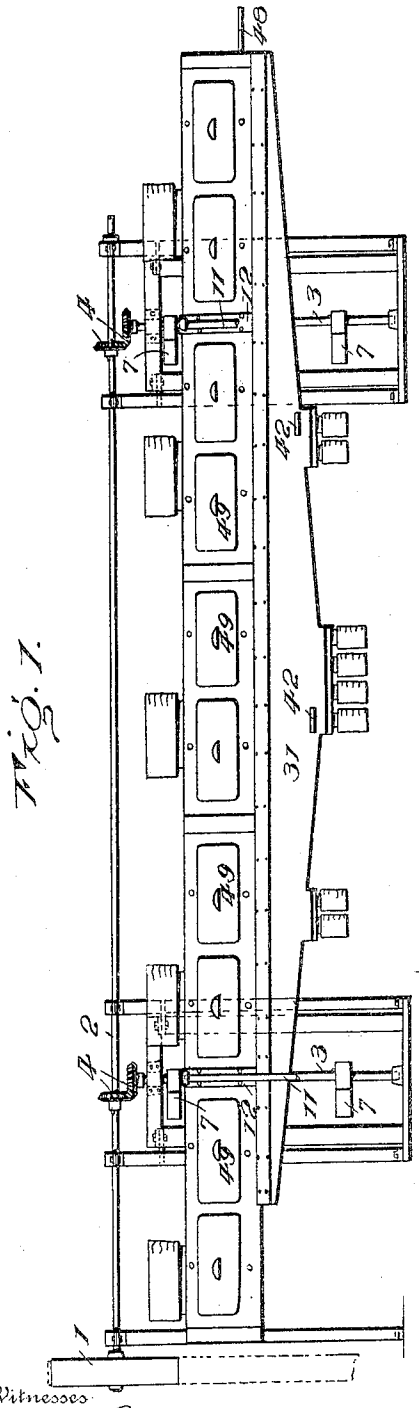

Fig. 1.

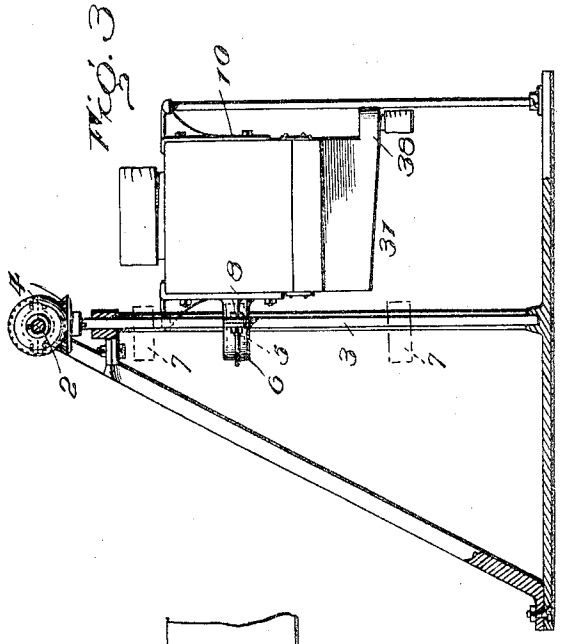

Fig. 3.

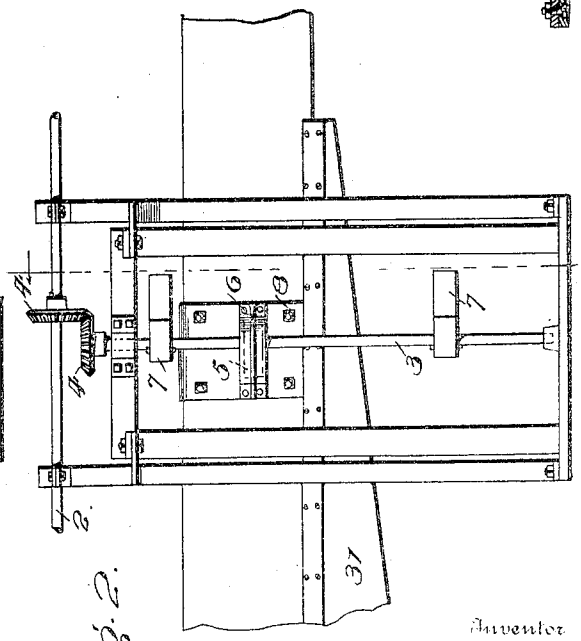

Fig. 2.

Witnesses

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4 SHEETS—SHEET 2.

Fig. 4.

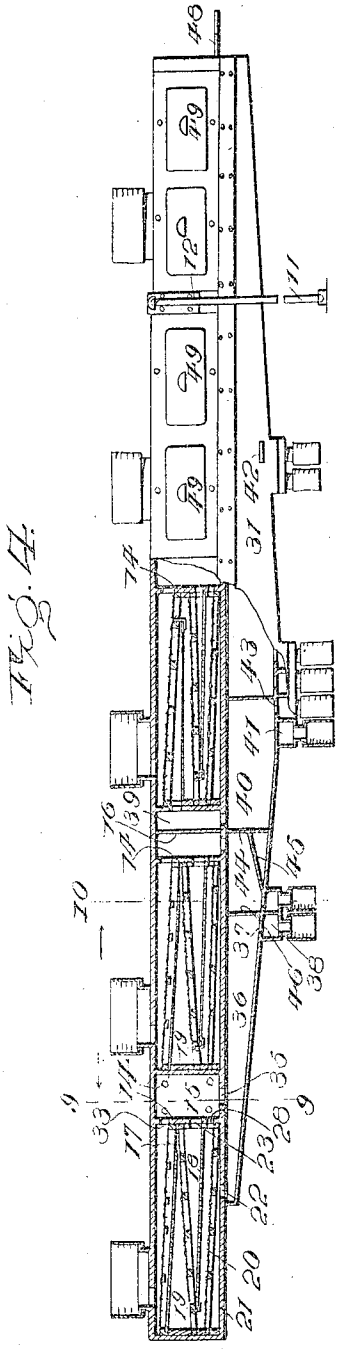


Fig. 5.

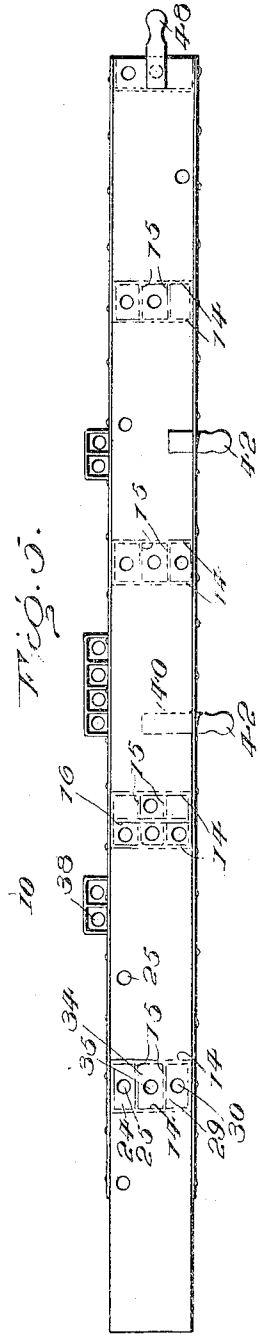
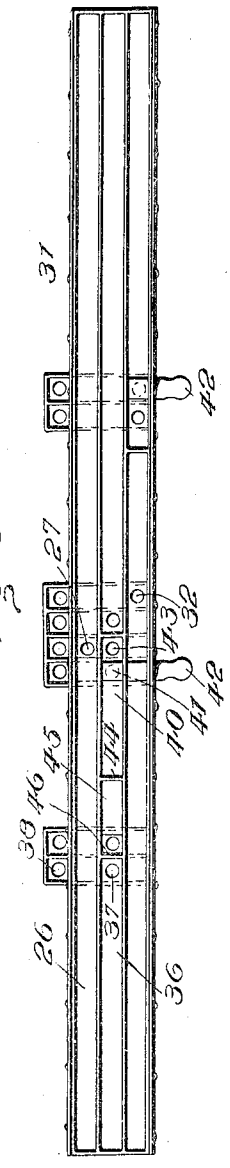


Fig. 6.



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4 SHEETS—SHEET 3.

Fig. 12.

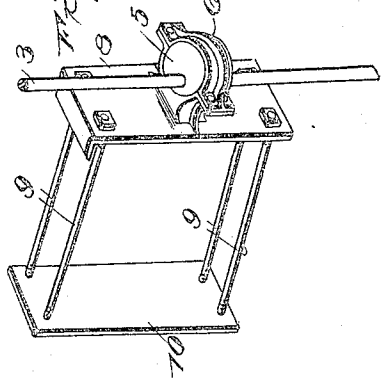


Fig. 7.

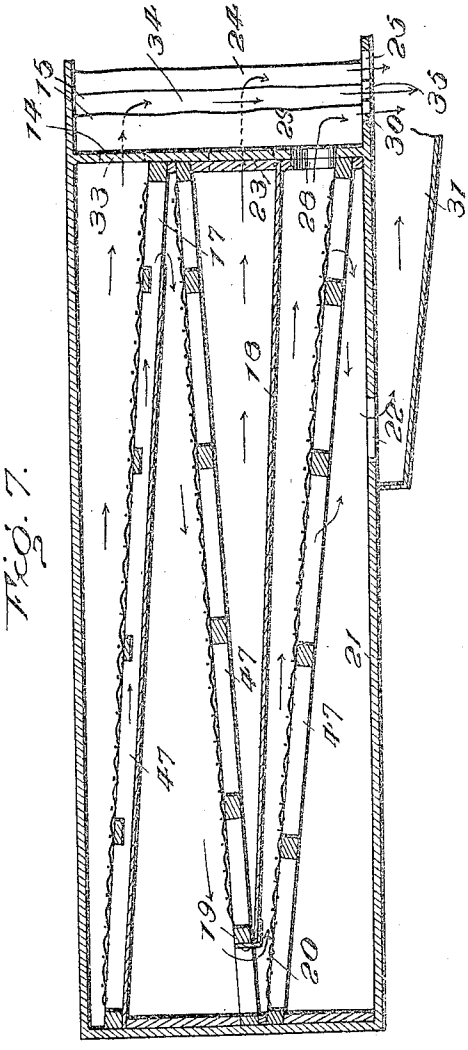
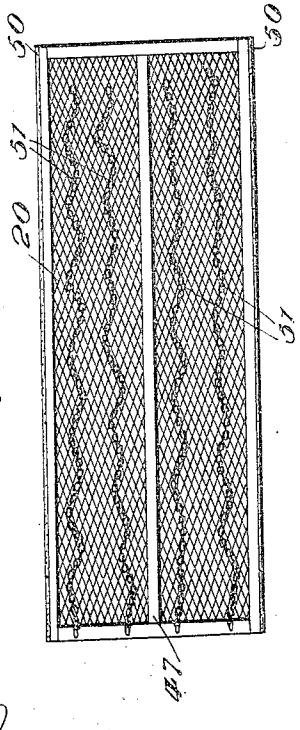


Fig. 8.



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4 SHEETS—SHEET 4.

Fig. 10.

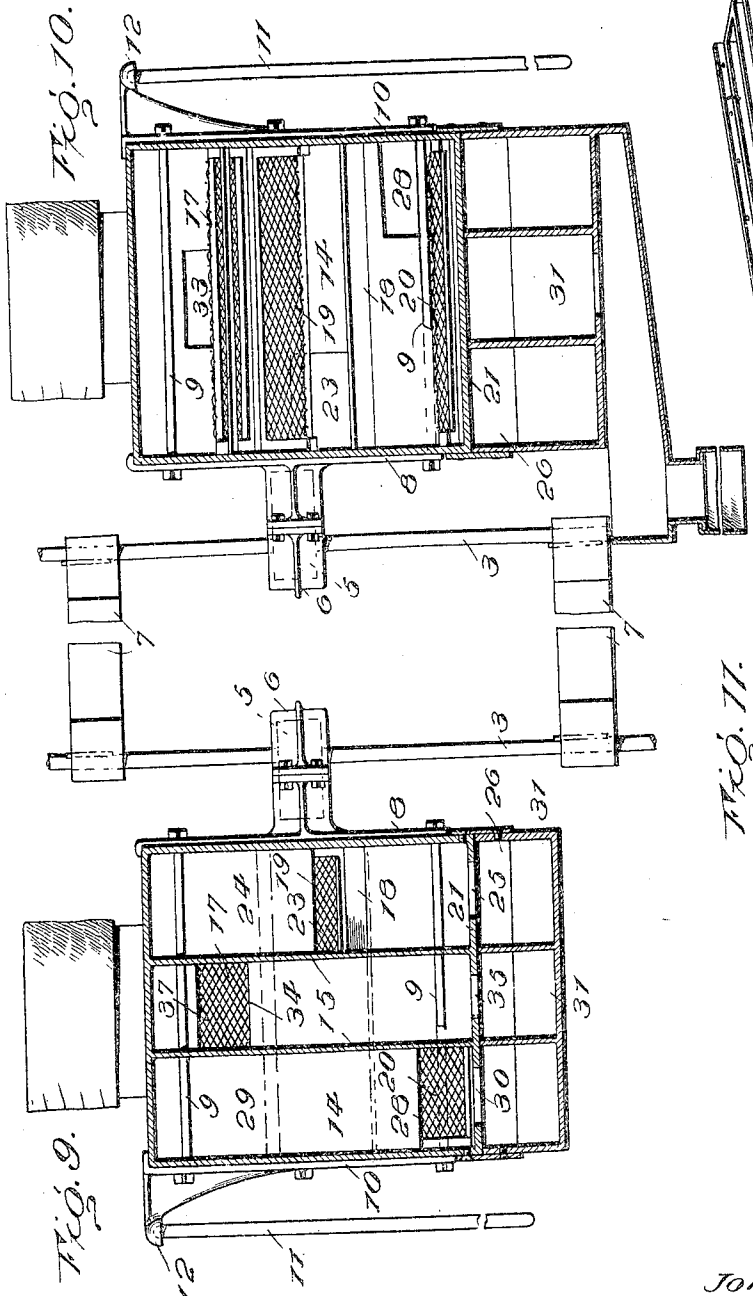
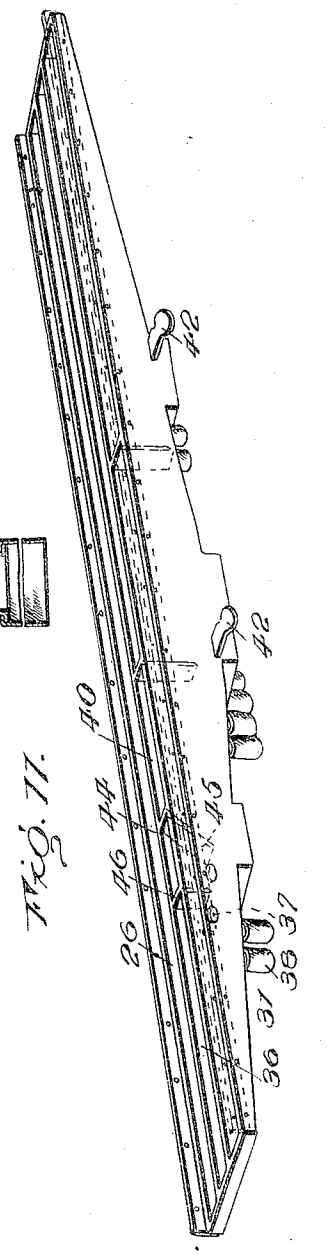


Fig. 9.

Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN M. CASE, OF CINCINNATI, OHIO.

BOLTING-MACHINE.

No. 808,724. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed March 21, 1903. Serial No. 148,945.

To all whom it may concern:

Be it known that I, JOHN M. CASE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Bolting-Machines, of which the following is a specification.

My invention relates to an improvement in the construction of bolting-machines, commonly known as "gyrators" or "sifters," for the purpose of manufacturing flour. It is constructed with special reference to the durability, cheapness of manufacture, and convenience in getting at all the parts and perfect adaptability to being connected with the breaking and grinding rolls and is constructed in one continuous series of bolting devices instead of being arranged in square-box form or cylindrical form, the advantages of which construction will be hereinafter explained.

Referring to the drawings, Figure 1 represents a front elevation of the complete bolting-machine. Fig. 2 represents a rear elevation of a portion of the machine with the gyrating mechanism for one end thereof. Fig. 3 represents an end elevation of the machine. Fig. 4 represents a side elevation of the series of bolting devices with three of the compartments drawn in section. Fig. 5 is a plan view of the bottom of the bolting devices with the conveyer-troughs below the same removed. Fig. 6 is a top view of the conveyer-troughs which are attached beneath the series of bolting devices. Fig. 7 represents an enlarged vertical sectional view of one of the bolting devices of the machine. Fig. 8 shows one of the sieves with a system of chains for cleaning the cloth. Figs. 9 and 10 are vertical transverse sections through the sieves and subdividing compartments of the bolting-machine, taken, respectively, on the line 9 9 and line 10 10 of Fig. 4 and looking in the directions indicated by the arrows. Fig. 11 is a perspective view of the conveyer-troughs through which material is directed to different points and delivered to the elevators, and Fig. 12 is a perspective view illustrating improved means for clamping the eccentric-box to the bolter.

Referring to Fig. 1, it will be seen that the bolting-machine is driven from pulley 1, having its shaft 2 geared to vertical shafts 3 by means of miter-gears 4. Revolution of shafts 3 is converted by eccentrics 5 into gyratory motion in the sifter, said eccentrics operating in boxes 6, which are rigidly connected to the sifter by specially-constructed clamps to be described. On each upright shaft 3 I place two counterbalancing-weights 7, the heavy part of which is placed upon the opposite sides of the shafts from the salient points of the eccentrics, so that when the sifter passes in one direction the weights pass in the opposite direction, and they are so adjusted that they perfectly counterbalance the sifter. By using two weights on each shaft at the respective ends of this sifter a more perfect counterbalancing of the forces is produced. By using two eccentrics, one at each end, the sifter is given a uniform and perfect gyratory action and the work performed in operating it is divided between the two ends, thus relieving the machine of undue strain which would result from driving from one common center. In order to sustain the box rigidly and prevent possibility of it shaking loose, one-half of the eccentric-box is cast on a plate 8, through which plate are passed bolts 9, extending through and secured on the opposite side of the sifter by plates 10, these plates and bolts clamping the entire structure together in such a manner that it is impossible for it to become loose or for any part to become detached.

The bolter is supported vertically with freedom of gyratory action by standards 11, suitably stepped at bottom and receiving at their upper ends the brackets 12, projecting from the bolter, said brackets on one side of the bolter being formed integral with clamping-plates 10 and those on the other side being attached by special plates formed integral therewith.

The body of the sifter is made from three pieces of board ordinarily about twelve inches wide. These boards are formed into a square box, except that the front is left open, and at intervals in this box I place two cross-sections of wood, as shown at 14, Fig. 5. In these cross-sections I put two more sections in the opposite direction, as shown at 15, Fig. 5. This divides the delivery-boxes into three sections, the three sections being used for the delivery of the three different classes of stock that come from the three sieves. In one of these sections, as shown at 16, Fig. 5, I divide one of the pockets, so as to form an additional pocket for the reception of the patent flour. Any of these sections may be so divided if it is desired to draw off any special kind of material. These three sections are provided with openings at

the bottom, which communicate with separate conveyer-troughs below the holes, and the product delivered into them is conducted to these separate troughs and delivered to the point where it is required to be taken up by the elevators. The construction of the several sections of the sifter will be understood from a description of one of them, that at the left-hand end, which is best shown in Figs. 5, 6, 7, 8, and 9. The upper sieve on the break-stock is provided with wire-cloth of suitable mesh to let the middlings pass out through the meshes. The upper sieve is also provided with a conveying-bottom, which carries the middlings forward underneath the wire-cloth and delivers it to a sieve at 17, Fig. 7. On this sieve I place silk cloth of suitable mesh, and the flour passing through the same drops onto a return conveying-plate 18, which brings it back and delivers the flour into one of the pockets heretofore explained. The material which tails over the second sieve at 19, Fig. 7, drops onto another sieve 20, clothed with suitable cloth, ordinarily of finer mesh than the one above, and the flour which passes through this sieve drops onto the floor 21 of the sifter-box, and by the gyrating motion of the machine it is caused to fall out an opening 22, as shown in Fig. 7, and commingles with the flour from the tail of the conveyer-plate 18 of the second sieve 17, which is being delivered through openings 23, compartments 24, and opening 25. The position of these openings 22 and 25 is shown in Fig. 5, and material from them is discharged into the rear longitudinal trough 26 in Fig. 6, whence it escapes through opening 27. The middlings which pass over the tail of the lower sieve escape through an opening 28, Fig. 9, (indicated by dotted arrow 28 in Fig. 7,) entering an end compartment 29, Figs. 5 and 7, and escapes through an opening 30, Fig. 5, into the front longitudinal trough 31, Fig. 6, whence it escapes through an opening 32 to an elevator, which carries it to the purifier. The broken wheat or partially-ground grain which passes over the tail of the upper sieve escapes through opening 33 into still another pocket 34, whence it passes through opening 35 into the middle conveying-trough 36 and is carried forward to an opening 37, whence it is delivered by transverse trough 38 to a suitable elevator, from whence it is delivered to the next successive pair of rolls. The construction and operation of the second section of my sifter is precisely the same as that of the first, except that the upper sieve or scalper is closed with finer wire, and sometimes the silk cloth is made a little finer in order to prevent the possibility of discoloring the flour. The third section of my sifter is constructed substantially the same as the first, except that the upper sieve instead of scalping the stock is clothed with silk cloth and makes flour which is communicated back and delivered out through a spout 39, Fig. 4, into a subdivided compartment 40, Figs. 4, 5, 6, in the conveyer-trough and delivered out as patent flour if opening 41 is uncovered by valve 42, or if opening 41 is closed it passes to opening 43 and mingles with straight flour previously referred to as escaping through opening 27. Being made from the best middlings, it is necessarily the highest grade flour. In order to take this patent flour out and prevent intermingling with the other classes, I put in two bridges 44 in this section of the conveying-trough, which confine the patent flour between them and force it to be delivered at its proper place. I also provide a returning cant-board, as shown at 45, Fig. 4, which returns the tailings over the second sifter backward, so as to deliver it opposite the elevator, where I also place a partition 46 in this section of the feed-trough to prevent the intermingling of the stock from the tail of the first pocket and that of the second pocket, as shown. The fourth section of my sifter is precisely the same as the third and closed substantially the same, except that the last sieve is finer cloth for dusting the middlings and tailing over the feed. The last section of my sifter I arrange to handle two classes of stock, if necessary, as at that point the quantity of the material is small, and the machine has the capacity to handle the product from two pairs of rolls or from a pair of rolls and the scroll-mill. I perform this by simply putting a dividing-strip 47 on the top of each of the sieves, which confines the stock to their respective sides. At times it is desirable to draw off patent and at other times not, and with some classes of wheat it is necessary to make some low grades of flour and at other times it is not desirable or required. There are also times when the miller desires to draw off the white feed or finished millings separate from the coarser feed and at other times to throw them all together in one common product. In order to provide for these contingencies, I have arranged on the shaking-trough below suitable valves, as shown at 48, Figs. 5 and 11. These valves are constructed to close up openings in the bottom of the sifter-box and by throwing the valves out to uncover these openings. When the openings are covered, the stock passes over the valve and drops into the next opening and is delivered into another class of flour, and when the valves are drawn out the material passes through the first opening, and consequently into a separate section of the delivering-troughs below. I am thus enabled to make patent flour and low-grade flour or cut it off and throw the low-grade flour into straight grade, according to the desire of the miller, and also to draw off the fine finished feed separately or pass it into one common product. I

construct the sifter with doors 49 opposite each compartment, so that by the removal of four bolts I am enabled to take these doors off and get immediately to the sieves. This is a matter of great importance to the miller, since the most of the sifters as now constructed are so arranged that in order to get at lower sieves the entire machine has to be taken apart, and it often requires a full day to take the sifter apart and put it together. It not infrequently occurs that the miller discovers that there are specks in his flour, which indicates that some of the bolting-cloth has been punctured, and it becomes necessary for him to get into the machine and determine where the difficulty arises. In my machine the entire doors in the whole length of the machine may be removed in less than five minutes. Thus all of the riddles are open for inspection, and the flour beneath each riddle may be readily examined and the point found where the specks are coming from and the difficulty remedied.

In the construction of my sieve-frame I place upon the outside of the frame a suitable packing ordinarily made of felt, which is glued on the inside and outside of the sifter-frame, as shown at 50, Fig. 8. By the use of this flexible packing I am not required to place any supporting-slats above and below the sieve; but I simply slide it in against the back of the sifter-box, and the fronts are all made in perfect line with each other, and when the door is bolted up it draws the same firmly up against the packing of the sieves and forces them firmly against the back of the sifter-box, thus making a perfectly tight joint to prevent the possibility of leakage of flour. I am enabled on this bolt to use various kinds of cleaning devices for keeping the cloth cleaned, among which may be named an ordinary jarring device which may be attached to the center division of a sifter-frame and caused to jar or slide back and forth by the gyratory motion of the machine, or I may use brushes upon the under side of the sifter, placed in suitable pockets and caused to slide from place to place through the gyratory motion of the machine, thus brushing the cloth upon the under side, or I may use, as herein shown, light chains 51, which by the gyratory motion of the machine cause themselves to take zigzag or snake-like positions on the cloth and slide from side to side, thus performing the function of cleaning the cloth in the most perfect manner. This plan I prefer to any of the others, since it has proved by practice to be very effective and easily attached and does not wear the cloth so much as grain which is commonly used for the same purpose.

To more fully describe the operation of my machine, I may say that the product from the first break is delivered to the first section of the sifter by means of spouts or suitable elevators and there separated into the several parts, as heretofore described, and the tailings pass down through the spout to the next pair of rolls and then through an elevator to the next section. Middlings from the purifier are delivered to the third section of the machine, and the unfinished product or "second middlings," as it is commonly termed, is sent forward to the next pair of rolls, the fine bran tailing off to feed from the last or lower sieve. The unfinished product from this sifter passes to another pair of rolls, or preferably to a scroll-mill, which is best adapted for reducing that class of stock, and thence returns to one side of the last sifter and tails over to a finishing pair of rolls, it being found in practice that rolls are better adapted to finishing the stock than a scroll-mill, since the scroll on very impure material is too severe. The tailings from this last sifter pass off through one of the conveyer-troughs below. It will thus be seen that I embody in this sifter all the required separations for a complete flour-mill, performing all the scalping and separation of the flour and delivery of the finished product in concentrated manner without the use of conveyers. The shaking bottom or conveyer below, divided into compartments, as herein represented, performs a very important function of my machine. It dispenses with three conveyers, as ordinarily used for this purpose. It delivers the stock without undue friction, wear, or injury, and it saves a large amount of space and expense in the matter of millwrighting. The construction of the box in one continuous line enables me to make a sifter not only much cheaper than any now in use, but at the same time much lighter, requiring no heavy timbers, the thickness of material used in its construction being seven-eighths of an inch. It therefore weighs less than one-half of any of the sifters now in use, and the shaking device or eccentrics being applied at two points the strain upon these eccentrics is reduced to a minimum, so that they never heat or give the miller any trouble whatever.

Having thus described my invention, the following is what I claim as new therein:

1. The combination with a series of bolts arranged end to end in a single gyratory structure, of a conveyer disposed beneath and movable with the bolts, having its bottom inclined from the ends toward the center and comprising a plurality of parallel rows of troughs having their tops in the same horizontal plane, the length of the troughs in any one row differing from the length of the troughs in any other row.

2. A bolting-machine comprising a series of complete bolts arranged end to end and in a horizontal line in a single gyratory structure and each bolt having a plurality of sieves arranged one above the other and inclined longitudinally of the structure; and a series

of transverse pockets between adjacent ends of adjacent bolts, each sieve of each bolt opening into one of the pockets of the series, and troughs common to the pockets of a plurality of bolts.

3. A bolting-machine comprising a series of complete bolts arranged end to end and in a horizontal line in a single gyratory structure and each bolt having a plurality of sieves arranged one above the other and inclined longitudinally of the structure; and a series of transverse pockets between adjacent ends of adjacent bolts, each sieve of each bolt opening into one of the pockets of the series, and a conveyer movable with the structure having a plurality of troughs common to a plurality of different bolts.

4. A bolting-machine comprising a series of complete bolts arranged end to end and in a horizontal line in a single gyratory structure and each bolt having a plurality of sieves arranged one above the other, a series of pockets transverse of the structure between adjacent ends of adjacent bolts, each sieve of each bolt delivering one of its products into one of the pockets, and each pocket having an opening to the exterior of the bolt structure to provide a discharge, and a plurality of troughs common to a plurality of the pocket discharge-openings.

5. A bolting-machine comprising a series of complete bolts arranged in a horizontal line in a single gyratory structure and having a plurality of sieves arranged one above the other, a series of pockets transverse of the structure separating adjacent bolts, each sieve of each bolt delivering one of its products into one of the pockets, and each pocket having an opening to the exterior of the bolt structure to provide a discharge, and a plurality of troughs common to a plurality of pocket discharge-openings and having discharges for the material received, some of said troughs having a plurality of said discharge-openings some of which are connected with the discharge-opening of other troughs.

6. A bolting-machine comprising a gyratory structure, a plurality of complete bolts arranged in said structure end to end and in a horizontal line, unconnected with one another within said structure and having a plurality of sieves, separate intakes for each bolt for material from without the structure, and a plurality of series of vertical pockets extending transversely of the structure and between adjacent ends of adjacent bolts, and each pocket receiving one of the products of one of the sieves of one bolt and having a discharge-opening in its bottom.

7. In a bolting-machine, the combination with a single gyratory structure, and a plurality of bolts unconnected with one another within said structure, having separate intakes for each bolt for material from without the structure, and a plurality of discharge-openings from each bolt, of a conveyer movable with the bolt structure, inclined downwardly from its ends to its center and divided into a plurality of troughs some of which are common to a plurality of bolts.

8. In a bolting-machine, the combination with a single gyratory structure, and a plurality of bolts unconnected with one another within said structure, having separate intakes for each bolt for material from without the structure, and a plurality of discharge-openings from each bolt, of a conveyer movable with the bolt structure, and divided into a plurality of troughs one of which is common to all the bolts, and the others being common to various numbers of the bolts.

9. In a bolting-machine, the combination with a single gyratory structure, and a plurality of bolts unconnected with one another within said structure, having separate intakes for each bolt for material from without the structure, and a plurality of discharge-openings from each bolt, of a plurality of conveyers movable with the bolt structure, having discharge-openings, and means on the conveyer for connecting the discharge of one of the troughs with the discharge of another of the troughs.

10. In a bolting-machine, the combination with a plurality of bolts unconnected with one another and each having a plurality of discharge-openings, of means for collecting and separately discharging material separated by the several bolts which consists of the series of longitudinal conveyer-troughs extending beneath all of the bolts, receiving all the material from all the bolts and made up of a box sloping from the ends to the center and having longitudinal partitions and transverse partitions inserted at suitable points in the respective troughs to confine the material and permit the use of one conveyer for a plurality of grades of material.

11. In a bolting-machine, the combination with a plurality of bolts unconnected with one another and each having a plurality of discharge-openings, of means for collecting and separately discharging material separated by the several bolts which consists of the series of longitudinal conveyer-troughs extending beneath all of the bolts, receiving all the material from all the bolts and made up of a box having longitudinal partitions and transverse partitions inserted at suitable points in the respective troughs to confine the material and permit the use of one conveyer for a plurality of grades of material, discharge-openings being provided for the respective compartments thus formed, and a transverse discharge-trough being arranged beneath each discharge-opening.

12. In a bolting-machine, the combination with a plurality of bolts unconnected with one another and each having a plurality of discharge-openings, of means for collecting

and separately discharging material separated by the several bolts which consists of the series of longitudinal conveyer-troughs extending beneath all of the bolts, receiving all the material from all the bolts and made up of a box having longitudinal partitions and transverse partitions inserted at suitable points in the respective troughs to confine the material and permit the use of one conveyer for a plurality of grades of material, discharge-openings being provided for the respective compartments thus formed, and a transverse discharge-trough arranged beneath each discharge-opening; some of said compartments having a plurality of discharge-openings and valves for determining through which of said discharge-openings the material shall pass.

13. In a horizontal bolting-machine, suitably mounted for oscillating or gyratory action, means for imparting motion, consisting of an eccentric having means for rotating it, a box in which said eccentric works, connected to the bolt by means of clamping-plates on opposite sides of the bolting-machine, securing-bolts passed through said plates and holding them together whereby the structure is sustained in addition to being rigidly connected with the driving parts brackets carried by the clamping-plates, on one side of the bolting-machine, and a standard suitably stepped at its lower end and supporting the bolt by its connection with said bracket.

The foregoing specification signed this 18th day of March, 1903.

JOHN M. CASE.

In presence of—
EDWIN S. CLARKSON,
JNO. R. ADAMS.