(No Model.) 2 Sheets—Sheet 1.

F. PRINZ.

ELEVATING BOLT.

No. 381,848. Patented Apr. 24, 1888.

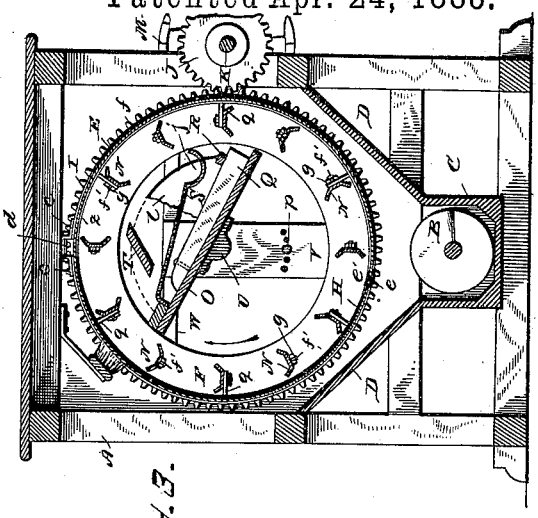

Fig. 3.

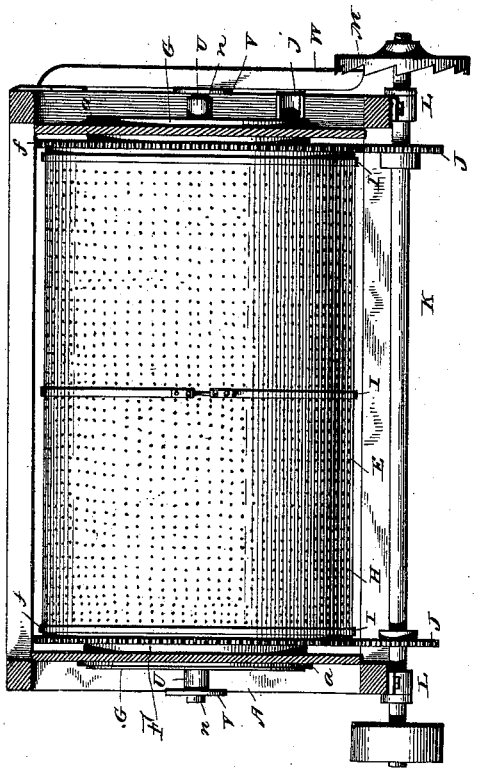

Fig. 1.

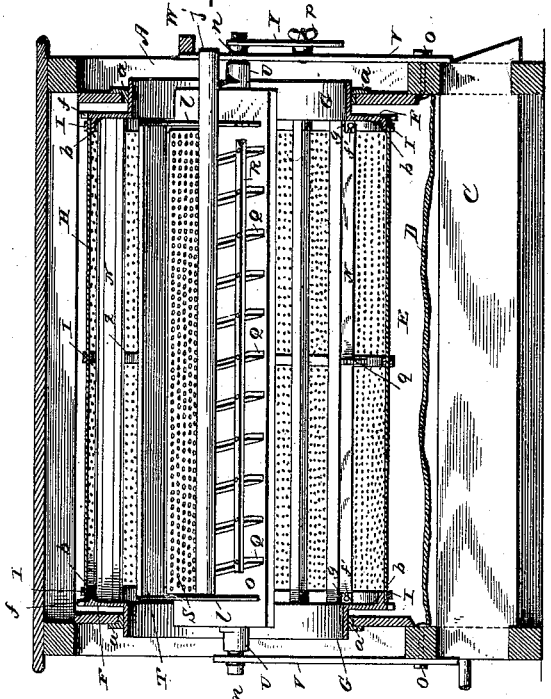

Fig. 2.

Witnesses.
Wm. L. Sheiden.
Alfred T. Gage

Inventor.
Faustin Prinz,
By Wm. E. Henderson
Attorney.

(No Model.) 2 Sheets—Sheet 2.

F. PRINZ.

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Fig. 5.

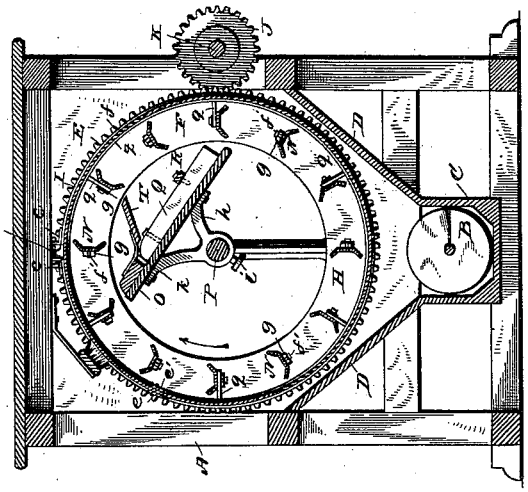


Fig. 8.

Fig. 9.

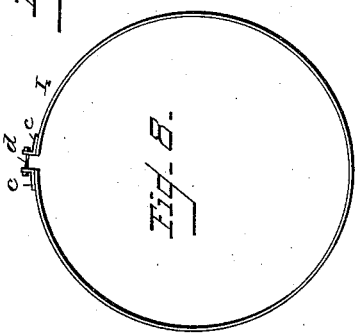


Fig. 7.

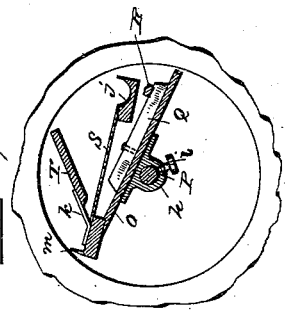


Fig. 6.

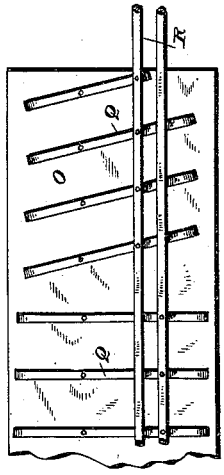
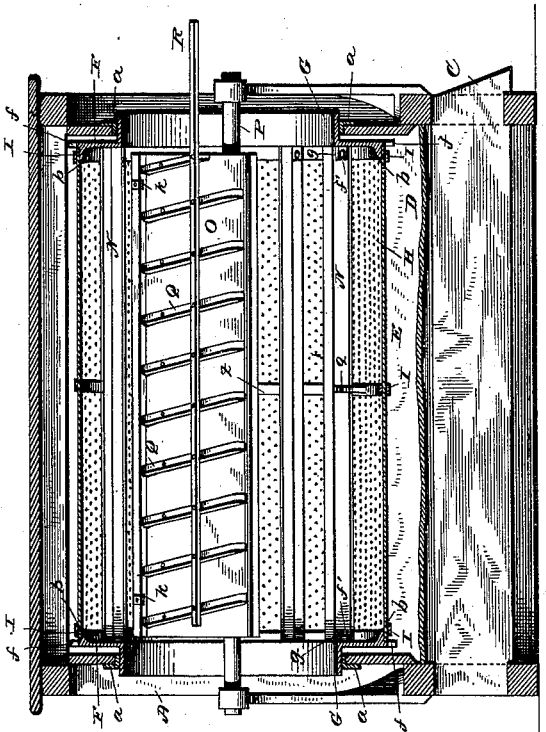


Fig. 4.



Witnesses.
Wm. L. Speidens.
Alfred T. Gage.

Inventor.
Faustin Prinz,
By Wm. G. Henderson
Attorney.

UNITED STATES PATENT OFFICE.

FAUSTIN PRINZ, OF MILWAUKEE, WISCONSIN.

ELEVATING-BOLT.

SPECIFICATION forming part of Letters Patent No. 381,848, dated April 24, 1888.

Application filed March 12, 1886. Serial No. 194,968. (No model.)

To all whom it may concern:

Be it known that I, FAUSTIN PRINZ, a subject of the Emperor of Germany, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Elevating-Bolts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to graders or elevating-bolts adapted for grading wheat or any other material that can be graded thereby, and has for its object to effect a more thorough grading or separation than heretofore; and to that end it consists in the constructions and combinations of parts, hereinafter particularly described, and then specifically defined by the claims.

Figure 1 of the drawings is a plan view of the bolt; Fig. 2, a vertical longitudinal section through Fig. 1; Fig. 3, a cross-section through Fig. 1; Fig. 4, a longitudinal section through the bolt, showing the directing-board without the shaker; Fig. 5, a cross-section through the bolt constructed according to Fig. 4; Fig. 6, a plan of a directing-board, partly broken away, showing two sets of wings, Q; Fig. 7, a cross-sectional view of part of the bolt, showing modified forms of directing-board and screen; Fig. 8, a view of one of the rings that bind the bolt in cross-section; Fig. 9, a cross section through part of the grading-cylinder, showing manner of forming joint.

In the drawings, the letter A designates the casing, with conveyer B, its trough C, and inclines D beneath the bolt, all of which are of the ordinary construction and therefore need not be more particularly described.

Within the casing is the bolt E, composed of heads F, having bearings G journaled in the boxing or rings *a* in the ends of the casing, and having a grading-surface, H, of wire-gauze, bolting-cloth, or any suitable material in use for the purpose. The preferred material is perforated metal, fitting at its ends on flanges *b* on the inner face of the heads F, and secured thereto by bands I, having angle-irons *c* at their ends, through which bolts *d* pass to clamp the bands to the flanges. These bands may be used at as many other points as desired to bind and stiffen the bolt.

To one edge of the perforated grading-surface, on opposite faces thereof, there are secured by rivets or other means metal plates *e e'*, forming a fork, in or between which fits the other edge of the grading-surface, so that when bolts or rivets are passed through the plates and grading-surface a good joint is made. The heads of the bolts are formed on their peripheries with cogs *f*, with which mesh the gears J on the shaft K, which is journaled in boxes L, secured to the casing, and has at one end a drive-pulley, from which motion is transmitted to the bolt, and at the other end a ratchet or cam-faced wheel, M.

While it is preferred to transmit motion to the bolt by the means described, still any other suitable means for the purpose may be employed—as, for instance, rollers mounted on a rotating shaft may be made to bear against the bearings G, so as to revolve the bolt by frictional contact. This is not illustrated because not claimed.

Within the bolt are a series of ribs or elevators, N, extending longitudinally of the bolt and secured by bolts *f'*, or other means, to lugs *g* on the inside of heads F. These elevators are concave, (preferably of the form shown,) and are set so that a space will be left between them and the inner face of the grading-surface. By this construction a portion of the material is between the carriers and grading-surface undisturbed by the carriers, which portion is continuously agitating or rolling, whereby the larger particles work or are brought to the top or surface of the mass and carried upward by the elevators, while the lighter or finer particles are brought to the surface of the screen, and, being freed from so much of the larger particles, are freer to pass through the screen. The coarser or larger particles lifted by the elevators to the upper portion of the bolt, instead of being permitted to fall directly to the bottom of the bolt, are intercepted in their downward course—for instance, as shown in Figs. 4 and 5—by a board, O, which directs the material to the opposite side of the bolt and against the surface thereof. The advantage of receiving the material from the ascending side of the bolt and directing it against

the surface of the bolt on the descending side is that the larger particles carried away from the smaller particles by the elevators move faster than the bolt when they leave the board and come in contact with the surface of the bolt on the descending side with the result of imparting a similar rolling motion as on the ascending side and with like results. Both sides of the bolt are thus brought into play in the treatment of the material. This directing-board may be supported, as clearly illustrated in Figs. 5 and 7, by brackets *h*, connected by set-screws *i* to a shaft, P, passing centrally through the bolt and supported by suitable standards outside of the casing, as shown in Fig. 4. By loosening the set-screws the brackets can be turned on the shaft so as to change the inclination of the board and discharge the material higher or lower against the side of the grading-surface, as the exigencies of the case may require, and partly to control the speed with which the material shall pass from the board.

The board has pivoted to it a series of bars or wings, Q, to which is connected a rod, R, extending to the outside of the bolt, and by means of which the inclination of the wings may be varied to regulate the speed with which the material will be moved to the end of the bolt.

Instead of a single rod, a series of rods may be used, a portion of the wings or bars being attached to each rod, so that some of the bars may be placed at a greater angle than the others. An additional rod is shown in Fig. 6.

I prefer to use in connection with the bolt a screen, which I designate a "shaker." It is shown in Figs. 2, 3, and 7, and consists of a perforated metal screen, S, secured at one end to the upper portion of the inclined board O, and having at its lower end a trough, *j*, made integral under the construction shown in Fig. 3 with the screen, thereby stiffening the same, or made separate and soldered or otherwise secured thereto. It stands above the surface of the board and receives from the carriers the material being treated, the smaller particles of which pass through the screen and down onto the directing-board, while the larger particles pass into the trough and out therefrom at the tail end of the bolt. To insure the falling of the material onto the upper end of the screen or on the board O, a board or shield, T, is supported, preferably, in an inclined position above the screen or board at its upper end, either by straps *k*, extending from the board, and to the upper end of which the shield is connected, as shown in Figs. 4, 5, and 7, or by an upright, *l*, extending up from the directing-board, and from which the shield is suspended, as shown in Fig. 3. The material that falls onto the shield is checked by it and slides down the same and passes under it and over the screen, and thus more of the material is screened than otherwise would be.

It is obvious that the screen S may have a wooden frame around its edges, which, however, is not shown, as a frame is well known and not claimed; and, if desired, a flange, *m*, may be placed as shown in Fig. 7, secured to any suitable part of the screen or inclined board and extending lengthwise thereof to prevent the material from backing over the inclined directing-board.

When the shaker is used, I prefer to support the inclined directing-board at opposite ends of the bolt by brackets U, as shown in Figs. 1, 2, and 3, instead of by a shaft extending through the bolt, as shown in Figs. 4, 5, and 7. These brackets have journal-pins *n* at their ends, which extend through openings in the spring-plates V, secured at their lower ends by bolts *o*, or otherwise, to some part of the framework. These spring-plates form the standards or supports for the directing-board and permit a vibrating movement to be imparted to the shaker. These vibrations may be imparted by any well-known means suitable for the purpose. As suitable means for the purpose I have illustrated a lever, W, extending horizontally from a spring or elastic connection with one of the uprights of the frame of the machine forward into contact with one of the spring or elastic plates V, and thence forward to a point where the cam-surface or ratchet-teeth of the wheel M in the rotation of shaft K will strike against its side, and thus move the shaker in the direction of the length of the bolt. The rebound of the spring-plate draws the shaker back, and thus a longitudinal reciprocating movement is imparted to the shaker. This causes the material to move toward the tail end of the bolt. The shaker is given some inclination to the tail end of the bolt, and the latter may have some inclination that way.

The directing-board and shaker may be adjusted to different angles by an arm, Y, connected rigidly to the journal *n* of one of the brackets U and held to the spring-plate V by a thumb screw and nut *p*. The plate V is formed with a series of holes, so that by removing the screw and turning the board by arm Y, and then passing the screw through the proper hole, the board will be adjusted and held to the desired angle.

The grading-surface may be braced or stiffened from within the bolt by a ring, Z, supported by arms *q*, extending from the ribs or elevators N. One of the clamping-bands I will be passed around the grading-surface at this point, so as to hold it close to the inside ring.

A brush may be applied to the outside of the grading-surface, as is common in grading-cylinders, and for the same purpose of clearing the surface.

I have described what I consider to be the best means for accomplishing the objects in view; but it will be understood that I do not mean to confine myself strictly to the details shown and described, as the mechanical equivalents thereof are embraced within the scope of my invention and claims.

While I prefer to use the directing-board

and the shaker, still I wish it understood that either of said parts can be omitted without departing from the other features of my invention described. The material will be fed to the reel or cylinder, and the coarse material discharged therefrom in the manner usual in bolting-reels.

Having fully described my invention and set forth its merits, what I claim is—

1. The combination, with the cylindrical grading-surface, of the elevators supported in proximity to the grading-surface, with a space between the surface and elevators, and the directing-board supported within the cylinder and inclined from the ascending to the descending side of the cylinder, substantially as described, to receive material from the elevators at the upper part of the cylinder and deliver it to the descending side of the grading-surface, substantially as and for the purpose described.

2. The combination, with the cylindrical grading-surface and elevators, of the directing-board located within the cylinder and inclined, substantially as described, from the ascending to the descending side of the grading-surface to receive material from the elevators and deliver it to the descending side of the grading-surface, substantially as described.

3. The combination, with the cylindrical grading-surface and elevators, of a directing-board located within the cylinder and inclined from the ascending to the descending side thereof, for the purposes specified, and adjustable bars or wings for regulating the flow of material over the said board, substantially as described.

4. The combination, with the cylindrical grading-surface and elevators, of an adjustable directing-board located within the cylinder and inclined from the ascending to the descending side of said cylinder, substantially as described.

5. The combination, with the cylindrical grading-surface and elevators, of a vibrating directing-board located within the cylinder and inclined from the ascending to the descending side of said cylinder to receive material from the ascending side of the grading-surface and deliver it to the descending side, substantially as described.

6. The combination, with the cylindrical grading-surface, of a vibrating screen located within said cylinder and means for vibrating said screen lengthwise of said cylinder, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FAUSTIN PRINZ.

Witnesses:

JOHN M. CONNOLLY,

WILLIAM F. LANDWEHR.