T. W. JENKINS.

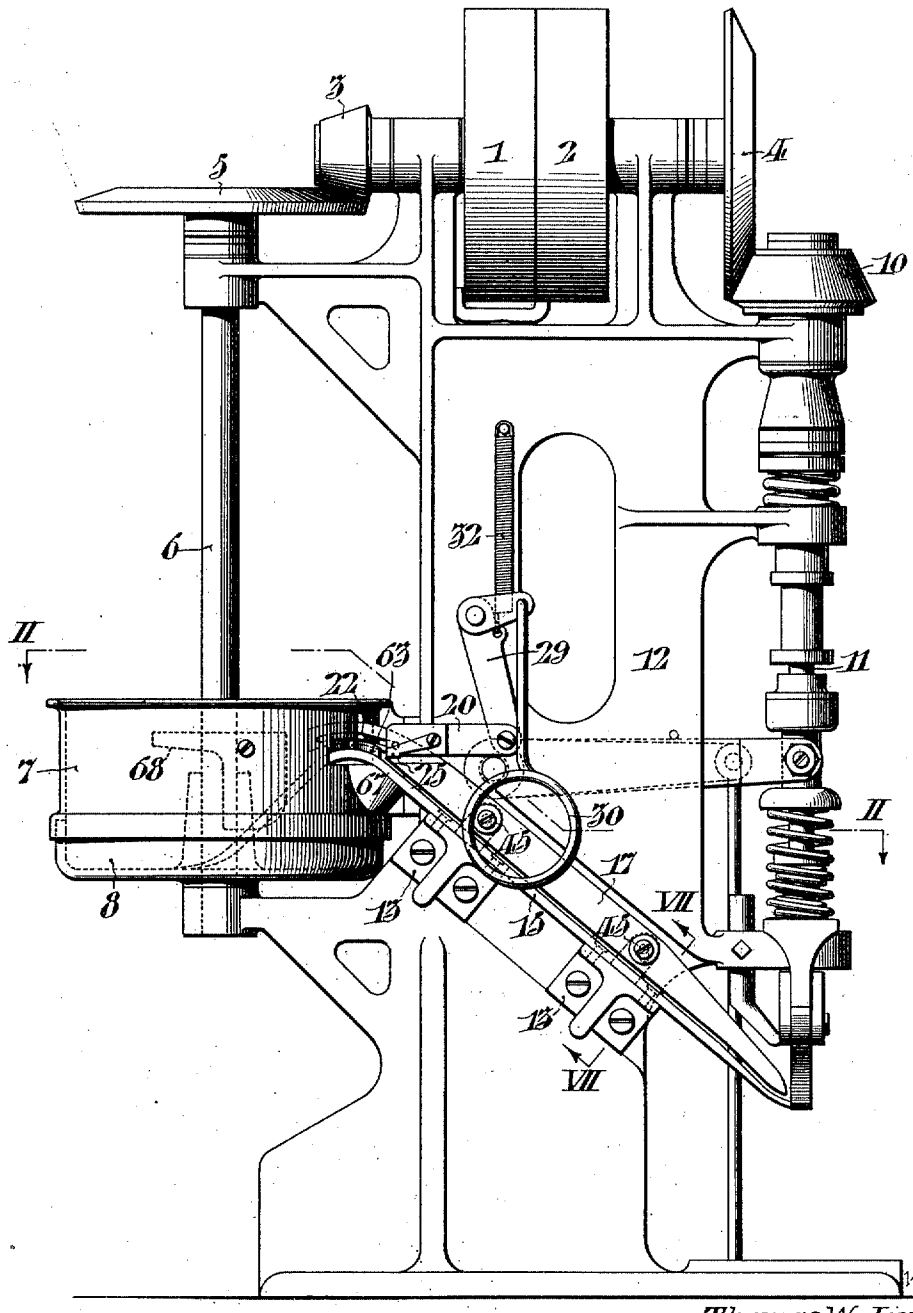
FEED CHUTE.

APPLICATION FILED NOV. 23, 1909.

982,725. Patented Jan. 24, 1911.

3 SHEETS—SHEET 1.

FIG. I.



Inventor

Thomas W. Jenkins,

by Filley & Lamp

Attorneys.

Witnesses

John C. Burgner.

James C. Bell

T. W. JENKINS.

FEED CHUTE.

APPLICATION FILED NOV. 23, 1909.

982,725. **Patented Jan. 24, 1911.**

3 SHEETS—SHEET 2.

FIG. II

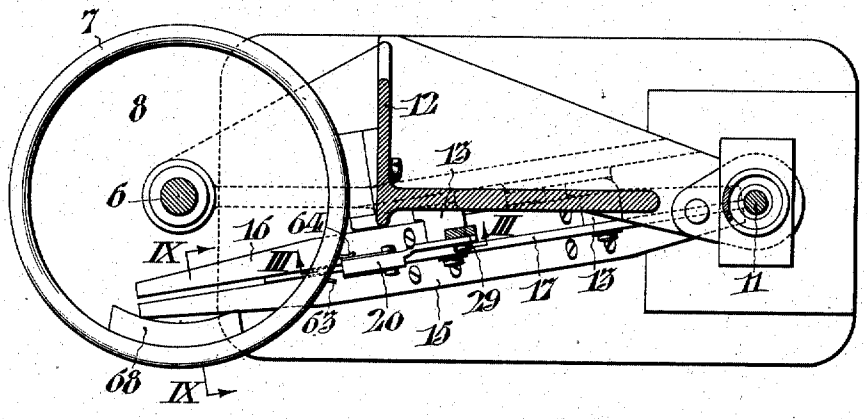


FIG. III

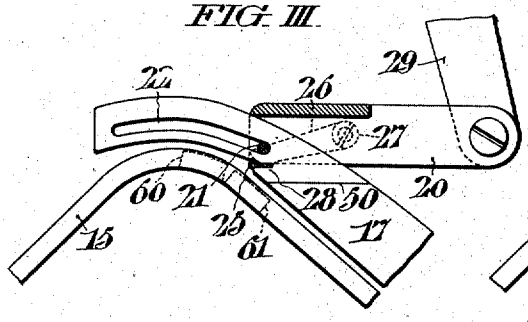


FIG. IV

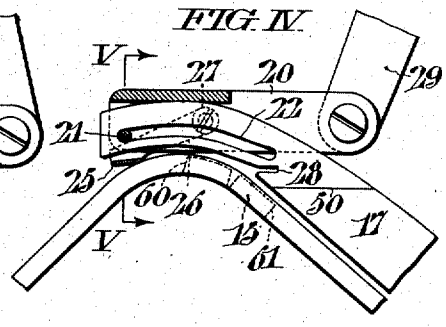


FIG. VI

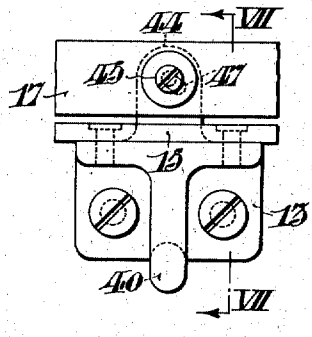


FIG. V

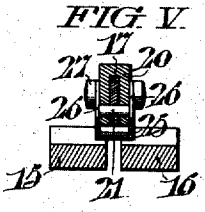
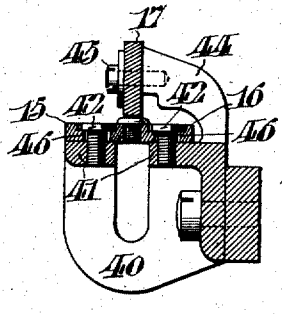


FIG. VII



Witnesses
John C. Bergner.
James H. Bell

Inventor
Thomas W. Jenkins
by Fulley & Paul
Attorneys.

T. W. JENKINS.

FEED CHUTE.

APPLICATION FILED NOV. 23, 1909.

982,725. Patented Jan. 24, 1911.

3 SHEETS—SHEET 3.

FIG. VIII.

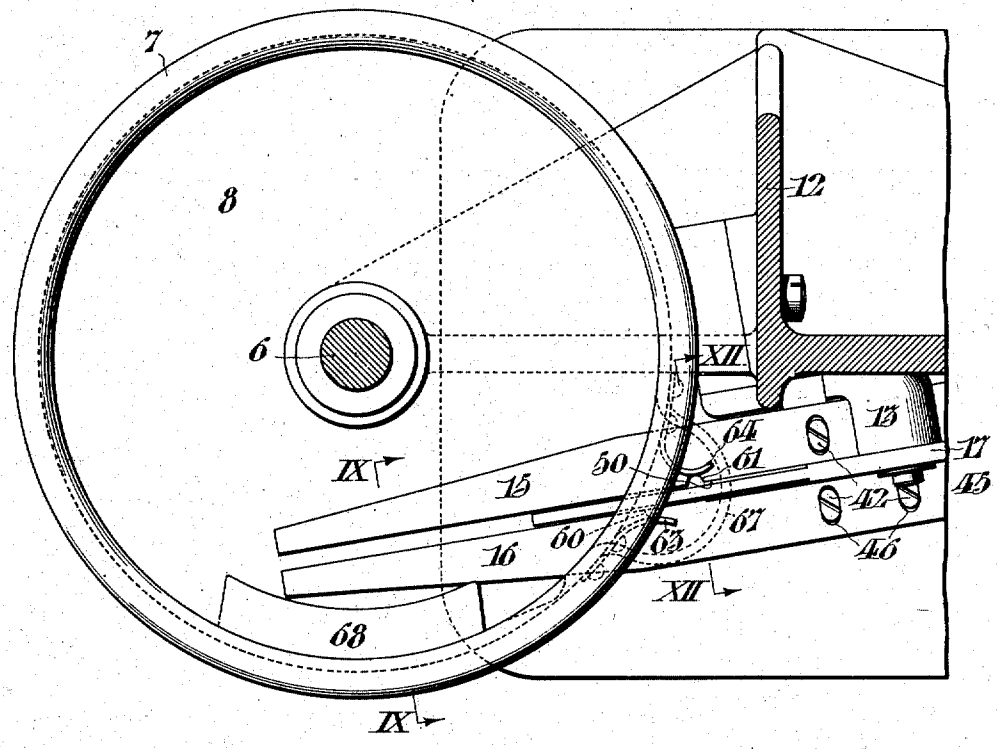


FIG. IX.

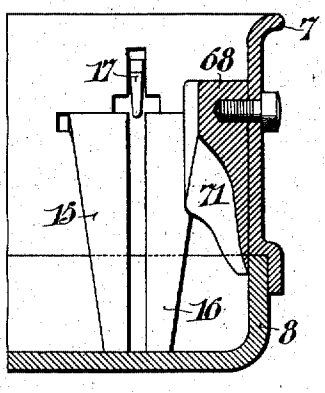


FIG. X.

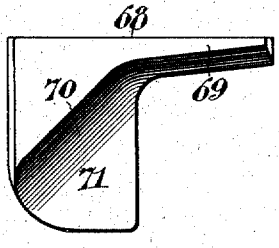


FIG. XI.

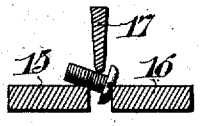


FIG. XII.

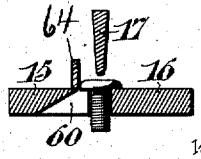
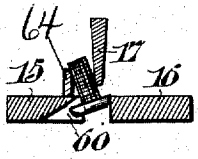


FIG. XIII.



Witnesses
John C. Bergner.
James C. Bell.

Inventor
Thomas W. Jenkins,
by Alley & Lamb
Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS W. JENKINS, OF PHILADELPHIA, PENNSYLVANIA.

FEED-CHUTE.

982,725. Specification of Letters Patent. **Patented Jan. 24, 1911.**

Application filed November 23, 1909. Serial No. 529,555.

To all whom it may concern:

Be it known that I, THOMAS W. JENKINS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Chutes, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to feeding mechanism employed for the purpose of continuously feeding headed metal objects, as for instance, screws, tacks, bolts, rivets, and the like, from a rotating hopper to a delivery point.

I have illustrated and will describe my mechanism as applied to a screw driving machine of the character shown in United States Letters Patent No. 944,561, granted under date of December 28th, 1909, upon an application filed by John J. W. Kenan, under date of April 9th, 1908, Serial No. 425,978, for screw driving machines. In such mechanism a feed chute is associated with a rotary hopper at one end, and screw driving mechanism at the other end of the chute, the relation of the parts being such that the screws are continuously fed by the chute from the rotary hopper to the point where they are delivered in position to be engaged by the screw driving mechanism, but it will be understood that my invention applies to similar mechanism employed for the purpose of feeding other objects than screws, and also that it is entirely independent of the mechanism which operates upon the object when delivered from the chute. Consequently, when in this specification and the claims I refer to a screw as the object which is to be fed by the chute, it will be understood that the word is used broadly enough to include all similar headed objects.

My invention relates more particularly to the construction of the parts forming the raceway; to the means employed for rejecting wrongly seated objects from the raceway; to the means employed for ejecting objects from the raceway which clog it, and to the means employed for facilitating proper seating within the raceway of the objects contained within the rotating hopper.

In the accompanying drawings, Figure I, represents a screw driving machine of the character above referred to, having feeding mechanism embodying my invention applied to it. Fig. II, is an irregular section of the same along the line II, II, of Fig. I. Figs. III, and IV, are vertical sections along the line III, III, of Fig. II, differing only in showing the ejector in different positions. Fig. V, is a cross section along the line V, V, in Fig. IV. Fig. VI, is an elevation of one of the brackets employed for the support of the feed chute. Fig. VII, is a section along the line VII, VII, of Fig. VI. Fig. VIII, is an enlarged plan view of the rotating hopper and the receiving end of the raceway, the ejector shown in Figs. I to IV, being removed in order to more clearly disclose the parts lying beneath it. Fig. IX, is a partial cross section along the line IX, IX, of Fig. VIII. Fig. X, is a detail view of the deflector. Figs. XI, XII, and XIII, are cross sections of the raceway taken in such a manner as to illustrate the means for rejecting wrongly seated objects.

Referring to Fig. I, fast and loose pulleys 1, and 2, afford belt control to a horizontal shaft provided at either extremity with bevel friction disks 3, and 4. The disk 3, is in engagement with a bevel disk 5, on the shaft 6, mounted in axial relation to a hopper 7, and carrying its rotating bottom 8. The bevel disk 4, engages a bevel disk 10, on the main shaft 11, of the screw driving mechanism, which, as it has been fully described, in the specification of the patent to which I have referred, and forms no part of this invention, need not be here described.

The feed chute is attached to the main standard 12, of the machine by means of brackets 13, 13, and in an angular direction in order that the chute may deliver by gravity.

The chute is formed of three parallel metal strips. Of these the two strips 15, and 16, form a raceway, being mounted in the same plane, with an intervening space, forming the feed slot between them. The third strip 17, is a guard strip mounted parallel with strips 15, and 16, and at right angles to their plane in such a way that the lower edge of the strip overlies and guards the raceway of the chute.

The raceway is in the form of an inverted V, with a curved apex and with arms of unequal length. The apex of the V, is situated at or near the point where the chute passes out of the hopper, the short arm being within and extending to the bottom of the hopper, while the long arm runs down to the point of delivery. The guard strip 17, is

coincident with the entire long arm of the chute and passes over its apex, but does not extend down the short arm. As seen in Figs. III, and IV, the upper end of the strip 17, after rounding the apex of the raceway, diverges from the parallel relation to it, flaring upward sufficiently to operate first as a guide to help seat the objects properly in the raceway as they advance up its short arm, and then as a guard prohibiting objects rightly seated in the raceway from jumping out of the raceway as they pass the apex and descend the long arm of the chute.

The brackets 13, upon which the parts of the chute are mounted are shown in Figs. VI, and VII. Each bracket consists of a bifurcated arm 40, surmounted by facing plates 41, the crotch between the bifurcations being of sufficient size to permit the passage of the object being fed along the chute. Against the facing plates 41, the main strips 15, and 16, which form the raceway are fastened by screws 42, passing through slots 46, which permit of the requisite adjustment of the strips to or from each other, whereby the raceway is capable of being made to fit different sizes of objects to be fed therethrough. The bracket is further provided with an upper arm 44, at the end of which the guard plate 17, is attached by screws 45, passing through slots 47, which are preferably inclined with reference to said guard strip as shown in Figs. I and VI, so as to secure vertical adjustment, notwithstanding the inclined position of the chute. By means of this adjustment, the guard may be made to accurately reject an object wrongly fed thereto, but to guide therein an object rightly seated in the raceway.

The guard strip 17, varies in width. The main portion of it overhanging the long descending arm of the raceway is of maximum width completely covering the slot beneath it as seen partly in Fig. VII, but at 50, the guard strip is provided with shoulders whereby it is reduced in width, this reduced portion being the part which coincides with the curved apex of the chute where the operations of rejection and ejection are performed. The narrowed width and curved lower edge of this portion of the guard strip are shown in Figs. V, IX, and XIII, and the functions of this part of the guard strip will be explained in connection with the description of the other parts of my feeding mechanism. A screw or similar object may ride up the receiving end of the raceway in one of four possible positions. It may ride in the raceway with its shank down, which is the proper way for the object to seat itself. It may ride up in an inverted position with its shank projecting upward, in which case the end of the guard strip prevents it from reaching the apex of the raceway. Or it may ride upon its side with its head either to the right or to the left, in which case it may pass beneath the end of the guard strip and must be rejected from the raceway, for which the following means are provided:—Two notches 60, and 61, (see Figs. III, IV, and VIII), are cut, one in each of the strips which form the raceway, on the side which forms the slot and in opposition to each other, but one farther along the slot than the other. Both of these notches are in that part of the raceway which overlies a projecting spout 67, formed on the hopper. The notches, as shown, are of such size and shape as to permit a screw which is lying upon its side to pass down through the slot and back into the hopper, as shown in Fig. XIII, while preventing the head of a screw rightly seated in the slot, from thus dropping down, as shown in Fig. XII. In this action the rounded narrow edge of the overhanging guard strip cooperates. To facilitate the rejection from the raceway of wrongly seated screws, I provide flaring plates 63, and 64, in proper proximity to these notches, so that a screw which has ascended the raceway seated upon its side, is shoved as it approaches the proper notch into the position of Fig. XI, with its head in contact with the far side of the raceway. This enables the shank of the screw when the proper point is reached, to drop through the notch as seen in Fig. XIII. The notches are paired and placed one on either side of the slot in order to provide for wrongly seated screws with their shanks reaching to one or the other side of the slot.

The ejector works over the apex of the chute. There is a pivoted link 20, bifurcated at one end to bestride the thinner upper end of the guard plate 17, and carrying a pin 21, playing in a slot 22, cut in the guard plate as shown in Fig. I, and thereby guiding and limiting its play. The ejector 25, has side arms 26, by which it is pivoted at 27, to the link 20, so that ordinarily the ejector rests by its own weight in contact with the surface of the raceway. A notch 28, is formed in the guard plate 17, to one side of the apex, and into this notch the ejector is received when at one end of its play. In this position it is held out of the path taken by objects traversing the chute, but if the ejector is driven to the other end of its play, by a reciprocating motion of the link 20, any object within the chute which may have become wedged there, as for instance, a malformed screw, is forced out by the motion of the ejector which terminates in the position shown in Fig. IV.

To impart a reciprocatory motion to the link 20, in order to operate the ejector, a bell crank lever 29, is pivoted upon the standard of the machine, and at the end of its long

arm, is in turn pivoted to the end of the link 20. The short arm of the bell crank lever 29, has a depending handle 30. The bell crank lever is ordinarily maintained under the tension of spring 32, in the position shown in Figs. I, and II, where the ejector rests within the notch 28, in such a way as not to obstruct the chute, but by depression of the handle attached to the short arm of the bell crank lever, the ejector is thrown, against the tension of the spring 32, to the other end of its play, and the chute cleared of any obstruction.

The stationary side of the hopper 7, has attached to it a deflector 68, shown in detail in Figs. IX and X. It comprises an overhanging edge 69, a descending edge 70, and a curved or warped deflecting surface 71. As the bottom of the hopper rotates, the mass of screws resting on it tends to rise up around the edge of the hopper by reason of centrifugal tendency. This is prevented by the overhanging edge 69, of the deflector, while at the same time the deflecting surface 71, causes the mass of screws rising around the edge to curl over and pass rapidly and forcibly across the inclined surface of the raceway within the hopper. In this way screws which are ascending the raceway, without being rightly seated therein, are swept out of it by the impetus of other screws traveling transversely to their motion. Screws which are rightly seated, pressing on instantly close up the gap, so that by the time the line reaches the apex of the raceway, all or nearly all are properly seated therein.

In operation a mass of screws are placed in the hopper, and the rotation of the bottom of the hopper throws them against the end of the raceway, which extends down within the hopper. Instantly a line of screws, some rightly and some wrongly seated, begins to ascend the short arm of the raceway. By the action of the deflecting plate just described, practically all of those which are wrongly seated, are swept out, so that a procession of rightly seated screws travels over the top of the V, whence gravity carries them down to the point where they engage the screw driving apparatus. Objects not entering the chute in proper relation are sometimes rightly seated therein, by the end of the guide strip 17. Otherwise, they are rejected and fall back into the hopper, through the spout 67, or are ejected from the top of the chute by the ejector as described.

Having thus described my invention, I claim:—

1. A feed chute in the form of an inverted V, formed of a slotted raceway and an overhanging guard strip, the portion of the guard strip which overhangs the apex of the V, being narrower than the slot and rounded along the lower edge, while the portion which coincides with the descending arm is wider covering the entire slot.

2. A feed chute for headed objects, provided with a slotted race-way adapted to engage and support the objects by the heads thereof, said race-way having a notch formed in one side thereof between its receiving and delivering ends adapted to receive the shank of a wrongly seated object and permit the same to drop from said race-way.

3. A feed chute for headed objects, provided with a slotted race-way adapted to engage and support the objects by the heads thereof, said race-way having a notch formed in one side thereof between its receiving and delivering ends, adapted to receive the shank of a wrongly seated object, and permit the same to drop from said race-way, in combination with a guiding plate located adjacent said notch to facilitate the rejection of such wrongly seated objects.

4. A feed chute for headed objects, provided with a slotted race-way adapted to engage and support the objects by the heads thereof, said raceway having notches formed in opposite sides thereof between its receiving and delivering ends, which notches are adapted to receive the shank of a wrongly seated object, and permit the same to drop from said race-way, said notches being staggered relative to each other.

5. The combination of a rotary hopper; a feed chute for headed objects in the form of an inverted V, with one arm reaching down into the hopper, and the other passing to a point of delivery, comprising a slotted raceway, the edges of which are provided with rejection notches, and a guard strip overhanging the slot of the raceway, and co-acting with the notches, the dimensions of the notches, and the shape of the guard strip being such that the heads of rightly seated objects bridge the notches, and continue their travel along the chute, while wrongly seated objects are by the co-action of the guard strip and the notches compelled to drop through and out of the raceway at the points where the notches occur.

6. A feed chute, comprising a slotted raceway, with an overhanging guard strip; in combination with a reciprocating ejector mounted within the feed chute; means whereby said ejector is guided so as to reciprocate below the guard strip, parallel with and in the region of the slotted raceway to eject objects from the raceway; and means whereby at one end of its play, said ejector is withdrawn from interference with objects passing along the chute.

7. The combination of a rotary hopper; an inclined chute reaching down into the hopper; and a deflecting plate held within the hopper in fixed relation to the chute, of

such shape and in such relation to the objects carried around by the rotation of the hopper, as to continuously deflect objects thrown against it by centrifugal force, and to throw them across the surface of the slotted raceway, where it reaches down into the hopper.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this fifteenth day of November, 1909.

THOMAS W. JENKINS.

Witnesses:

JAMES H. BELL,

E. L. FULLERTON.