W. E. ELLIOTT.

BUTTON HOPPER AND TRANSFER TUBE.

APPLICATION FILED OCT. 30, 1916.

1,330,854.

Patented Feb. 17, 1920.

2 SHEETS—SHEET 1.

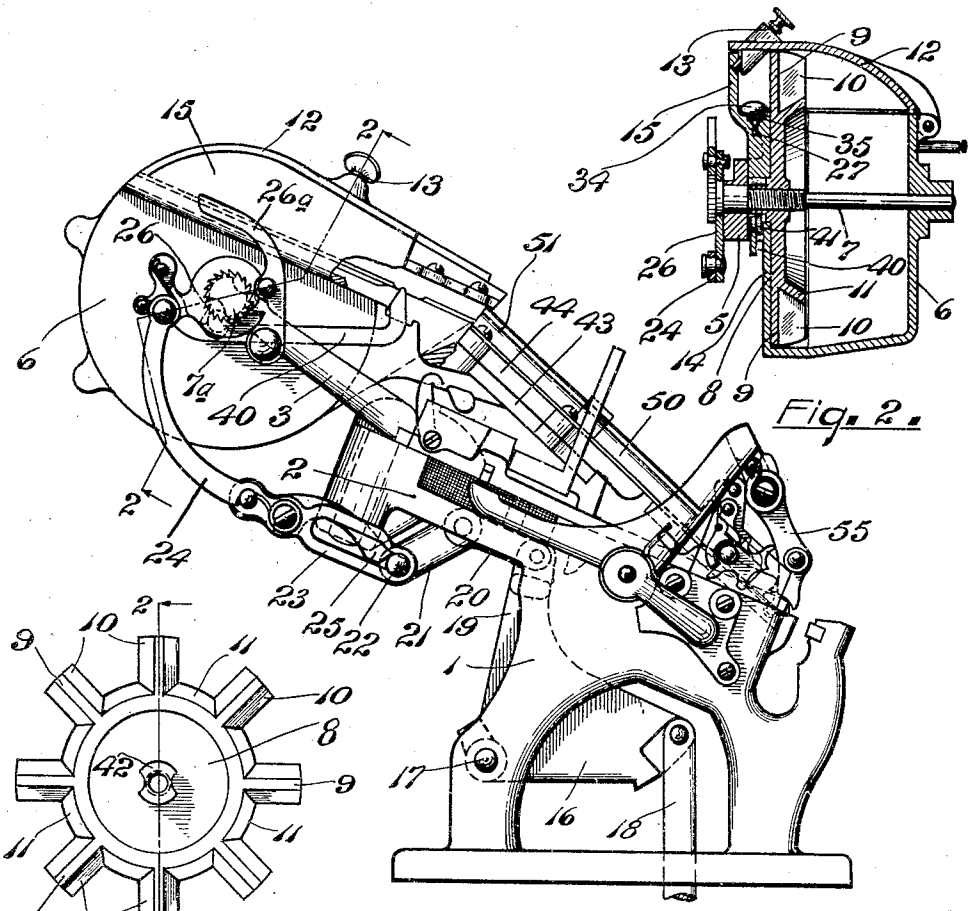


Fig. 1.

Fig. 2.

Fig. 3.

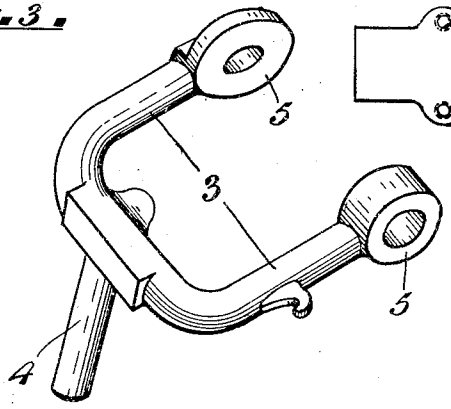


Fig. 4.

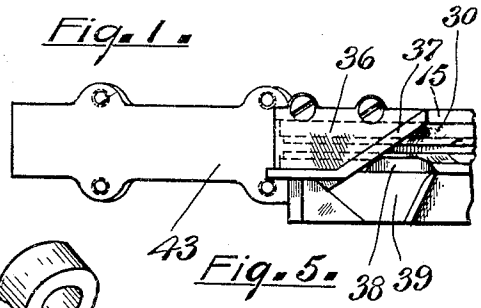


Fig. 5.

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2 SHEETS—SHEET 2.

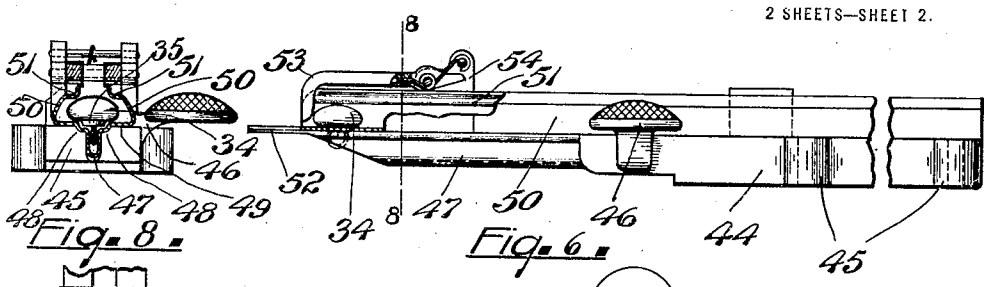


Fig. 8.

Fig. 6.

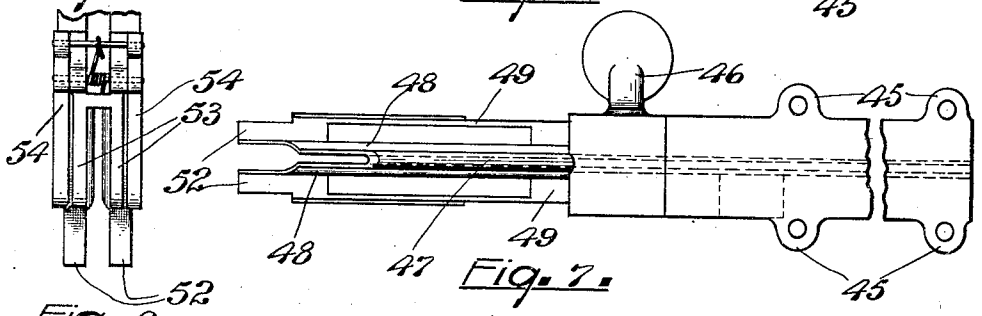


Fig. 9.

Fig. 7.

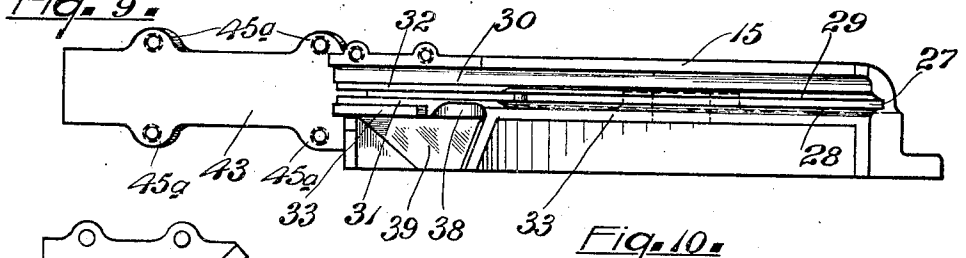


Fig. 10.

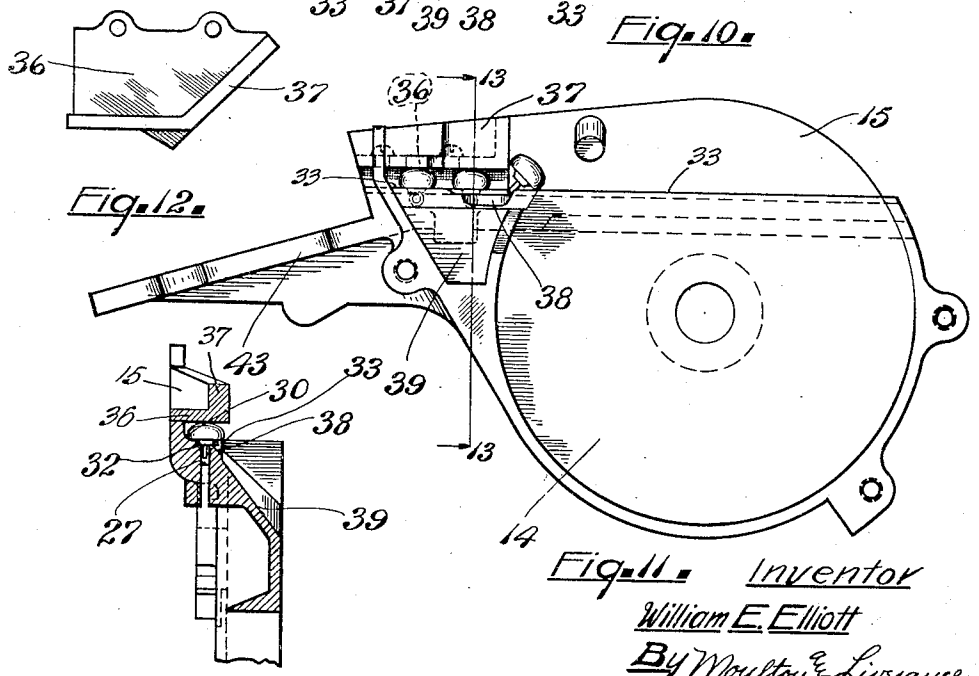


Fig. 12.

Fig. 11.

Fig. 13.

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UNITED STATES PATENT OFFICE.

WILLIAM E. ELLIOTT, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO AMERICAN BUTTON & FASTENER COMPANY, A CORPORATION OF MAINE.

BUTTON-HOPPER AND TRANSFER-TUBE.

1,330,854. Specification of Letters Patent. Patented Feb. 17, 1920.

Application filed October 30, 1916. Serial No. 128,617.

To all whom it may concern:

Be it known that I, WILLIAM E. ELLIOTT, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Button-Hoppers and Transfer-Tubes; 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.

This invention relates to mechanism for handling shoe buttons and more particularly to improvements in button hoppers and transfer tubes or raceways connected thereto for removing buttons from an indiscriminate mass and delivering them in a series in predetermined positions to be acted upon by suitable mechanism as for example, by mechanism for attaching the buttons to a shoe.

Button handling mechanisms of this sort have commonly been restricted to use with one particular style of button in which the base of the button is flat or substantially flat and it has been necessary to change the mechanism when other types were to be used. Accordingly, an object of the invention is to provide a button transfer tube or raceway constructed of sheet metal which is made practically universal by being adapted for handling all commercial forms of buttons now in use and which does not need to be changed when the style of button is changed.

A feature of the invention relates to the construction of this transfer tube or raceway whereby it is particularly adapted for carrying a button having a projecting boss or neck upon its base and, at the same time, is adapted to carry buttons of different shapes and hold them in such position that they will slide freely down the tube without binding thereon at any point.

When button transfer tubes of this general nature are used in connection with button attaching machines, a button is commonly held fully or in part upon the lower end of the transfer tube during the time that the wire from which the staple is to be formed is threaded through the eye of the button. To this end, the lower side of the raceway is commonly cut away so as to expose the eye of the button and if necessary the portions of the lateral surfaces which support the base of the button are reduced in thickness so as to expose the eye of the button fully. If the raceway is used in connection with the type of button which is provided with a projecting neck or boss then it is desirable that the material of the raceway beneath the neck or boss of the button be also removed in order that the eye of the button may be fully exposed. Another feature of the invention relates to a raceway constructed to expose fully the eye of the button when it is supported adjacent to the lower end of the raceway.

Another object of the invention is to provide a button hopper which will be adapted for use with all types of buttons and will be particularly adapted for use with that style of button which is provided with a projecting neck or boss upon its base by being provided with a novel form of raceway or guideway within the hopper.

Other features of the invention relating to the construction of the hopper, the deflecting device for removing buttons at a point outside the path of operation of the button elevating means, a guiding notch and chute coöperating with the deflecting device, and to the combination of the improved hopper with the improved transfer tube will be more fully understood from a consideration of the following description taken in connection with the accompanying drawing in which,

Figure 1 is a side elevation of a machine to which my invention has been applied.

Fig. 2 is a section through the hopper taken on the broken line 2—2 of Fig. 1, the rotating member within the hopper being indicated in section on the line 2—2 of Fig. 3.

Fig. 3 is an elevation of said rotating member.

Fig. 4 is a perspective view of the detachable supporting bracket by means of which

the hopper and tube may be mounted upon and readily removed from the button setting machine.

Fig. 5 is a fragmentary plan view of the forward portion of the raceway in the hopper, the transfer tube being detached therefrom.

Fig. 6 is a side elevation with parts broken away of said transfer tube.

Fig. 7 is a plan view of the under side of the same.

Fig. 8 is a section on the line 8—8 of Fig. 6.

Fig. 9 is a plan of the front end of the transfer tube or raceway.

Fig. 10 is a plan of the button transfer portion of the hopper, the element for deflecting improperly positioned buttons being removed.

Fig. 11 is a side elevation of the device shown in Fig. 10.

Fig. 12 is a plan view of the member for deflecting improperly positioned buttons and,

Fig. 13 is a vertical section taken on the line 13—13 of Fig. 11.

Like reference characters refer to like parts throughout the several views of the drawings.

In the illustrated embodiment of my invention the parts are carried by a suitable support 1 which also carries additional mechanism for setting the buttons after they have been carried to proper position by the tube. Said support includes an extension 2 in which the bracket for supporting the hopper and transfer tube is rotatably and detachably mounted. This bracket includes spaced apart arms 3 and a depending post 4 which, as indicated in Fig. 1, is adapted to enter a suitable opening in the extension 2 previously noted. The ends of the arms 3 are formed with bearings 5 which carry the hopper 6 and a horizontal shaft 7 extending therethrough. Within the hopper and mounted on the shaft is a disk 8 projecting radially from which are a plurality of fingers 9 having sides 10 located at an angle to each other and to the plane of the disk. Between the fingers, an angularly related rim 11 also extends outwardly at an angle to the plane of the disk as best shown in Figs. 2 and 3. The hopper is closed by a cover 12 which is detachably held in position by any suitable catch 13 and the rotary member 8 is mounted closely adjacent to the vertical side 14 of the hopper, said side contacting with the plane side of the disk 8 except at the upper portion thereof where it is extended laterally and then upwardly as indicated at 15 forming a trough-like raceway into which buttons elevated by the rotary member 8 are delivered, it being apparent that the buttons which naturally fall to the lower portion of the hopper are engaged by the sides 10 of fingers 9 and elevated being held against falling by the inclined rim 11 until they reach said trough-like way whereupon they are delivered thereto by virtue of the inclination of the rim and slide down it by gravity.

The shaft 7 may be rotated in any desired manner. One means of effecting this rotation comprises a bell crank lever 16 which is pivotally mounted at 17 on the support 1 and may be oscillated back and forth about the pivot 17, by the rod 18 which may be reciprocated in any desired manner. The vertical arm 19 of the bell crank lever is connected by a link 20 with a member 21 from the end of which projects laterally a pin 22 adapted to enter a slot in the widened end 23 of a link 24 as shown in Fig. 1. A spring operated dog 25 is mounted on this link and engages with the pin, after it is introduced in the slot, to retain it against disengagement. The link 24 is curved upwardly and to the rear and is pivotally connected with a crank 26 loosely mounted upon the shaft 7 and carrying a dog 26^a adapted to engage with a ratchet wheel 7^a on the end of the shaft 7. The oscillation of the bell crank member 16 accordingly rotates the disk 8 step by step, and raises the buttons for entrance into the raceway.

This raceway is provided with a central groove or slot 27 adapted to receive the eyes of shoe buttons which are helped to proper position with respect to the slot by means of the rounded sides 28 and 29 as shown in Fig. 10 which have a tendency to right any button not in proper position for its eye to enter the slot. The heads of the buttons extend over and beyond the rounded or curved parts 28 and 29 and rest above substantially horizontal portions 30 and 33 of the way. Between these supporting surfaces and adjacent the groove 27, recesses 31 and 32 are cut to form a shallow and wider groove merging with the deeper groove 27. If the buttons are of the ordinary type having heads the undersides of which are substantially flat, said heads rest upon parts 30 and 33 and the eyes are received in and guided by the groove 27. There is, however, a button extensively in use of the type shown in Figs. 2 and 8 having a head 34 with a central depending neck or boss 35 on its under side and the shallow and wider groove formed adjacent the deep groove 27 is formed to receive and provide space for the passage of this neck. The neck or boss on the under side of such buttons has a base of a reduced diameter approximately equal to the diameter of the eye and this base is vertically separated from the level of the normal base of the button where it is usually supported in the raceway. The way shown

is adapted for a plurality of types of buttons including those having a flat or rounded under surface and those having a neck projecting from the under side of the head.

In practice buttons delivered to the raceway are, in many instances, turned bottom side up or otherwise so positioned that the eyes of the buttons do not enter the groove or slot 27. To remove such buttons from the way there is located adjacent its forward end and above it a member including a horizontal attaching plate 36 from which at one edge projects upwardly an inclined portion or rib 37. The horizontal plate 36 is located a distance above the way sufficient to permit the passage of button heads which are properly positioned in the way with the eyes thereof in the slot 27. If a button is turned bottom side up or on one side, however, as it passes down the way it strikes against the rib 37 as indicated in Fig. 11, and this tends to deflect it to one side of the way. A notch 38 as shown is cut at this point of deflection to aid in removing such buttons, this notch merging with the shallow groove formed by the recesses 31 and 32 (see Figs. 5, 10 and 11), and the buttons deflected drop over this notch and down the incline 39 and into the hopper at a point beyond the range of movement of the rotary elevating device 8. If any button should become lodged against the rib 37 and not fall naturally it is ejected by the end of finger 40 pivotally mounted on the side 14 of the hopper and having a roller 41 bearing against a cam 42 cast integral with the disk 8 heretofore described. As an added precaution, a portion of the wall of the widened groove is removed at a point adjacent to the notch 38 and immediately beneath the edge of the deflecting rib 37. This avoids the possibility that a misplaced button having a neck might become wedged between the lower edge of the deflecting member and what would otherwise be the edge of the notch 38. The rotation of the disk and of the cam serves to periodically elevate the forward end of the finger 40 and dislodge any button which may be lodged against the rib 37.

Directly in front of the button carrying way of the hopper is positioned a supporting bracket 43 which serves as a support for the tube or raceway which receives the buttons after they pass from the hopper. In the construction of the tube a block 44 is provided having ears 45 adapted to be attached to similar ears 45[a] formed on the bracket 43 such attachment being by means of screws or like removable attaching devices. The block also has a laterally projecting handle 46 for the manual operation of the tube and hopper. The tube is formed from sheet metal which, centrally and on its under side is fashioned into a narrow U-shaped guide as indicated at 47 to receive and conduct the eyes of the buttons and is thence turned laterally at each side and then upwardly as indicated at 48 to provide a space for the passage of the necks 35 of the buttons when such type of buttons are used. The sheet metal is then extended for a distance as indicated at 49 to provide relatively widely separated supporting surfaces for the base of a button and is then turned upwardly and inwardly as shown at 50 and then formed at each side with an inwardly bent rib 51 which in practice is adapted to lie directly above the heads of the buttons on each side thereof and prevent said buttons from tilting thereby also preventing the eyes of the buttons from binding against the sides of the part 47 of the tube. The transfer tube at its forward end is adapted to be operatively associated with the button setting mechanism, the tube terminating a short distance back of the mechanism and having the parts 49 extended forward a distance and fashioned into flat fingers 52 spaced a distance apart as shown in Figs. 7 and 9. The buttons sliding down the tube are stopped from passing out by fingers 53 having their ends bent down into the path of movement of the buttons at the forward end of the tube the member of which these fingers form a part being pivotally mounted between ears 54 extending upwardly from and secured to the tube. The buttons passing down the tube accordingly are stopped when they reach the end of the tube and are in position to be engaged by an ejecting finger 55 which is adapted to enter between the fingers 53 to engage with the head of the foremost button and take it from the tube. This mechanism forms no part of the present invention but is a part of the subject matter of my previous Patent No. 1,147,382 issued July 20, 1915. These extensions 52 are adapted to assist in supporting the button, after it has been pushed forward by the finger 55, in such a fashion that the eye of the button will be completely exposed for the admission of the wire out of which a staple is to be formed, or has been already formed, in the manner common to such machines. It will be observed that these extensions may be formed by cutting away from the under side of the raceway the material in which both the deep and the shallow grooves are formed so as to taper the raceway vertically until the button is supported only by the surfaces outside the wide and shallow groove. If even the thin material, which, in the sheet metal raceway herein illustrated, forms the bottom of the shallow groove, were retained, a part of the button eye would be obstructed and it is de-

sired to avoid such a difficulty. The sheet metal forming the laterally disposed supporting surfaces is preferably of a thickness no greater than the length of the boss or neck of the button.

I claim:—

1. In a machine of the character described, a button transfer tube formed from sheet metal bent on its under side to form a central longitudinal guide, the sides of said guide at their upper ends being turned outwardly away from each other and then upwardly for a short distance thereby widening the guide at its upper part, said tube including parts extending away from each other at the upper portion of said guide and then turned upwardly and inwardly toward each other and terminating each in a longitudinal rib extending toward the interior of the tube, substantially as described.

2. In a machine of the character described, a button transfer tube including a central longitudinal guide on its under side formed with a widened upper portion, said tube including parts extending away from each other from the upper part of said guide and then turned upwardly and inwardly toward each other, substantially as described.

3. A button raceway constructed of an elongated sheet of metal having a longitudinal fold constituting a groove for the reception of the eye of a button and lateral extensions serving as supporting surfaces for the base of the button adjacent to its periphery, the sides of said sheet of metal extending inwardly over the button and formed to provide offset ribs arranged to lie closely adjacent to the upper surface of the button.

4. A button raceway constructed of a sheet of metal which has four substantially parallel guiding surfaces and a groove between two adjacent surfaces adapted to receive the eye of a button, said adjacent surfaces therefore acting as supports for the base of the button and the remaining surfaces being arranged to overlie the button closely adjacent to its head, and provided, adjacent to the edges of the sheet, with inwardly directed ribs to prevent tilting and offer a minimum of frictional resistance to the passage of the button.

5. In a machine of the character described, a button transfer tube including a central longitudinal guide on its under side formed with a widened upper portion, parts extending from the upper portion of said guide away from each other and then turned upwardly and inwardly toward each other, means at one end of the tube for holding buttons against passage from the tube, and extensions to said parts beyond said holding means spaced apart a distance equal to or greater than the width of the wider portion of the guide.

6. In combination, a hopper adapted to hold a quantity of shoe buttons, a raceway in the hopper down which buttons are adapted to slide, said raceway having a central longitudinal groove to receive the eyes of the buttons and also provided with a shallow and wider groove merging with the first mentioned groove and adapted to receive a boss upon the base of the buttons, a deflecting member located above the way at the front end thereof arranged to deflect improperly positioned buttons back into the hopper, but permitting the passage of properly positioned buttons, and a tube in communication with the hopper for receiving buttons passed therefrom.

7. In combination, a hopper adapted to receive a quantity of shoe buttons, a way positioned at the upper part of the hopper inclining downwardly toward the front, means for elevating buttons and delivering them to the way, said way having a central longitudinal slot to receive the eyes of said buttons and surfaces each side of the slot against which the under sides of the heads of the buttons are adapted to engage, said surfaces being cut away immediately adjacent to said slot to form a wider shallow groove merging with the slot and adapted to receive a boss upon the base of the button, a deflecting member positioned a distance above and at the forward portion of the way in the hopper including a portion diagonally crossing the way for stopping and deflecting improperly positioned buttons back into the hopper, and arranged to permit the passage of properly positioned buttons thereunder, said way having a notch in one side adjacent to and coöperating with said deflecting member which merges with the shallow groove of the way and communicates with the hopper, and a tube in communication with the hopper and in alinement with the way for receiving buttons passed therefrom.

8. A button raceway provided with a groove adapted to receive the eyes of the buttons and adjacent thereto with a groove of greater width than the first-mentioned groove and of less depth to receive a projection on the base of the button, the material in which the shallow groove and the deep groove are formed being cut away along the under side of the raceway to form a notch adjacent to the end of the raceway and extending longitudinally thereof, of less width than the diameter of the head of the button and substantially equal to the width of said shallow groove.

9. A button raceway provided with a longitudinal groove adapted to receive the eye of a button, said groove being broadened at its upper part to receive a projection upon

the lower side of the button, and lateral surfaces adjacent to the edges of the longitudinal groove arranged to co-act with the base of the button outside of said projecting portion to support the button, said raceway being tapered vertically adjacent to one end to form a slot of a width to expose the projection upon the base of the button and the eye while leaving the lateral supporting surfaces.

10. In combination, a hopper including a receptacle for holding a quantity of shoe buttons, a way in the hopper down which buttons are adapted to slide, said way having a central longitudinal groove to receive and pass the eyes of said buttons, said groove being widened adjacent to its upper edge to receive a boss upon the lower side of the button, a deflecting member positioned a distance above and at the forward portion of the way in the hopper and including a portion located diagonally across the way for stopping and deflecting improperly positioned buttons, said way directly back of the rib having a notch cut therein in the side adjacent the receptacle, at a point adjacent to but above said deflecting member, said notch merging with the bottom of the widened portion of the groove, said way also having a portion of the wall of the widened groove removed adjacent to said notch, an incline leading from the way below said notch to the receptacle and a tube in communication with the hopper and in alinement with the way for receiving buttons passed therefrom.

11. In combination, a hopper adapted to hold a quantity of shoe buttons, a way in the hopper down which buttons are adapted to slide, said way having a slot adapted to receive the eyes of the buttons and surfaces at each side of the slot against which the under sides of the button heads engage, there also being longitudinal recessed portions cut from the way at each side of the slot, and a tube connected to the hopper and in alinement with the way communicating therewith, said tube including a central longitudinal guide on its under side formed with a widened upper portion and having parts extending laterally from the upper portion of the guide, said parts alining with similar surfaces of the way, and the guide alining with the slot and recessed portions of the way, substantially as described.

12. In combination, a hopper adapted to hold a quantity of shoe buttons, a way in the hopper down which buttons are adapted to slide, said way having a central longitudinal slot to receive the eyes of the buttons and surfaces at each side of the slot against which the under sides of the button heads engage, there also being longitudinal recesses cut from the way each side of, paralleling and communicating with the slot, a tube connected to the hopper in alinement and communicating with the way, said tube being formed from sheet metal and including a central longitudinal guide on its under side formed with a widened upper portion and having parts extending laterally from the upper portion of the guide for a distance and then bent upwardly and inwardly toward each other terminating each in a longitudinal rib bent inwardly toward the interior of the tube, and means in the hopper adjacent the way for permitting the passage of properly positioned buttons to the tube and deflecting improperly positioned buttons back into the hopper.

13. A button raceway having a longitudinal groove into which a boss on the under side of the button head and an eye projecting therefrom may extend, while the head of the button slides upon the track portions on the upper face of the raceway on opposite sides of the groove, said groove being of sufficient width for a portion of its depth to receive the boss on the button but of less width than the head of the button and having a narrower portion through the middle thereof of greater depth to receive the eye of the button, said groove toward the lower end of the raceway merging into a slot which extends entirely through the base of the raceway and of sufficient width for the passage of the boss on the button, the raceway also diminishing in height so that the boss on the button will extend through the slot and bring the eye of the button entirely below the base of the raceway.

14. A button raceway having a longitudinal slot extending from the exit end for some distance toward the opposite end of substantially greater width than the width of the eye of the button and of sufficient width so that a boss on the under side of the button may project down through said slot while the button head rests upon the upper side edges of the raceway and permits the eye which projects downward from said boss to be entirely below the base of the raceway.

15. A button raceway having a longitudinal slot extending from the lower end for some distance toward the upper end thereof, the said slot at its upper end being of a width to receive the eye of a button edgewise, said slot being broadened laterally toward its lower end to a considerably greater width but of less width than the full diameter of the head of the button.

16. A button raceway provided with a longitudinal groove which is shaped to receive the eye of a button having a base of reduced diameter vertically spaced from the maximum diameter of the button and which is broadened at its upper part to receive the

lower part of the button, said raceway being formed to support the button adjacent to its outer edges and tapering vertically adjacent to one end to reduce the thickness of the button supporting parts of the raceway to a dimension not greater than the vertical distance between the base of the button and the line of support of the button by the raceway.

17. A button raceway constructed and arranged to support, adjacent to its rim, a button having an eye and a base of a diameter approximately equal to the diameter of the eye, said base lying below the point of maximum diameter of the body of the button, and said raceway having a groove to receive the lower part of said button and its eye and being tapered vertically adjacent to one end to form a notch to expose the base of the button and the eye while still supporting the button near its rim.

In testimony whereof I affix my signature.

WILLIAM E. ELLIOTT.