Aug. 21, 1951 W. J. WITTE 2,564,944

SELECTIVE FEEDER FOR SHANK BUTTON BLANKS

Filed March 22, 1949

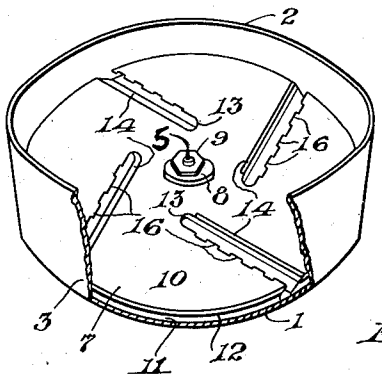


Fig. 1.

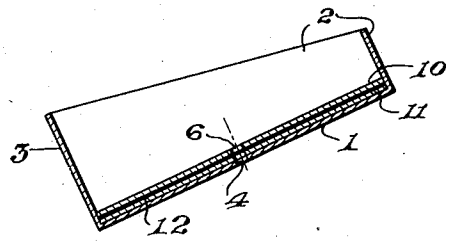


Fig. 2.

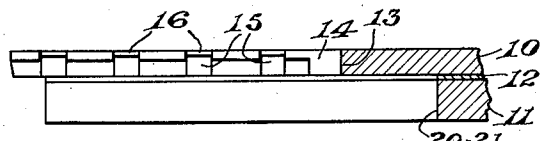


Fig. 4.

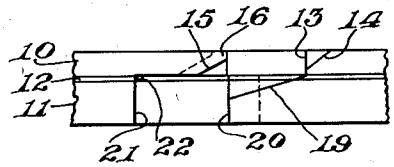


Fig. 5.

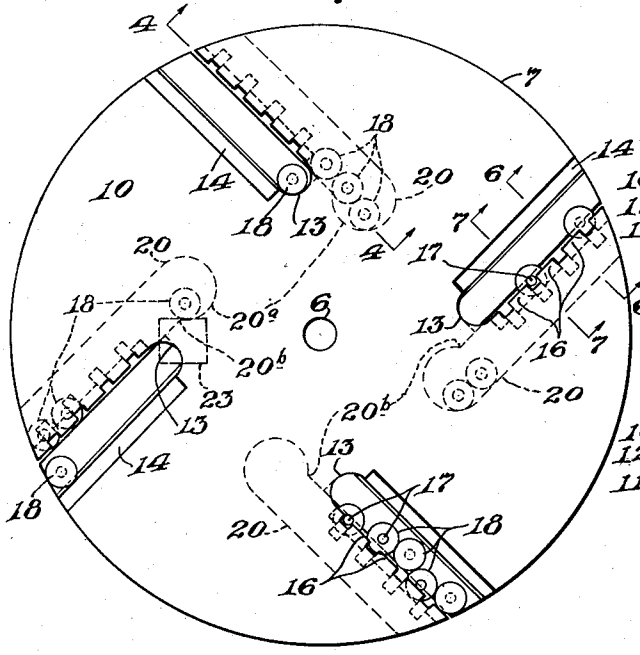


Fig. 3.

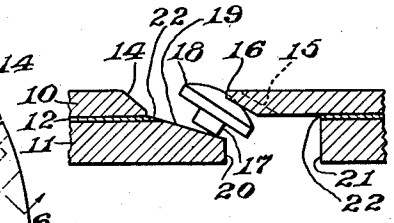


Fig. 6.

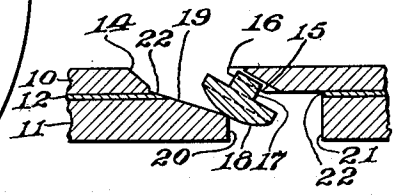


Fig. 7.

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Patented Aug. 21, 1951 2,564,944

UNITED STATES PATENT OFFICE

2,564,944

SELECTIVE FEEDER FOR SHANK BUTTON BLANKS

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Application March 22, 1949, Serial No. 82,871

7 Claims. (Cl. 79—17)

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The object of the invention is broadly to provide improvements in machines for drilling shank buttons, but more especially in a combined hopper and feeder for the blanks of undrilled buttons.

In the machines of this class as in most if not all others, efficiency in selectively sorting and feeding the blanks to the holding and drilling elements of the machine, so as to thereby eliminate manual sorting and to resultingly minimize labor costs, depends primarily upon the design, construction and operation of the feeder mechanism. Consequently, the feeder mechanism in this instance is combined with and as a unitary part of the usual hopper into which large batches of blanks are deposited before the drilling operation.

Another and more specific object, therefore, is to provide a fixed cylindrical hopper having a preferably plane bottom wall, and a liner disc for such wall that is normally rotated at moderate speed in an inclined plane, said disc being provided with one or more slots of irregular cross section, that extend in a general radial direction outwardly across the surface of said disc, though not necessarily in actual radial relation with the axis, and open through the periphery of the disc for manufacturing exigency, but whose outer ends are closed by the circular side wall of said hopper, the inner end of each such slot as said disc rotates passing and momentarily registering with the open entrance to a chute by which the individual blanks are fed one at a time to the drilling elements of the machine, said elements comprising in sequence a clamping device or chuck for securely holding said blank, and one or more rotating drills that pierce the shank of the blank while being held by said clamping device.

A further object is to provide such slot with a transversely sloping surface, above and spaced from which is a parallel series of spaced teeth, which readily permit the shank of a button blank in inverted position to pass into the lower portion of the slot, whence it tends to gravitate towards the discharge opening in the bottom wall of the hopper, as the radially inner end of such slot registers therewith.

Still another object is to construct the rotary disc of laminations adapted to receive and have secured fixedly between them interchangeable shims, whereby the difference between the number and thickness of such shims, or the complete absence of a shim, alters the distance between the sloping surface and the aligned under surfaces of the teeth and intervening spaces, whose combined function it is to pass only blanks of the proper size and then only when such blanks are in inverted position.

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With the objects thus briefly set forth, the invention comprises further details of construction and operation, which are hereinafter fully described in the following specification, when read in conjunction with the accompanying drawings, in which Fig. 1 is a front elevation of the improved hopper and feeding disc in operative position; Fig. 2 is a diametrical section of the same from front to rear; Fig. 3 is an enlarged plan view of the rotary sorter and feeder disc per se; Fig. 4 is a fragmentary section on the line 4—4 of Fig. 3; Fig. 5 is a fragmentary elevation of a portion of the edge of the disc, looking radially into one of the sorting slots; and Figs. 6 and 7 are fragmentary sections on the lines 6—6 and 7—7, respectively, of Fig. 3.

Referring to the drawings, the hopper, with which the improved sorting and feeder disc is operatively associated, is shown as comprising a sloping bottom wall 1, having a peripherally extending cylindrical wall 2, that is preferably of greater length at its lower portion 3 in order to increase its capacity of button blanks. This hopper is supported by any suitable means with respect to the drilling portion of the machine, which as it is not a part of the invention is not here illustrated. However, the said bottom is shown as being provided with a central aperture 4, through which is adapted to extend a positioning pin 5, that also passes slidably through a central aperture 6 in the rotary disc 7 and is capped by a washer 8 and nut 9.

The improved sorting disc per se may comprise a single thickness of any suitable material such as iron, transparent plastic, etc., but is here shown as being composed of a pair of upper and lower discs or laminations 10 and 11, separated by any one of a plurality of shims 12 that may widely vary in thickness, said laminations and intervening shim or shims being unitarily secured together in any suitable manner. In order to simplify the description of the shape and function of the sorting slots, the said disc will be considered as being composed of a pair of such laminations and an intervening shim, rather than composed of a single member, and only one of said slots will be described since they are identical in shape regardless of the number used.

Referring more specifically to Figs. 3–7, the upper lamination 10 is provided with a plurality of generally radially extending slots 13, that ex-

tend transversely through the thickness of said lamination, and which upon one side are characterized by a sloping surface 14 and upon their opposite side with a substantially parallel sloping, under-cut surface 15, that is notched to provide teeth 16 that are spaced apart sufficient only to readily pass the upstanding shank 17 of a button 18, as it slides diagonally downwardly across the sloping surface 19 of a corresponding slot 20 of the lower lamination, that in general forms a substantial continuation of the slope 14 of the slot of the upper lamination. The opposite side 21 of the lower lamination's slot may be of any shape or angularity, but is here shown as being substantially vertical. The intervening shim 12 is provided with slots that preferably correspond in shape and size with the configuration of the line of meeting of the said upper and lower lamination slots.

The actual angular direction of the slots of the improved sorter and feeder is not critical. The device would function to a certain extent, if they extended actually radially from the axis of rotation, but it has been found preferable to arrange them at a more or less acute angle with respect to the tangent of the periphery of the disc at the intersection of the slot with said periphery. Therefore, in the appended claims the term "substantially radial" and similar terms are to be construed accordingly.

Referring to Fig. 3, it will be noticed that the inner end of the lower portion 20 of the unit slot, or of that section of the slot that is in the lower lamination, has a slight offset 20^a. This offset performs no function while the slot is in positions such as those represented by the uppermost, rightmost and lowermost (Fig. 3), except to provide an extension within which several of the blanks are entrapped after falling thereinto, as hereinbefore described. However, as the slot moves in counterclockwise direction towards and through the leftmost position, it will be seen that one and only one blank of those in said slot is caught and held by the shoulder 20^b, while the others separate therefrom and gravitate towards the radially outer end of the slot. Thus, as the slot offset in time passes over and in registry with the outlet 23, the single blank held by the shoulder 20^b freely drops into said outlet and thence passes to the chuck or clamping jaws of the drilling machine. As the disc continues to revolve, the blanks that separated from the shoulder-retained blank again shift by gravity towards the offset end of said slot, until the foremost blank enters said offset and is retained by said shoulder, as in the previous case, while the remaining blanks are separated from it as before.

In the operation of the improved sorter and feeder, a quantity of button blanks is deposited in the hopper. As the disc is rotated in any desired manner in counterclockwise direction, the blanks 17—18 fall into the upper portions of the substantially radial slots, some upright, some on edge and some inverted, but only those in inverted position, that is, with their shanks extending upwardly, are able to fall into said slots, so that their shanks are in position to pass between pairs of adjacent teeth 16, and thence after entering the lower portion of the slot gravitate toward the radially inner offset end thereof, as the position of the slot approaches the rightmost position and continues towards and through the uppermost position, shown in Fig. 3, finally being separated from other blanks that may have entered the lower portion of the slot, so as to drop

therefrom through the discharge opening 23 as above described.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a rotatable disc having an inclined axis of rotation, a cylindrically walled hopper having a flat bottom wall provided with a discharge aperture, said disc being provided with a substantially radial slot extending through it to said bottom wall and terminating at the periphery of said disc so as to be closed by said cylindrical wall, the radially inner end of said slot being registerable with said discharge aperture, one side wall of said slot sloping inwardly and the other side wall being provided with spaced teeth, that permit the passage of a predetermined size of button blank only when in inverted position, when the upstanding shank of such blank passes between a pair of adjacent teeth.

2. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a cylindrically walled hopper having a sloping bottom wall provided with a discharge aperture, a rotatable disc in close proximity to said bottom hopper wall and its periphery in close proximity to said cylindrical wall, said disc being provided with a substantially radial slot extending through it to said bottom wall and its radially outer end opening through the periphery of said disc and closed by said cylindrical wall, the radially inner end of said slot being registerable with said discharge aperture as said disc rotates, one side wall of said slot comprising teeth spaced apart so as to pass only the upstanding shanks of inverted blanks, and the distance between said teeth and the opposite side wall of said slot being adjustable, to predetermine the height size of blanks designed to pass to said discharge aperture.

3. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a rotatable disc having an inclined axis of rotation, a cylindrically walled hopper having a flat bottom wall provided with a discharge aperture, said disc being provided with a substantially radial slot extending through it to said bottom wall and terminating at the periphery of said disc so as to be closed by said cylindrical wall, the radially inner end of said slot being registerable with said discharge aperture, one side wall of said slot sloping inwardly and the other side wall being provided with spaced teeth, that permit the passage of a predetermined size of button blank only when in inverted position, when the upstanding shank of such blank passes between a pair of adjacent teeth, said disc comprising a plurality of laminations, and a replaceable shim secured between said laminations and having a slot corresponding in size and position with that of said disc, and with said teeth and the opposite side of said slot predetermining the height of blanks permitted to pass from said hopper to said discharge aperture.

4. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a cylindrically walled hopper having a sloping bottom wall provided with a discharge aperture, a rotatable disc in close proximity to said bottom hopper wall and its periphery in close proximity to said cylindrical wall, said disc being provided with a substantially radial slot

of transversely irregular cross section extending through it to said bottom wall and its end opening through the periphery of said disc and closed by said cylindrical wall, the radially inner end of said slot being registerable with said discharge aperture as said disc rotates, one side wall of said slot comprising teeth spaced apart so as to pass the upstanding shanks of inverted blanks, and the distance between said teeth and the opposite side wall of said slot determining the height size of blanks designed to pass first transversely and then longitudinally through said slot to said discharge aperture, said disc comprising a plurality of laminations, and a replaceable shim secured between said laminations and having a slot corresponding in size and position with that of said disc.

5. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a rotatable disc having an inclined axis of rotation, a cylindrically walled hopper having a flat bottom wall provided with a discharge aperture, said disc being provided with a substantially radial slot extending through it to said bottom wall and terminating at the periphery of said disc so as to be closed by said cylindrical wall, the radially inner end of one side of said slot having a laterally directed annular offset providing a shoulder, one side wall of said slot sloping inwardly and the other side wall being provided with teeth spaced apart sufficient to pass transversely the upstanding shanks of a predetermined size of blanks only when said blanks are in inverted position, the lower portion of said slot receiving the blanks from between said teeth and permitting them to pass longitudinally of said slot into said offset where one only such blank is separated from any other blanks that may be in said slot, and retained by said shoulder until able to drop therefrom through said discharge aperture as said slot offset registers therewith during continued rotation of said disc.

6. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a rotatable disc having an inclined axis of rotation and comprising a pair of laminations separated by a shim that is interchangeable with other shims of different thicknesses, a cylindrically walled hopper having a flat bottom wall provided with a discharge aperture, said disc as a unit being provided with a substantially radial slot extending through it to said bottom wall and terminating at the periphery of said disc so as to be closed by said cylindrical wall, the radially inner end of one side of said slot having a laterally directed annual offset providing a shoulder, one side wall of that portion of said slot that is in the upper lamination sloping inwardly and the other side wall thereof being provided with teeth spaced apart sufficiently to

pass transversely the upstanding shanks of a predetermined size of blanks only when said blanks are in inverted position, that portion of said slot that is in the lower lamination having a bevelled side wall forming a substantial continuation of the slope in the corresponding side wall of the upper portion of said slot, while the opposite side wall of said lower slot portion is unbroken beneath the teeth of the upper slot portion, that portion of said slot in the lower lamination receiving blanks whose shanks pass vertically between said teeth, and permitting them to pass longitudinally into said offset where only one such blank is separated from other blanks that may be in said slot, and retained by said shoulder until able to drop through said discharge aperture, as said offset registers therewith during continued rotation of said disc.

7. A combined sorter and feeder for the blanks of a drilling machine for shank buttons, comprising a cylindrical hopper having a flat bottom wall provided with a discharge outlet, a pair of discs, and a shim, said discs and said shim being secured together to form a disc unit having a substantially radially extending slot opening through the radially outer edge of said disc unit and closed by the side wall of said cylinder, the radially inner end of one side of said slot having a laterally directed annular offset providing a shoulder, one side wall of the slot in the upper of said discs sloping inwardly and the opposite wall thereof being provided with teeth spaced apart sufficient to pass transversely the upstanding shanks of a predetermined size of blanks only when said blanks are in inverted position, the effective cross section of the combined slots of said upper and lower discs and said shim being variable to pass blanks of different predetermined sizes by varying the thickness of the shim used, and blanks being adapted to pass transversely through the slot in said upper disc and thereafter longitudinally through the slot in said lower disc and into said offset, where only one such blank is separated from other blanks that may be in said last-mentioned slot, and retained by said shoulder until able to drop through said discharge aperture, as said offset registers therewith during rotation of said disc.

WILLIAM J. WITTE.

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