July 31, 1962 N. O. BRODERSON 3,047,193

ARTICLE FEEDING DEVICE

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FIG. 1.

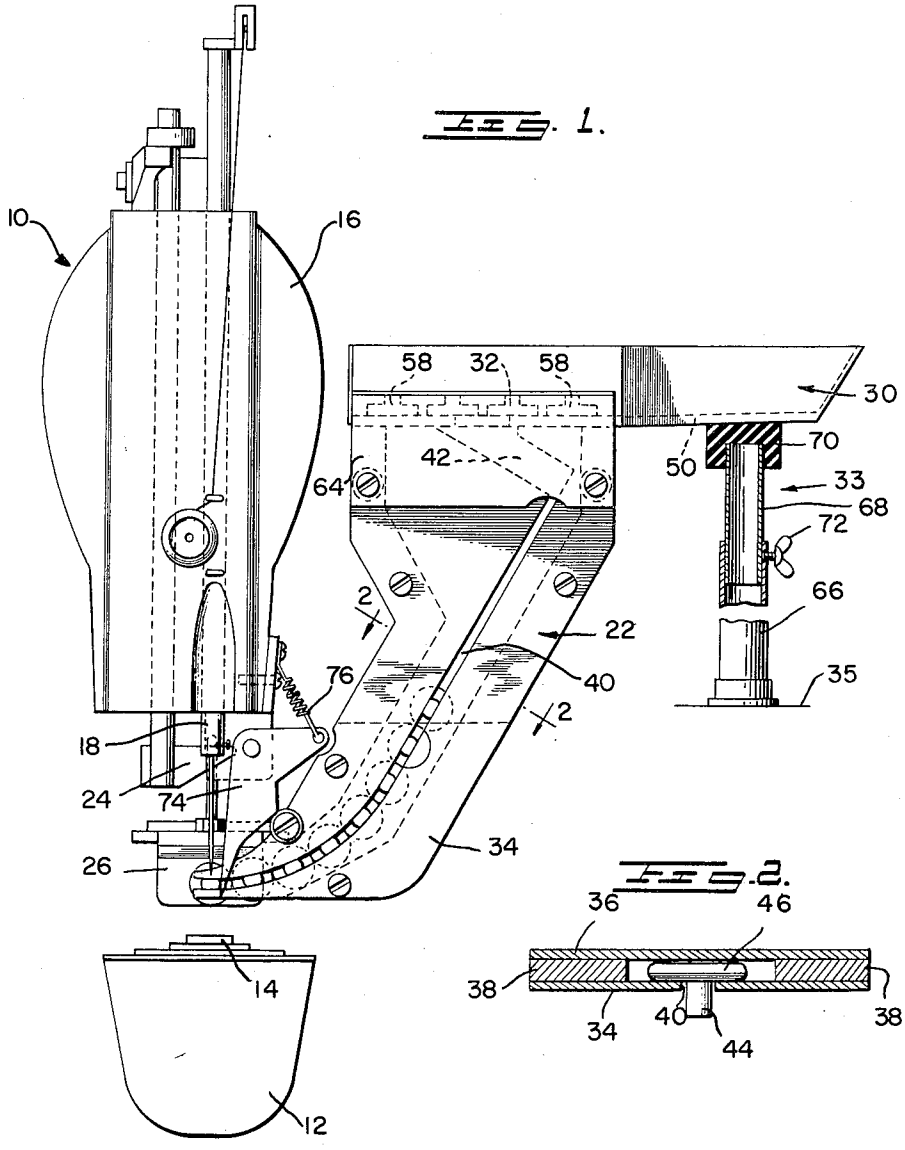


FIG. 2.

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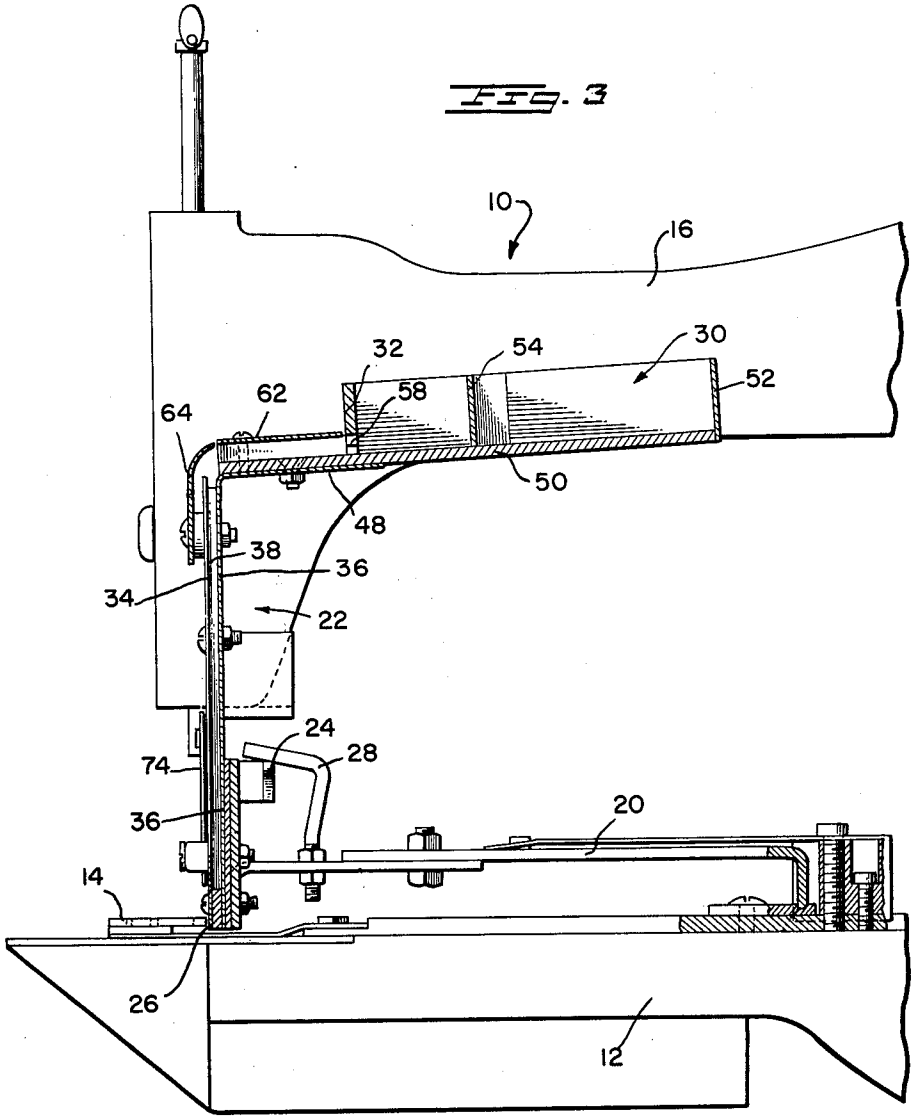
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Fig. 3



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FIG. 4.

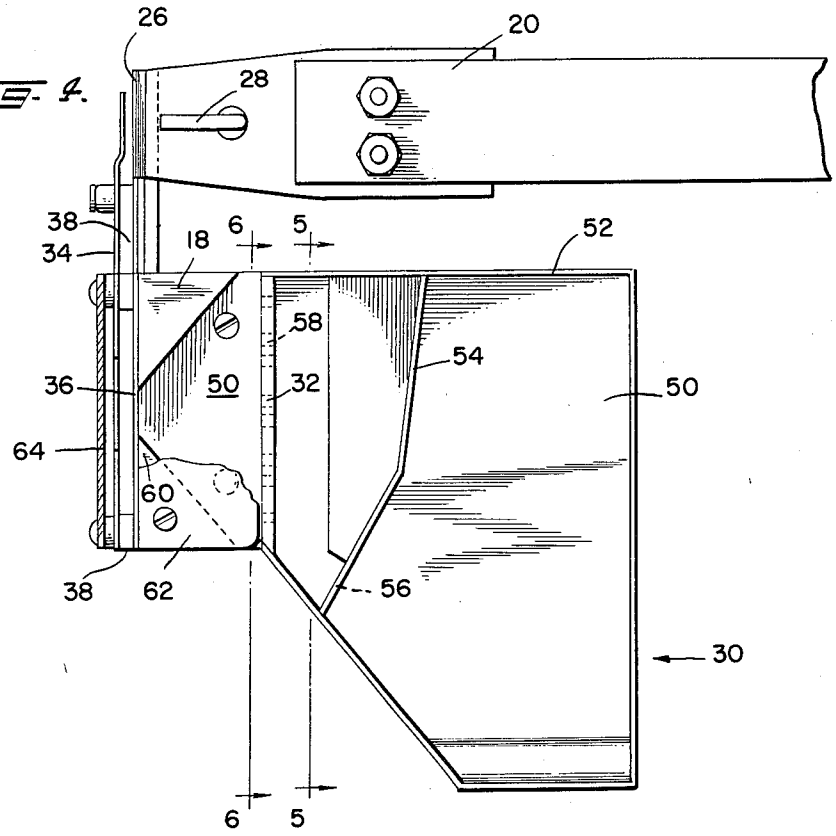


FIG. 6

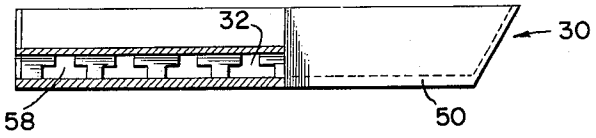
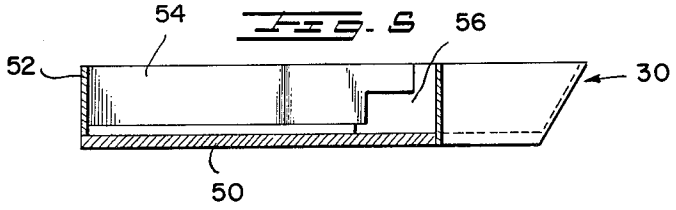


FIG. 5



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United States Patent Office 3,047,193 Patented July 31, 1962

3,047,193

ARTICLE FEEDING DEVICE

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Filed Feb. 29, 1960, Ser. No. 11,726
3 Claims. (Cl. 221—163)

The present invention relates to feeding devices and, more particularly, to a vibratory feeding device for irregular-shaped articles.

It is a principal object of the present invention to produce a new and useful vibratory feeding device for irregular-shaped articles which may be placed in random positions within the device and are automatically, serially fed therefrom in a predetermined position.

A specific and important use of the invention is in combination with a button sewing machine wherein the feeding device automatically sorts buttons fed into said device at random and feeds or delivers the buttons serially into a sewing position relative to the sewing machine to which the device is attached.

The nature of the feeding device of the present invention may be stated in general terms as a vibratory feeding device for irregular-shaped articles, a hopper comprising an inclined bottom, upstanding side walls, partition walls dividing the hopper into at least three chambers, a supply chamber for receiving the articles in random positions, an orienting chamber, and a feed chamber, one of the side walls having an opening communicating with the feed chamber, the partition wall between the supply chamber and the orienting chamber provided with a single aperture permitting passage of only a single article therethrough at any one time, and the partition wall between the orienting chamber and the feed chamber provided with a plurality of orienting openings therein, each of the openings being shaped in relation to the irregular shape of the articles to pass the articles in predetermined position from the feed chamber to the opening in the upstanding side wall.

Further objects and advantages of the invention will become apparent from a reading of the following detailed description of an embodiment of the invention when considered in the light of the following drawings, in which:

FIG. 1 is a vertical elevation of the feeding device of the invention in combination with a button sewing machine;

FIG. 2 is a sectional view of a chute mechanism leading away from the feeding device of the invention taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary side elevational view of the apparatus illustrated in FIG. 1 with parts broken away in vertical section for clearer illustration;

FIG. 4 is a fragmentary top plan view of the feeding device of the invention;

FIG. 5 is a vertical sectional view taken along line 5—5 of FIG. 4; and

FIG. 6 is a vertical sectional view taken along line 6—6 of FIG. 4.

Referring to the accompanying drawings and, in particular, to FIGS. 1, 2 and 3, there is shown a vibratory feeding device incorporating the principles of the present invention which is employed in combination with a button sewing machine generally designated at 10. The button sewing machine includes a supporting base from which extends a horizontally disposed work supporting arm 12. The extended end of the work supporting arm 12 carries a work support element 14. A drive shaft housing 16 is supported in the usual manner and extends in parallel spaced relation above the work supporting arm 12. The extended end of the drive shaft housing

16 carries a downwardly projecting needle bar 18 which is adapted to reciprocate relative to the work support element 14 by means of the usual cam drive mechanism driven from the cam shaft of the machine.

Disposed lengthwise of the upper face of the work support arm 12 is a sliding rocker mechanism 20 which is caused to slide horizontally by driving means, not shown, to effect movement of the work support element 14 relative to the sewing machine needle carried by the needle bar 18; and also to effect movement of the bottom portion of a button chute 22 as will be described in greater detail hereinafter. A lift rod 24 adapted to be reciprocated either automatically or by a pedal whereby the sewing machine operator may lift an associated presser foot 26. It will be noted that the lower end of the lift rod 24 engages the under surface of an inverted L-shaped element 28 which, in turn, is secured to the sliding rocker mechanism 20. When the lift rod 24 is raised, as shown in FIG. 1, the end of the sliding rocker mechanism 20 carrying the element 28 is likewise moved upwardly. Since the presser foot 26 is formed as an integral part of the mechanism 20, any movement of the mechanism 20 will be simultaneously transmitted to the presser foot 26.

The bottom portion of the button feeding chute 22 is attached to the presser foot 26, as shown in FIGS. 1 and 3, while the upper portion thereof is adapted to carry the feeding device of the invention and is generally indicated as at 30. The chute 22 is provided with a button channel which extends from the lowermost end adjacent the presser foot 26 to communicate with the hopper 30 through a button orienting gate 32. Where desired, a vibration dampening and support member 33 may be engaged beneath the projected end of the hopper 30 and has its second end supported on a work surface or support surface as at 35. The extended upper end portion of the vibration dampening member 33 which is adapted for engagement of the bottom of the hopper 30 may be formed of a yieldable material such as rubber, for example. Thereby, it will be appreciated that the vibration dampening means 33 is disposed in frictional engagement with the hopper 30 whereby the vibration of the hopper may be regulated.

In more particular detail, the chute 22 consists of a pair of plates 34 and 36 which are secured by suitable fastening means carrying spacer elements 38 intermediate the plates in parallel spaced relationship. The lowermost end of the plate 34 is provided with a projecting resilient toe portion which projects beyond the plate 36 and thereby lies in side-by-side relationship to the outer vertical face of the presser foot 26. With this arrangement, the buttons at the bottom of the chute 26 are held firmly in sewing position against the face of the presser foot 26 by the resilience of the toe portion of the plate 34.

The plate 34 of the chute 22 is provided with a continuous slot 40 which extends centrally thereof upwardly to communicate with an enlarged slotted area 42 immediately adjacent the upper end of the plate and opening therethrough. The slot 40 is of such configuration as to frictionally engage the projected shank portions 44 of the buttons 46 as clearly shown in FIG. 2. The shank portions 44 of the buttons are provided with flat sides as shown in FIG. 1 of the drawings so that the buttons are always delivered down the slot 40 of the chute 22 in proper alignment relative to the sewing machine needle.

The upper outermost end of the plate 36, as seen in FIG. 3, is turned outwardly and rearwardly of the machine at substantially right angles to form a substantially horizontal platform 48.

The article feeding device 30 of the invention comprises

a hopper or tray having a bottom member **50** secured on the upper face of the platform **48** to extend in a slightly inclined position outwardly and upwardly therefrom. Vertically upstanding side walls **52** are provided about three sides of the tray bottom **50** with the open side thereof overlying the projecting portion of the bottom **50** which is secured upon platform **48**. The tray or hopper is divided intermediately by an upstanding partition wall **54** to define a supply chamber. In one end of the partition wall **54** is an opening **56** permitting the passage of buttons from the supply chamber side of the wall **59** therethrough in the direction of the open side of the tray above the platform **48**. The open side of the tray or orienting chamber is provided with a button orienting and positioning gate **32** which takes the form of an upstanding wall in which is provided a series of openings **58**. The openings are of a configuration slightly larger than and conforming to the size and shape of the buttons to be fed into the sewing machine. The openings **58** are positioned to permit the passage of buttons therethrough with the shank portions thereof upwardly disposed into feed chamber formed by plates **60** secured to the bottom **50** of the hopper or tray **30**, to provide for proper positioning of the buttons in the channel formed within the chute **22** with the shanks thereof in projected position outwardly through the slot **40** in the plate **34** of the chute.

The projected portion of the bottom **50** of the button tray where it overlies platform **48** is provided with a cover plate **62** which prevents buttons from being displaced or rearranged in their passage from the orienting chamber through the gate **32** to the feed chamber, and likewise a vertical cover plate **64** secured to the upper end of plate **34** and having the upper end thereof turned inwardly forms a continuation of cover plate **62** immediately adjacent the angular bond between plate **36** and platform **48**.

The vibration dampening support member **34** may consist of two elongate tubes **66** and **68**, telescoped one within the other with the upper inner tube slidably mounted in the lower tube which has a flanged bottom support for attachment to the supporting surface **36**. The upper inner tube is provided with a resilient cylinder member **70** adapted for frictional engagement with the bottom wall **50** of the hopper tray **30** and the vertical tension thereon is adjusted by thumb screw **72** for the purpose of controlling the amount of vibration of the tray from the sewing machine movement to provide the proper agitation and movement of the buttons in the tray into and through the orienting and positioning gate **32**.

In order to cam the buttons out of the chute **22**, a pivoted lever or bell crank **74** is pivotally secured at its apex portion to a plate on the sewing head portion of the machine above and to the side of the presser foot with one leg of the lever terminating in a pointed end adjacent the outer face of the plate **34**. The second end of the bell crank arm **74** is connected by means of a coil spring **76** to a fixed plate on the side of the sewing machine which normally retains the crank in a retracted position.

The edge of the downwardly projecting arm of the crank **74** disposed toward the upwardly and outwardly inclined chute **22** is provided with a cam surface **74'** which engages a cam pin **75** secured in the outer face of the plate **34** to ride therealong during the vertical movement of the button feeding device to thereby force the bottommost button in the chute to a sewing position.

In operation of the button feeding attachment in combination with or in attachment to a sewing machine of the type described, shank type buttons are placed in the supply chamber of the hopper or button tray **30** whereupon the vibration of the feeding attachment by reason of its rigid connection to the reciprocating elements of the sewing machine will cause the buttons to move from the supply chamber through the opening **56** in the partition wall **54** of the tray to the orienting chamber and into communication with the positioning and orienting gate **32** which will permit the buttons, in proper position only, to enter the button feed chamber and thence to the space between the spaced plates **34** and **36** with the shank portions thereof projecting outwardly through and being guided by the slot **40**. By such button movement buttons will be caused to stack in the chute **22**, as shown in FIG. 1, with the first button entering the slot retained between fingers in the toe portion of the spaced plates and with the shank of the button disposed above the work support **14** and below the sewing needle with the eye of the shank being vertically disposed in that position.

With the presser foot and feeding device in its depressed sewing position (FIG. 3) the button shank is held directly on the work holder **14** in contact with a fabric previously inserted beneath the needle and the presser foot member with the eye of the shank directly above the usual cut-out needle passage in the work support member **14**. Cycled operation of the sewing machine will then cause reciprocation of the needle downwardly through the shank eye of the button, the work support, the fabric and into the bobbin chamber of the machine, not shown. With a subsequent endwise or lengthwise reciprocation of the work support upon raising of the needle to permit alternate vertical passage of the needle externally of the shank thereby causing a looping of the thread through the fabric and the eye of the shank to secure the button to the fabric.

Following the timed interval of the sewing operation for a shank button the lift rod **24** will be elevated to raise the presser foot **26** and the button feeding device, as illustrated in FIG. 1, whereupon the cam action of the bell crank will cause the pointed extremity of the bell arm **74** to engage behind the shank of the next button in line in the slot **40** moving the same to the proper sewing position in replacement of the button previously sewn.

In accordance with the foregoing it is seen that a completely automatic button feeding device has been provided for the automatic sorting, orienting and feeding of buttons to a button sewing position of a button type sewing machine which serves to perform a new and useful function at a minimum of cost or operation maintenance.

While the present invention has been described with reference to sewing machines wherein the feeding device is employed to feed buttons, it must be understood that the invention is likewise useful for feeding other irregular-shaped objects of various materials. The invention is particularly useful in applications wherein it is a desideratum to effect a delivery of articles in a predetermined orientation from a supply of these articles wherein they are in random displacement.

This application is a continuation-in-part application of my copending application Serial No. 603,698 filed August 13, 1956 entitled "Button Feeding Attachment for Sewing Machines," now Patent No. 2,931,327 of April 5, 1960.

In accordance with the provisions of the patent statutes, I have explained the principle and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. In a vibratory feeding device for irregular shaped articles, a hopper comprising an inclined bottom, upstanding side walls, partition walls dividing said hopper into at least three chambers, said chambers including a supply chamber for receiving said articles in random positions, an orienting chamber, and a feed chamber, one of said side walls having an opening communicating with said feed chamber, a first partition wall between said supply chamber and said orienting chamber provided with a single aperture at the bottom of said first partition wall and of a size permitting passage of only a single article therethrough at any one time, a second partition

wall between said orienting chamber and said feed chamber provided with a plurality of orienting openings therein at the bottom of said second partition wall, each of said openings being shaped in relation to the irregular shape of the articles to pass said articles in predetermined position only from said feed chamber to the opening in said upstanding side wall and means for maintaining said articles in said predetermined position.

2. The invention defined in claim 1 wherein said means comprises a cover for said feed chamber in spaced relation from said bottom.

3. The invention defined in claim 1 wherein each of the orienting openings in the partition wall between said orienting chamber and said feed chamber is in the shape of an inverted T.

References Cited in the file of this patent

UNITED STATES PATENTS

1,261,462	Vincent	Apr. 2, 1918
1,481,064	Ochs	Jan. 15, 1924