

Aug. 5, 1924.

1,503,494

W. E. ELLIOTT

FEEDING APPARATUS

Filed Aug. 18, 1919

2 Sheets-Sheet 1

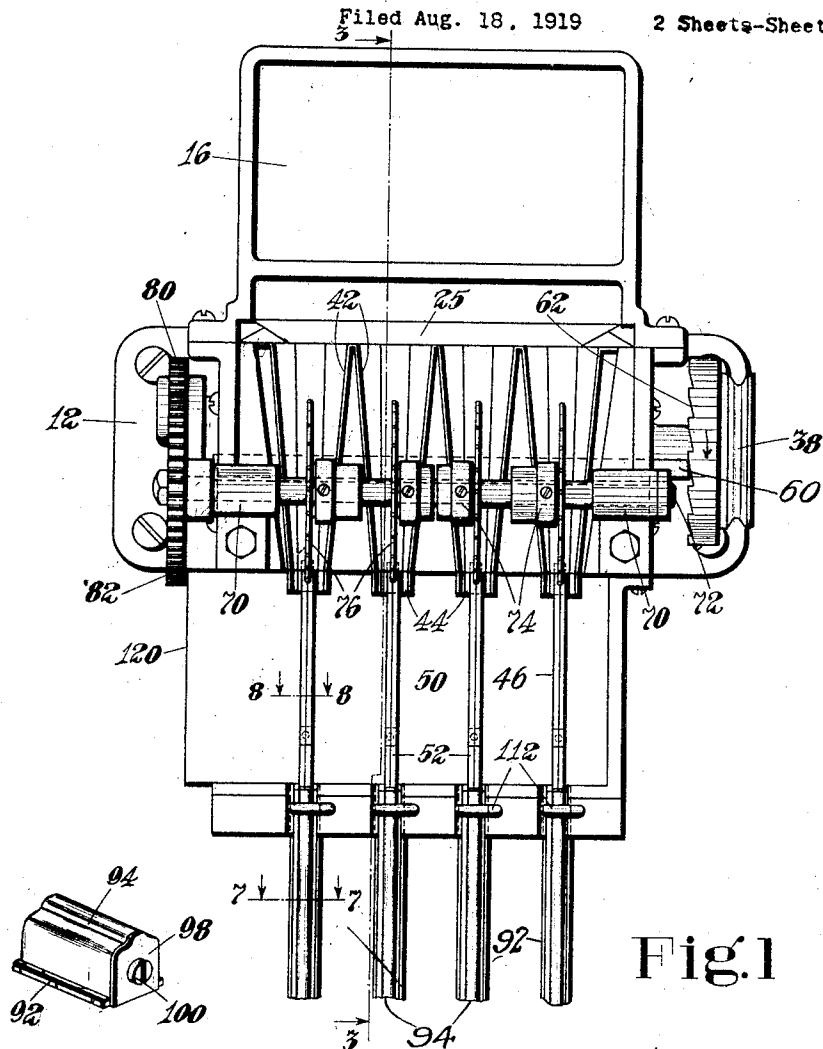


Fig. 1

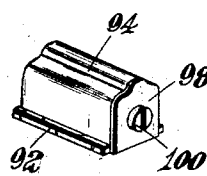


Fig. 6

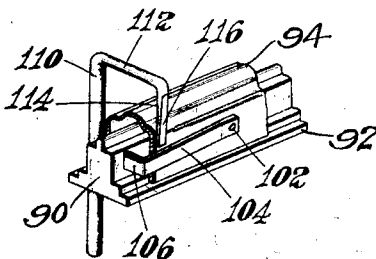


Fig. 5

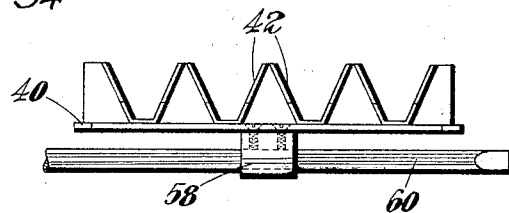


Fig. 4

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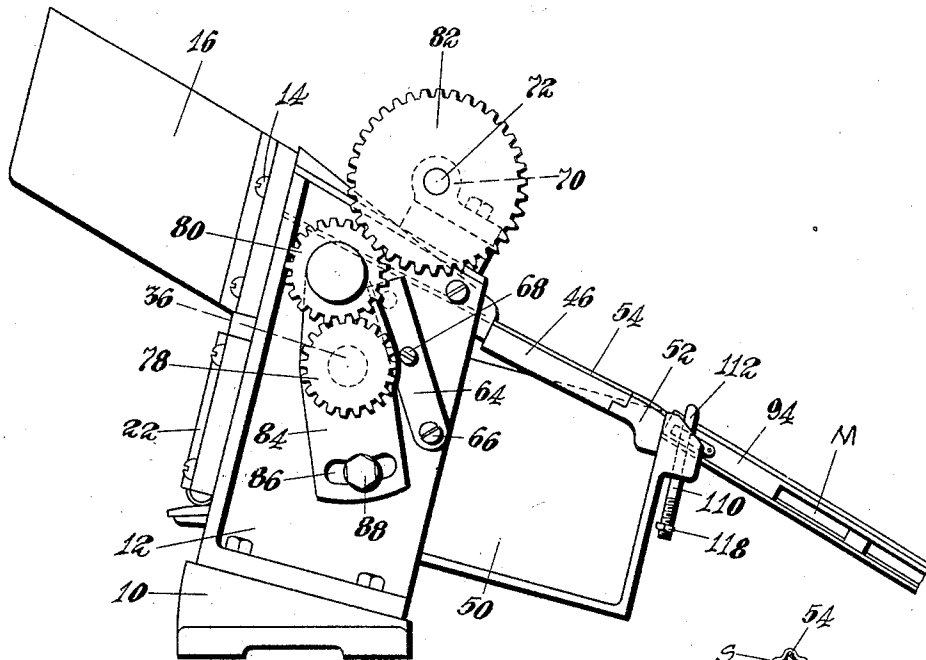


Fig. 2

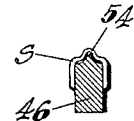


Fig. 8

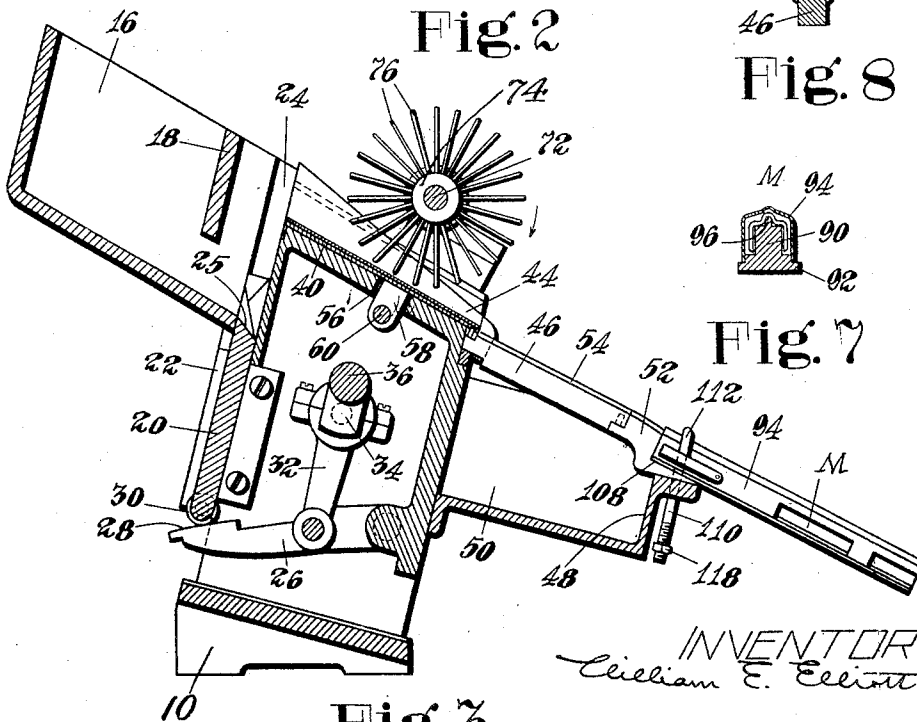


Fig. 3

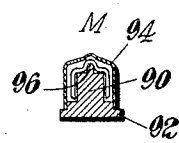


Fig. 7

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FEEDING APPARATUS.

Application filed August 18, 1919. Serial No. 318,237.

To all whom it may concern:

Be it known that I, WILLIAM E. ELLIOTT, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain Improvements in Feeding Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

The present invention relates to apparatus adapted to feed objects, for example staples, from a source of supply to a receiving device or mechanism. By the apparatus of this invention the objects are advanced to the receiving device in a regular and orderly manner, and said receiving device is effectively supported and the retention of objects therein controlled.

As a feature of the invention, the objects fed are delivered to a guide, on which they are supported and advanced in a predetermined position, while the means delivering to said guide is acted upon to arrange the objects favorably for the assumption of such predetermined position. In feeding staples, the guide may support them by their yokes, and the chute delivering thereto is preferably vibrated laterally to so turn the staples that a large portion will properly engage the guide. To further facilitate the correct presentation of the objects to the guide, I prefer to so act upon them on the delivery means that they are arranged in a single series. This may be accomplished by a member which moves the objects from superposed relation longitudinally of the chute or other delivery means.

As another feature of the invention, a device receiving objects from the guide member is provided with a closure, and there is novel means which both maintains the co-operation of the receiving device and guide member and actuates the closure. In this way the receiving device, which I show as a magazine tube, may be secured in alinement with the raceway. I employ, in the present embodiment of the invention, a clamp so mounted that the raceway acts to engage both the magazine tube and its closure, the former to fix it in position or release it, and the latter to free the tube for the reception of the objects or to effect their retention.

One of a number of possible forms which

my invention may assume is illustrated in the accompanying drawings. Here,

Fig. 1 is a top plan view of my improved feeding apparatus;

Fig. 2 is a side elevation looking from the left in Fig. 1;

Fig. 3 is a vertical section on the line 3—3 of Fig. 1;

Fig. 4 is a detail, in end elevation, of the staple-delivering chutes;

Fig. 5 is a perspective view of one extremity of the magazine tube, particularly illustrating the clamping and closure-actuating means;

Fig. 6 is a similar view of the opposite end of the tube; and

Figs. 7 and 8 are transverse sections on the lines 7—7 and 8—8, respectively, of Fig. 1.

Upon a base 10 is supported, in an inclined position, a main frame member 12. At the upper inclined side of the member 12 is secured at 14 a receptacle 16 for the staples or other objects to be fed. Extending transversely of the receptacle, near the frame member 12, is a partition, stopping short of the inclined bottom wall of the receptacle. This permits the passage of the contents in a somewhat reduced stream to that portion from which the feed begins. At this lower forward extremity of the receptacle is an opening, through which operates an elevating plate or member 20, movable between guide plates 22, 22 fixed to the wall of the frame 12 below the receptacle and ways 24 between the adjacent edges of these elements. The plate 20 is reciprocated in its guides, from a position in which its inclined upper edge 25 is just below the bottom wall of the hopper to one in which this edge is somewhat above the inclined top of the frame portion 12, by a lever 26 fulcrumed upon the inside of the forward wall of the frame 12, and having an upper contact surface 28, upon which rests an anti-friction roll 30 rotatably mounted at the bottom of the plate 20. To this lever is articulated a connecting rod 32, operated by a crank 34 secured upon a shaft 36 journaled in the end walls of the frame. At one end of the shaft is fixed a pulley 38, to which power may be applied by means of a belt (not illustrated).

Upon the upper surface of the frame portion 12, which is downwardly inclined from the hopper 14 in the direction in which the feed is to occur, is mounted to slide a plate

40 carrying a series of delivery chutes 42 situated side by side. These chutes may be formed conveniently of sheet metal, and are preferably of such width at their upper ends that they contact with one another, here occupying the whole width of the plate opposite the elevating plate 20. From their meeting edges the sides of each chute converge to separated contracted throats 44 of such width as to readily permit the passage of the object to be fed. Aligned with the throat of each chute is a guide-bar or raceway 46 extending from the chute to a wall 48 of a receptacle 50 fastened to the forward side of the frame, to which wall the bars are secured at 52 by portions seated in slots in the widened upper extremity of the wall. These bars are preferably inclined from the delivery chutes at the same general angle, this being sufficient to allow the advance of the staples over them by gravity. In transverse section each bar may be of the form particularly illustrated in Fig. 8 of the drawings, its upper portion generally conforming to the contour of the inside of a staple. That is, it has vertical side walls over which the inside of the staple legs may move, and an upper wall upon which the yoke may rest, there being at the center an upward projection 54 to enter the loop which is customarily formed in staples which are to be utilized for the attachment of shoe buttons, the apparatus here illustrated being particularly designed for feeding objects of this character.

In their passage through the throats 44 of the chutes, the staples will be presented to the bars in four principal ways. They may approach a bar sideways, so that either of the two legs may contact with the top of the bar, in which case they will not be retained thereby, but will waste between the adjacent bars to the receptacle. Instead of the sideways approach, the points of the staple legs may be forward. In this case the staple will straddle the bar and be caught by it. Or the yoke of the staple may be foremost, in which case, as it contacts with the bar, the legs will turn astride it and it will be delivered as is desired. To insure the greater portion of the staples being correctly presented to the bars, I provide means for turning them upon the supporting surfaces of the chute to a relation with the bars favorable for their correct reception. Depending through a slot 56 in the upper wall of the frame portion 12 is a block 58 secured to the plate 40 and perforated to receive a transverse rod 60, which is fixed against movement in the block. This rod extends in both directions, at one end co-operating with an actuating member, shown as a stepped cam 62, this being conveniently formed upon the inner face of the pulley 38. At the opposite end of the rod there bears against it a spring 64, which I

have illustrated as of the leaf type, secured to the wall of the frame at 66 and having threaded through it a screw 68 contacting with the rod. As the cam rotates in the direction indicated by the arrow in Fig. 1, the rapid contact of the steps with the rod 60 vibrates the entire series of chutes, the intensity of this vibration being varied, if desired, by adjustment of the screw 68 and therefore of the tension of the spring 64. As a result of this vibration, the staples upon the bottoms of the chute are not only jarred and their downward travel facilitated, but also tend to be turned gradually about vertical axes until the heavier portion, or yoke is foremost. In this relation their advance continues until they enter the throats 44 of the chutes in one of the two positions in which they will remain upon the raceway bars.

To present the staples one by one at the throats of the chutes to the bars so they may fall astride of these without mutual interference, I have means for combing them out from the more or less massed arrangement which tends to form in the chutes, into single series at the throats. Journaled in bearings 70, secured upon projections above the sides of the frame walls, is a shaft 72 extending transversely of the chutes 42. Fast upon this shaft are hubs 74, one for each chute, from which hubs radiate fingers 76, preferably arranged symmetrically about the peripheries of the hubs. The shaft is rotated to revolve the fingers between the side walls of the chutes from the main shaft 36. This has fast upon it a pinion 78 meshing with an idler pinion 80, the latter in turn meshing with a gear 82 secured to the shaft 72. The idler pinion I have shown as rotatable upon the upper extremity of a plate 84 pivoted about the shaft 36 outside one of the end walls of the frame portion 12, and having below the shaft an extension, in which is formed a slot 86 concentric with the shaft 36. A screw 88 extends through this slot and is threaded into the frame, serving to fix the plate in such position that it will properly engage the pinion 78 and gear 82. The revolution imparted to the fingers 76 is in the direction of the arrow in Fig. 3, or opposite to the movement of the staples down the chutes. The fingers engage the staples superposed or overlying one another at points somewhat above the throats, and, forcing them upward, arrange them in series entering the throats one by one, so they will not interfere with one another in their engagement with the guide-bars.

From the raceways the staples are received by magazine tubes M adapted to be filled by the present apparatus, and then removed for attachment to a machine to be supplied, as one for setting buttons. These magazine tubes I have shown as each consisting of a

bar 90 (Fig. 7) having an enlarged base 92 grooved or longitudinally recessed to receive a cover 94, which, with the bar, completes the tube. The form of the bar above the base is substantially like that of the guide bar 40, and is similarly provided with an upward projection 96 to enter the loops of the staple yokes. The space between the bar and cover in a general way corresponds to the form of a staple, which rests astride the bar and is retained against displacement by the cover. The lower extremity of the tube may be permanently closed by a plate 98 fixed to the bar by a screw 100. At the upper end is a closure consisting of a spring riveted to the outer side of the cover at 102, and having a main portion 104 extending along the vertical wall of said cover. Across the end of the tube, between the side wall of the cover and the side of the bar, extends an arm 106 of the spring, this so closing the opening that, when it is in this position, staples cannot be either received or removed. This is the relation for transferring and handling the magazines. The resiliency of the spring portion 104 permits the arm 106 to be moved back from the tube opening to free it either for the reception of staples from the feeder or their supply to the machine in which they are to be utilized. The magazine tubes are held in depressions 108 in the portions 52 of the guide-bars in alignment with said bars by clamps, which may each consist of a rod 110 extending through an opening in the enlargement of the receptacle wall 48, these rods being bent at 112 over the top of the depression which is to receive the tube. From the end of this bent-over or horizontal portion, opposite the body of the rod, is a depending portion 114, which is reduced or wedge-shaped at 116, and is of such thickness as to enter between the body 104 of the spring closure and the vertical wall of the cover 94. The entrance of the wedge forces out the spring to carry the arm 106 clear of the end of the tube so that the staples may enter it. At the same time, the clamp bears upon the top and the opposite sides of the tube cover, and holds it in position in the depression 108 ready for the delivery of the staples from the guide-bars. The rod when pressed upwardly both frees the spring closure to temporarily seal the tube and releases said tube for its removal from the feeding apparatus. To hold the clamping rod against displacement from the apparatus, its lower end is threaded to receive a nut 118, this contacting with the under side of the enlargement of the receptacle wall and limiting its movement in this direction.

To briefly outline the operation of the apparatus, a mass of staples placed in the receptacle 14 pass gradually below the bottom of the partition 18, and are raised by the

plate 20 so that they enter the upper widened ends of the chutes 42. Down these they slide by gravity and under the impulse of the vibration imparted to the chutes by the cam 62, at the same time being turned to bring the yokes downward as the staples enter the chute throats 44. Before the staples reach the throats they are separated into a single series by the revoluble fingers 76, and then fall over the ends of the chutes upon the guide-bars, save a small number which may be improperly presented to the bars and will pass between them into the receptacle. From this they may be removed at intervals, as desired, through an open end 120. Into the depressions 108 of the guide-bars, magazine tubes have been inserted and clamped in place by the rods 110, which simultaneously, by their inclined ends, open the spring closures. The staples traveling from the bars into the thus opened ends of the tubes slide down the tube bars 90, and, when they have been filled, may be removed by the attendant, the rods 110 being raised to permit this, and also freeing the closure springs to seal the tubes.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a feeding apparatus, a guide for supporting in a predetermined position the objects to be fed, said objects being of different weight at their opposite extremities, means delivering to the guide, and means acting upon the delivering means for arranging the objects thereon with their heavier ends toward the guide.

2. In a staple-feeding apparatus, a staple raceway comprising a staple-yoke-supporting surface and surfaces along which the pendant staple legs may move, a chute delivering to the raceway, and means for vibrating the chute laterally to present the staple-yoke in predetermined relation to the supporting surface of the raceway.

3. In a staple-feeding apparatus, a guide constructed and arranged to support a staple by its yoke, a chute delivering to the guide, and means for vibrating the chute laterally.

4. In a feeding apparatus, a guide for supporting in a predetermined position the objects to be fed, means delivering to the guide, means acting upon the delivering means for arranging the objects thereon favorably for the assumption of the predetermined position, and means acting upon the objects on the delivering means and tending to arrange them in a single series.

5. In a staple-feeding apparatus, a staple raceway, a chute delivering to the raceway, means for vibrating the chute laterally, and means forming an element of the apparatus for moving the staples longitudinally of the chute.

6. In a staple-feeding apparatus, a staple raceway, a chute delivering to the raceway, means for vibrating the chute laterally, and means for moving the staples longitudinally of the chute in a direction opposite to their advance toward the raceway.
7. In a staple-feeding apparatus, a staple raceway, a chute delivering to the raceway, means for vibrating the chute laterally, and a rotatable member contacting with the staples in the chute.
8. In a staple-feeding apparatus, a staple raceway, a chute having a contracted portion delivering to the raceway, and staple-arranged means co-operating with the staples in the contracted portion of the chute and being movable relatively to said chute.
9. In a staple-feeding apparatus, a staple raceway, a chute having a contracted portion delivering to the raceway, staple-arranging means co-operating with the staples in the contracted portion of the chute and being movable relatively to said chute, and means for vibrating the chute.
10. In a staple-feeding apparatus, a staple raceway, a chute having a contracted portion delivering to the raceway, a movable member co-operating with the staples on the chute, and means for moving the chute in a direction transverse to the movement of the member.
11. In a staple-feeding apparatus, a staple raceway, a chute delivering to the raceway, a member having fingers revolving through the chute, and means for vibrating said chute laterally.
12. In a feeding apparatus, a plurality of chutes situated side by side, means for vibrating the chutes laterally, means common to the chutes for supplying staples thereto, and a plurality of raceways fixed against movement and to which the chutes deliver.
13. In a staple-feeding apparatus, a frame; a plate mounted to slide across the frame, a series of chutes carried by the plate, a rod mounted upon the plate transversely of the chutes, a cam contacting with one extremity of the rod, a spring bearing against the opposite extremity of the rod, a shaft journaled in the frame above the chutes, and fingers extending from the shaft into the chutes.
14. In an apparatus of the class described, a raceway, a magazine tube having a closure and to which the raceway delivers, and means extending on opposite sides of the magazine tube, said means being arranged to hold the tube in receptive relation to the raceway and to actuate the closure.
15. In an apparatus of the class described, a guide member, a receiving device co-operating with the guide member and having a closure, and a movable clamp for the receiving device engaging the closure.
16. In an apparatus of the class described, a raceway, a magazine tube having a closure and to which the raceway delivers, and a clamp mounted with the raceway and arranged to move into engagement with the magazine tube and closure.
17. In an apparatus of the class described, a raceway, a magazine tube to which the raceway delivers, said tube including a base and a cover, a member carried by the tube and movable across its end, and a member mounted with the raceway, extending over the cover of the tube and engaging the movable member.
18. In an apparatus of the class described, a raceway, a magazine tube to which the raceway delivers, said tube including a bar having an enlargement and a cover resting upon the enlargement and surrounding the bar, a member carried by the tube and movable across its end, and a member mounted with the raceway, extending on opposite sides of the cover and engaging the movable member.
19. In an apparatus of the class described, a raceway, a magazine tube to which the raceway delivers, a spring extending along the side of the tube and across the extremity thereof, and a member mounted with the raceway and movable between the tube and spring.
20. In an apparatus of the class described, a raceway, a magazine tube to which the raceway delivers, a spring extending in close proximity to the side of the tube and across the extremity thereof, and a member mounted with the raceway and having a tapered portion movable between the tube and spring.

In testimony whereof I have signed my name to this specification.

WILLIAM E. ELLIOTT.