(No Model.) 3 Sheets—Sheet 1.

W. D. GRAY.

BOLTING MACHINE.

No. 543,088. Patented July 23, 1895.

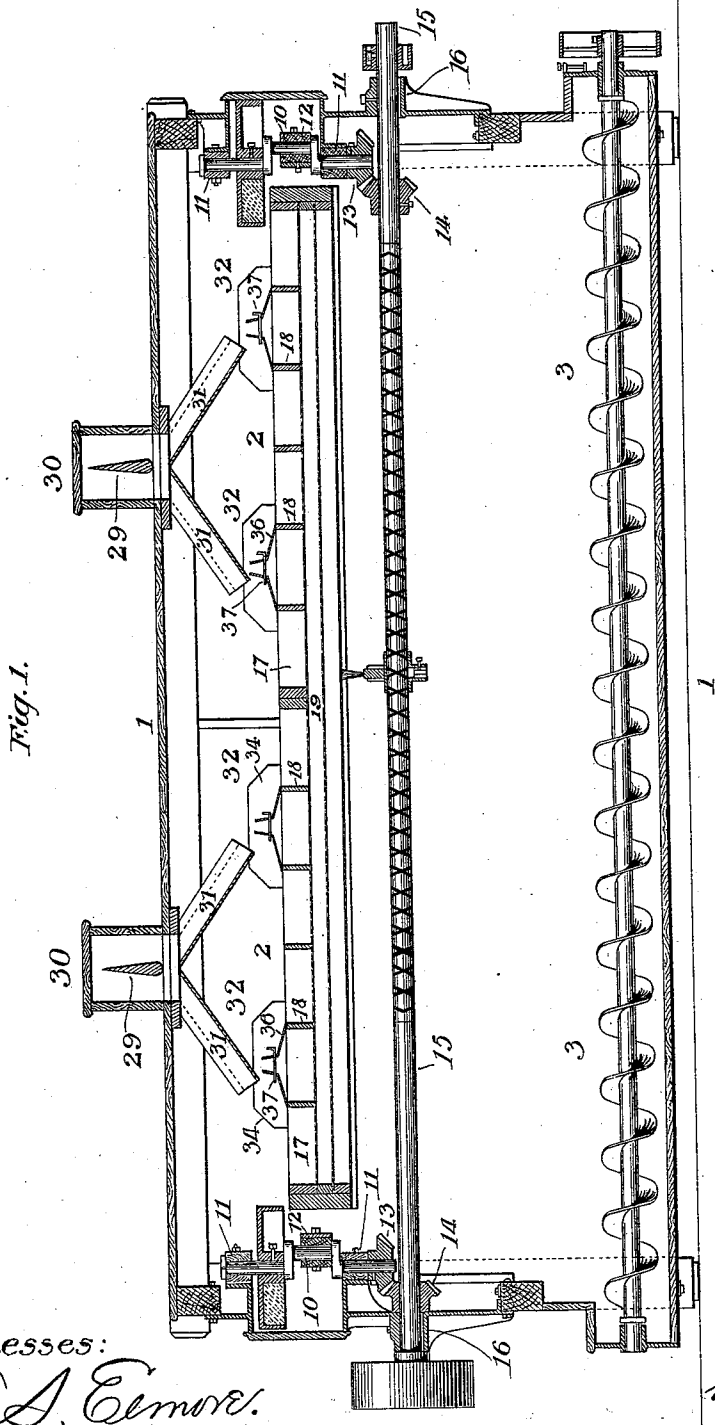

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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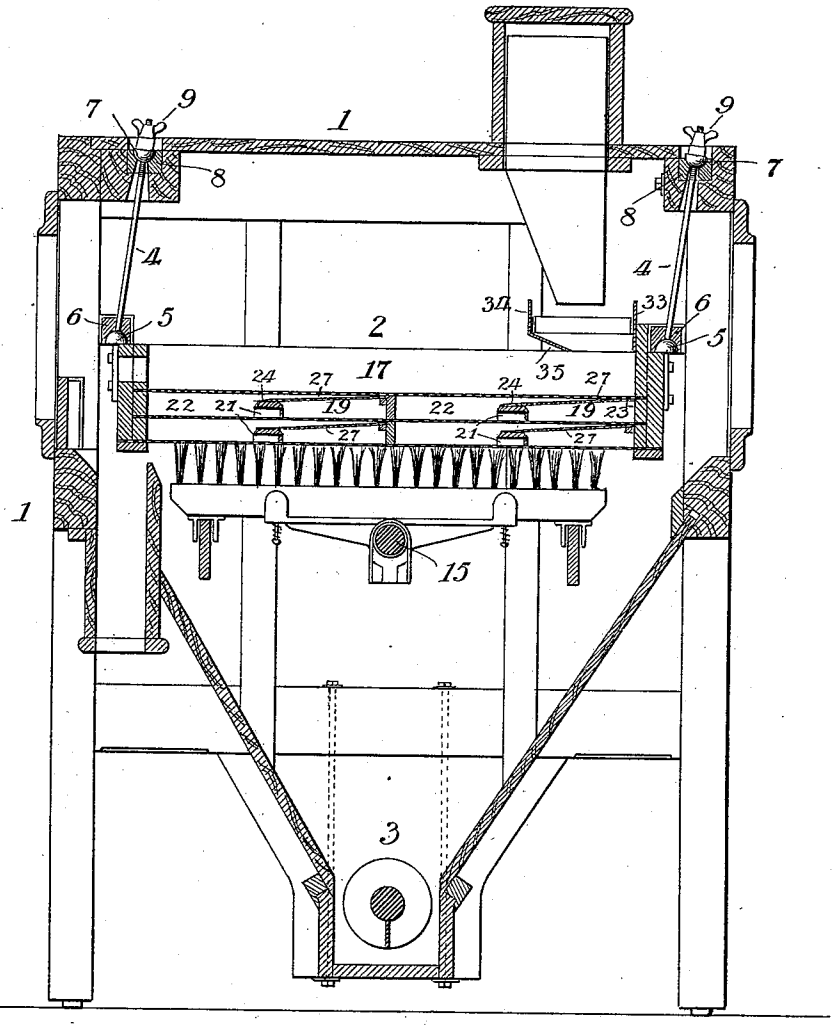
Fig. 2.



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(No Model.) 3 Sheets--Sheet 3.

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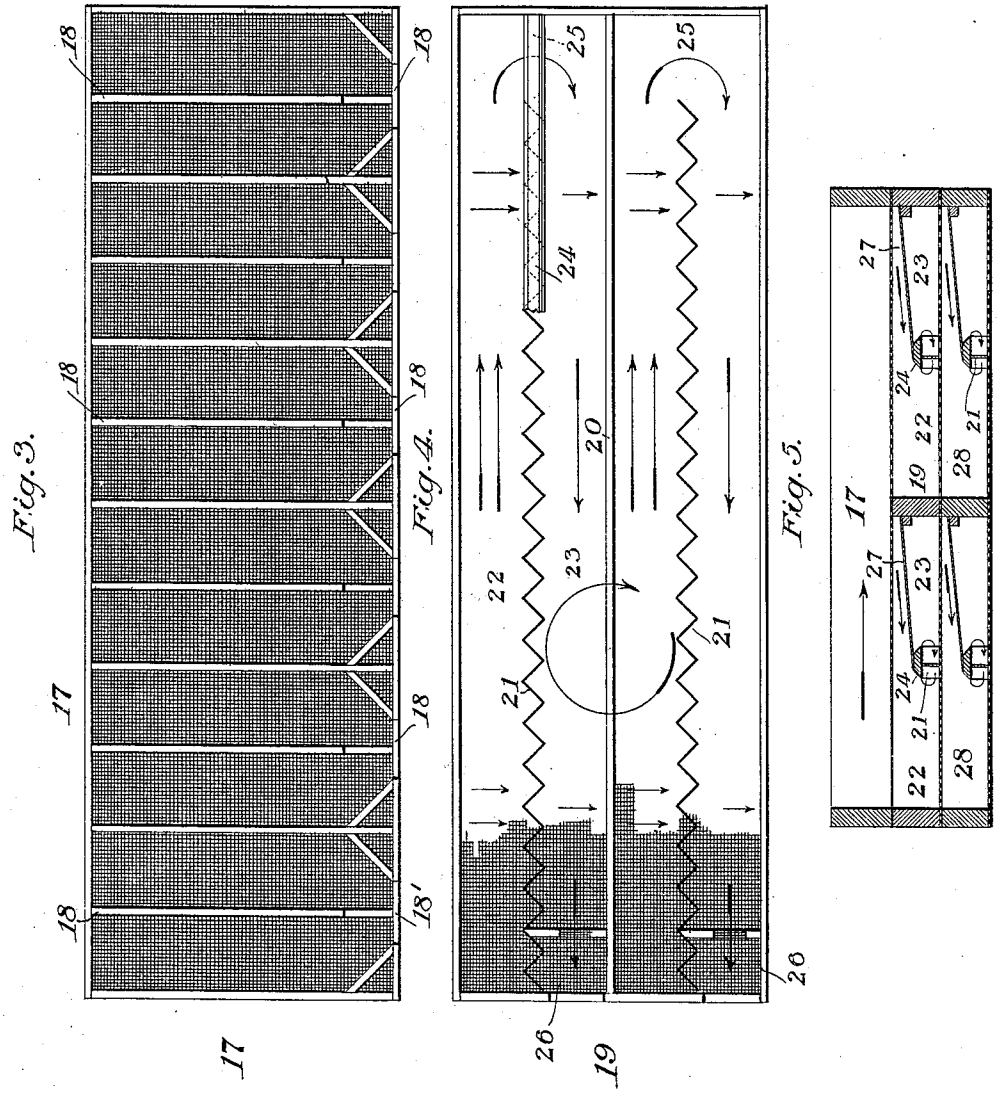

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UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE EDWARD P. ALLIS COMPANY, OF WISCONSIN.

BOLTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,088, dated July 23, 1895.

Application filed November 10, 1894. Serial No. 528,422. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. GRAY, of Milwaukee, county of Milwaukee, and State of Wisconsin, have invented a new and useful Improvement in Bolting-Machines, of which the following is a specification.

This invention has reference to bolting or sifting machines for treating flour, meal, or analogous materials, which embody flat sieves arranged to swing or move in a horizontal plane, the object being to cause the material or stock under treatment to pursue an extended and circuitous course over the screening-surface, to the end that it may be subjected to a thorough and effective sifting.

With this end in view, my invention consists primarily of a sieve of improved construction, and also of a peculiar arrangement of sieves by which the material under treatment is caused to travel over an extended course, as more fully described hereinafter.

The invention also consists in an improved manner of feeding the material to the sieve and in the manner of controlling and regulating the feed.

The invention also consists in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal section through a bolting-machine having my invention embodied therein. Fig. 2 is a transverse section through the same. Fig. 3 is a plan view of the sieve, which receives the material from the feeding device. Fig. 4 is a plan view of one of my improved sieves constructed to cause the material to travel back and forth over its surface. Fig. 5 is a transverse section, on an enlarged scale, through a series of superposed sieves.

1 represents a trunk or casing of a material and form adapted to inclose and sustain the operative parts of the machine hereinafter described.

2 represents a horizontal rectangular sieve-frame sustaining a series of superposed sieves, as more fully described hereinafter, and 3 represents a horizontal longitudinally-extending screw-conveyer located in the base of the casing in position to receive the siftings from the sieves.

The sieve-frame is suspended from its four corners by means of vertical hangers 4, jointed at their lower ends to the frame and at their upper ends to the top of the trunk. The lower ends of the hangers are provided with semi-spherical heads 5, mounted in correspondingly-shaped bearings 6, fixed to the sieve-frame, while at their upper ends they are similarly provided with semispherical heads 7, mounted in bearings 8, these upper heads being screwed onto the hangers and secured by means of wing-nuts 9, by which vertical adjustment of the sieve-frame may be effected. By suspending the frame in the manner above described it is capable of a universal or circular movement in a horizontal plane, which movement is effected by means of two vertical cranked shafts 10, mounted at their upper and lower ends in bearings 11 at the opposite ends of the trunk. The central cranked portions of the shafts are mounted in bearings 12, fixed to the opposite ends of the sieve-frame, while at their lower ends the shafts are provided with horizontal bevel-gears 13, which are engaged by two vertical bevel-gears 14, fixed near the opposite ends of a horizontal longitudinally-extending driving-shaft 15, sustained at its ends in bearings 16, fixed to the opposite ends of the casing. The end of the shaft is provided with a pulley, through the medium of which it may be driven from any suitable source. As a result of this arrangement the rotation of the driving-shaft will, through the vertical cranked shafts, cause the sieve-frame to be moved in a circular path in a horizontal plane.

The arrangement of the hangers is such that when the sieve-frame is in a central position with respect to its vertical driving-shafts the said hangers will extend at an inclination, as shown in Fig. 2, the result being that the sieve-frame, in addition to its circular movement, will receive a slightly up-and-down movement, the purpose of which will presently appear.

Within the sieve-frame are located the sieves proper, in the present instance three in number, which are arranged one above the other, as plainly shown in Fig. 5. The upper sieve 17 may or may not be provided with a series of transverse partitions 18, the office of said sieve being to receive the ma-

terial from the feeding-spouts, which material, owing to the up-and-down movement of the sieve, will be caused to travel sidewise, the tailings passing out through suitable openings 18 in the sides of the frame, and the siftings dropping onto the sieve below. The underlying sieve 19, which receives the material from that just described, is constructed to cause the material delivered to it to travel back and forth longitudinally thereof, the extended course the stock is thus compelled to pursue causing it to be subjected to a thorough and effective screening treatment. The peculiar arrangement and construction of the sieve for effecting this action of the material constitutes one of the principal parts of my invention. This improved sieve 19 is preferably divided by a central longitudinal partition 20 into two non-communicating compartments, each of which is divided by a longitudinally-extending continuous corrugated strip 21 into two compartments or spaces 22 and 23, communicating at one end only. These corrugated or zigzag strips are located on the upper side of the screening-surface, being fixed to the under sides of bars 24 extending longitudinally of the sieve-frame and secured at their ends to the ends of said frame. At one end the corrugated strips terminate a slight distance from the end wall of the sieve-frame, thus leaving a communicating space 25 between the two compartments on opposite sides of said strip. As a result of this arrangement, the movement of a sieve in a circular path, as indicated by the arrow in Fig. 4, and the up-and-down movement of said sieve, as described, will cause the material to travel in the first place transversely of the sieve, as indicated by the dotted arrows, and in the second place longitudinally thereof by being engaged and pushed by the inclined faces of the corrugated strips. The material will travel in opposite directions on opposite sides of the corrugated partition, moving faster on the side where its transverse movement carries it toward the partition and slower on the opposite side where its transverse movement carries it away from the partition.

On reference to Fig. 4 it will be seen that the material moves longitudinally of the sieve on one side of the corrugated partition to its end, thence through the communicating passage 25 to the opposite side of the partition, and returns slowly into the compartment 23, the tailings passing out through an opening 26.

If the material were delivered to the entire surface of the sieve that falling in channel 23 would pursue but a comparatively short course, and consequently would not be thoroughly bolted, while that delivered to compartment 22 would travel to the end of the same and return in the other compartment and thus be more completely bolted. In order, therefore, that all the material may be subjected to the same degree of sifting and be caused to travel back and forth over the screening-surface, I provide imperforate shields or covers 27, which are located over the compartments 23, said shields being secured at one edge to the bars 24, and at their other edges respectively to the side wall of the sieve-frame and to the central partition therein. These covers incline downward toward the compartments 22, and receive the siftings and direct the same into said compartments so that the latter will receive all the siftings from the upper sieve, which siftings will be caused to travel quickly along the compartments, thence transversely and return slowly through the compartments 23. It has been found a decided advantage to thus first move the material quickly over the screening-surface, and after its quantity is considerably reduced to convey the same slowly, the remaining stock being thus caused to receive a thorough bolting, and that leaving the sieve to be bolted perfectly.

Below the sieve just described I apply a third sieve 28, of similar construction, in order to cause the material to be thoroughly bolted. The compartments in this lowermost sieve corresponding to compartments 23 in that above are provided with shields or covers so that the material from the compartments in the sieve above will be compelled to first enter compartments 22 in the lowermost sieve and traverse the same before it can be returned through compartments 23 in said sieve. By the arrangement of the sieves above described the material before its final delivery to the conveyer makes four trips: first, longitudinally of the central sieve through compartments 22; secondly, returning through compartments 23 in said sieve; thence along compartments 22 in the lowermost sieve, and finally along compartments 23 in said sieve. It will be seen, therefore, that by increasing the number of sieves the degree of the bolting treatment may be varied according to the nature of the stock being treated.

While I have described my improved sieve as being combined with the others, as shown, it will be understood that my invention is not to be limited to such a combination, but is intended to embrace as well the construction of the sieve individually without regard to its arrangement in conjunction with the others.

In order that the material may be conveyed to the upper sieve in the proper manner, and in order that means may be provided for governing and regulating the feed I have adopted the construction shown in Figs. 1 and 3. In these figures the upper sieve is shown as being provided with transverse partitions dividing the same into twelve compartments, into each of which a portion of the stock is introduced from two breaks. It will be understood, however, that the number of breaks may be either increased or diminished and the arrangement of the compartments varied without departing from the limits of my invention in this respect.

The stock from the breaks is divided into two streams by means of adjustable valves 29, each consisting of a plate pivoted at its lower end in the center of the feed hopper 30, which receives the material from the break. When in a central vertical position the plate divides the feed-hopper into two chambers which lead to two chutes or spouts 31, extending downwardly and outwardly in opposite directions, their lower ends terminating over movable distributing devices 32 sustained by the sieve-frame. Each of these distributing devices comprises two vertical longitudinal side walls 33 and 34, which rest and may be slid upon the transverse partitions of the sieve, the outer wall being provided with a lateral flange 35 projecting from the upper edge of the sieve-frame. These two walls are connected together by means of two transverse hoods 36 extending at an upward inclination toward each other and terminating a slight distance apart, their adjacent ends being turned upward vertically, as shown in Fig. 1. The length and arrangement of the hoods are such that when the distributing device is moved to the position shown in Fig. 1, the outer ends of the hoods will terminate over two adjacent transverse partitions, the result being that the hoods will direct the material to the two compartments at the outer sides of the partitions, while the material entering between the adjacent ends of the hoods will enter the compartment between the two adjacent partitions. In this way, a distributing device being arranged beneath each spout, six compartments are supplied by one break.

The amount of material fed to the various compartments and the number of compartments supplied may be varied by adjusting the distributing device in a longitudinal direction and closing or opening the space between the edges of the two hoods, which latter is effected by means of a horizontally-sliding gate or valve 37, mounted in the vertical upturned edges of the hoods, as shown in Fig. 1.

Having thus described my invention, I claim—

1. The combination with the sieve comprising a screening surface and a rectangular surrounding frame, of a bar sustained by the frame above the screening surface, and a thin metal partition bent into zig-zag form with alternately converging and diverging faces, said partition being sustained by said bar and depending therefrom into contact with the screening surface.

2. In a bolting machine the combination of a horizontal sieve, means for moving the same in a substantially circular path in a horizontal plane, a partition corrugated on both sides and extending from one end of the sieve toward the opposite end to form two communicating compartments, and connections for imparting to the sieve a rising and a falling movement during its lateral movements, from and to a central position whereby the material at one side of the partition is thrown against the same during each lateral reciprocation.

3. In a bolting machine the combination with a horizontal sieve of a partition having on each side a series of oppositely inclined conveying faces, the said partition extending from one end of the screen toward, but not to, the opposite end to form two longitudinal compartments communicating at one end, means for imparting horizontal movement to the sieve, means for supplying material to the sieve, and a shield overlying one of said compartments and arranged to direct the material into the other compartment.

4. In a bolting machine, the combination with a horizontal sieve, of a partition overlying the screening surface thereof and formed on opposite sides with inclined conveying faces, said partition dividing the sieve into two compartments, means for moving said sieve in a substantially circular path in a horizontal plane, and a shield covering one of said compartments and inclining downward toward the other; whereby the material delivered from above will all be caused to enter the open compartment.

5. In a bolting machine, the combination with a horizontal sieve, of a partition overlying the screening surface thereof and formed on opposite sides with inclined conveying faces, said partition dividing the sieve into two communicating compartments, means for moving the sieve in a substantially circular path in a horizontal plane, a shield covering one of said compartments and inclining downward toward the other, and a sieve overlying that first named and arranged to deliver its siftings to the underlying sieve.

6. In a bolting machine the combination of a horizontal sieve provided with a partition overlying the screening surface and formed on opposite sides with a series of inclined conveying faces, said partition dividing the sieve into two compartments communicating with each other at one end, means for moving the sieve in a circular path in a horizontal plane, means for feeding the material solely to one of the compartments, a second sieve located beneath that first named and fixed with relation thereto, a partition overlying the screening surface of the second sieve and formed on opposite sides with inclined conveying faces and a shield covering one compartment of said lower sieve and inclining toward the other compartment to feed the material thereinto.

7. In a bolting machine the combination with a horizontal sieve, of a feed spout arranged thereover, and a horizontally movable distributing device located between the end of the spout and the sieve the said distributing device being adapted to be adjusted relatively to the screen to deliver the material thereto at different points.

8. In a bolting machine the combination of a sieve provided with partitions dividing the same into compartments, a feed spout terminating above the sieve, a horizontally movable

distributing device sustained by the sieve below the spout, and comprising two hoods extending at an upward inclination toward each other, their outer edges terminating over two adjacent partitions of the sieve and their inner edges terminating a slight distance apart over the compartment between said partitions.

In testimony whereof I have hereunto set my hand, this 6th day of October, 1894, in the presence of two attesting witnesses.

WILLIAM D. GRAY.

Witnesses:
B. T. LEUZARDER,
WM. BANNEN.