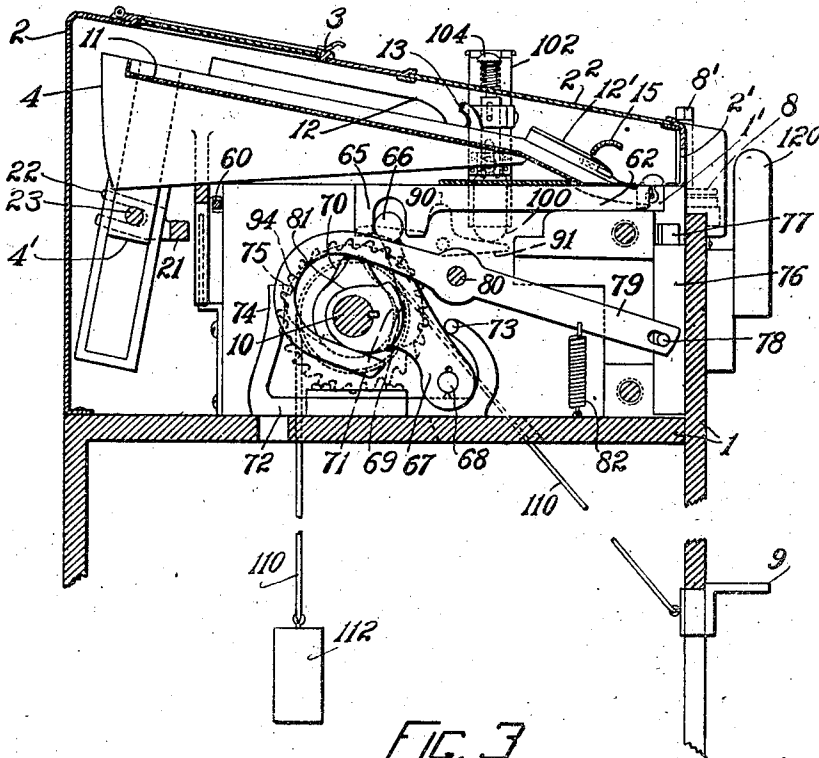
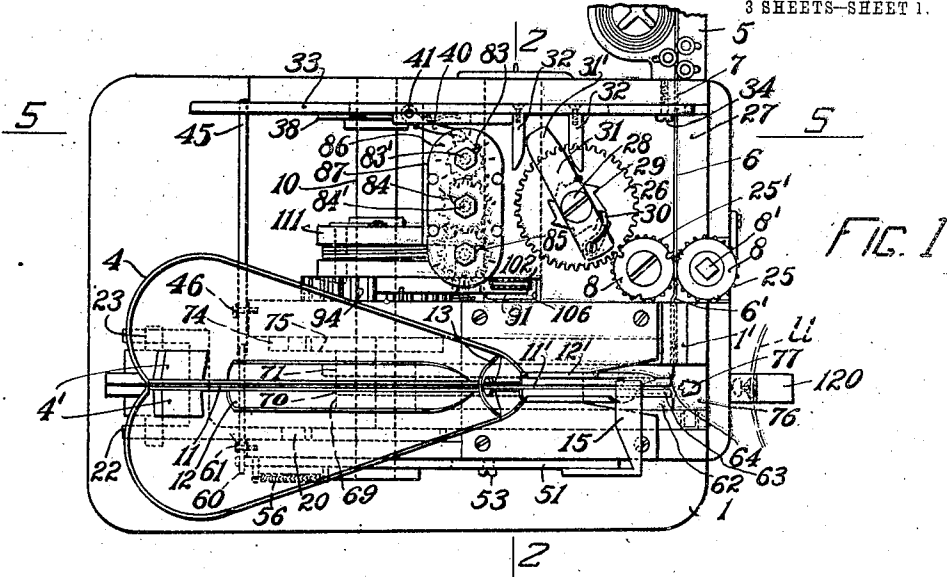


E. F. STENMAN.
 BUTTON SETTING MACHINE.
 APPLICATION FILED FEB. 23, 1912.

1,057,894.

Patented Apr. 1, 1913.

3 SHEETS—SHEET 1.



WITNESSES
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 Victoria London

FIG. 3

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 BY *E. F. Stenman*
 ATTY.

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3 SHEETS—SHEET 2.

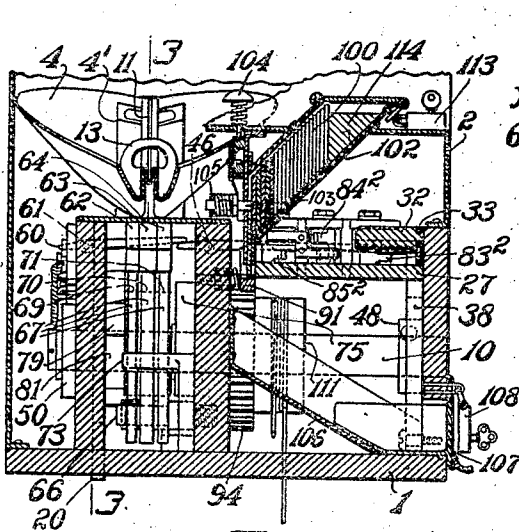


FIG. 2

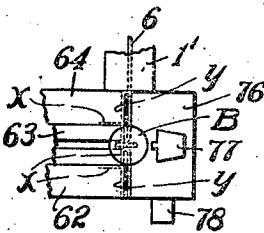


FIG. 7

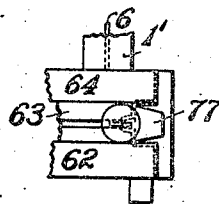


FIG. 8

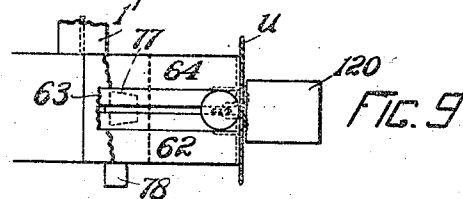


FIG. 9

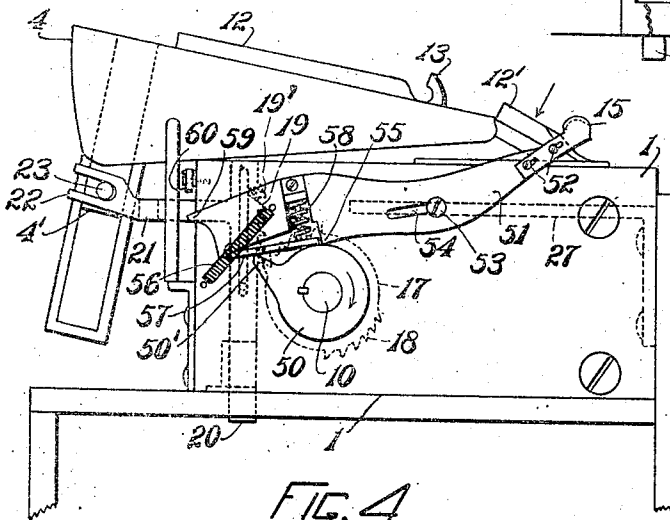


FIG. 4

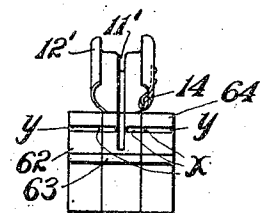


FIG. 10

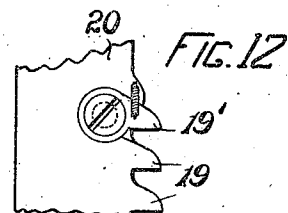


FIG. 12

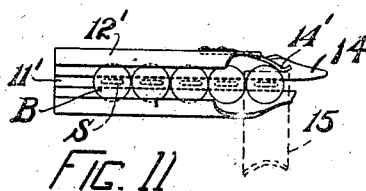


FIG. 11

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3 SHEETS—SHEET 3.

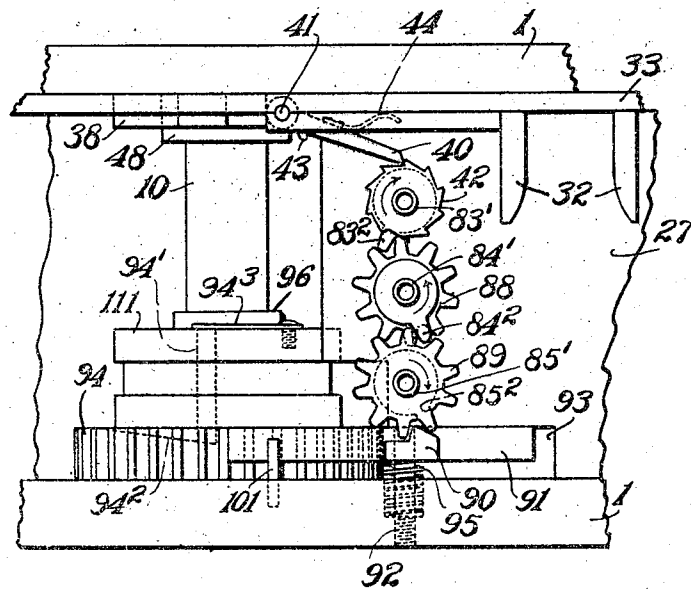
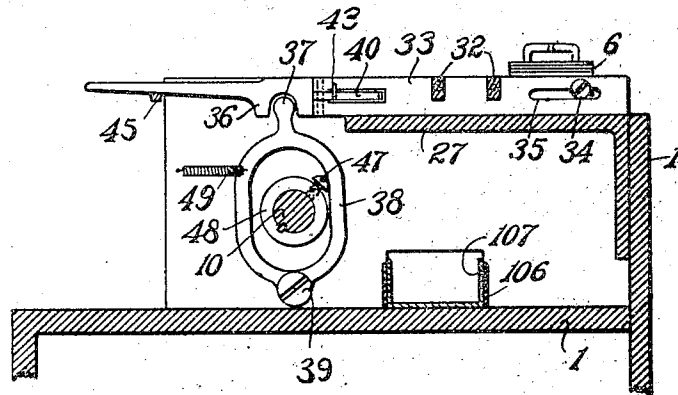


FIG. 6

ATTY

UNITED STATES PATENT OFFICE.

ELIS F. STENMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INDEPENDENT BUTTON FASTENER MACHINE CO. (INC.), OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

BUTTON-SETTING MACHINE.

1,057,894.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed February 23, 1912. Serial No. 679,361.

To all whom it may concern:

Be it known that I, ELIS F. STENMAN, a citizen of the United States, residing at 2 Adolf street, Worcester, county of Worcester, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Button-Setting Machines, of which the following is a specification.

This invention relates to button-fastening machines and more particularly to such machines as are adapted to attach buttons by means of fasteners formed by the machines of this type, which are or may be placed in the hands of routine mechanics and away from the superintendence of expert minds, it is very desirable that the parts be so protected that no tampering therewith may be attempted, so that an accurate check upon work may be obtained through periodical visits rather than constant supervision. For this purpose I have provided a machine which may be locked, the material to be used being fed into the same by the operative and the checking of the material so used being entirely out of said operative's control.

To the end of certainty of operation and accuracy of result, together with structural simplicity and the element of portability, I have devised the several features of my invention which I will more fully set forth in the succeeding specification. As illustrative of my invention I have shown and will describe a machine embodying these principles which I have found well adapted to the ends sought.

Throughout the specification and drawings like reference characters are employed to indicate corresponding parts and in the drawings which accompany and form part of this specification, Figure 1 is a plan view with the casing removed, Fig. 2 is a section on line 2—2 of Fig. 1, Fig. 3 is a section on offset line 3—3 of Fig. 2, Fig. 4 is a side elevation, the casing and parts of the mechanism being removed, Fig. 5 is a section on the line 5—5 of Fig. 1, Fig. 6 is an enlarged partial plan view, similar to Fig. 1, Figs. 7, 8 and 9 represent several stages of the work in plan. Fig. 10 is a front elevation of the forming dies, Fig. 11 is a view of the feed

trough toe looking as the arrow points in Fig. 4, and Fig. 12 is a detail of the yielding tooth construction of the hopper feed.

My button setting machine comprises a frame 1 which supports a casing 2 within which the working parts are inclosed. An opening 2¹ in the casing 2 permits the margins of the working parts to come in contact with the upper of the shoe upon which the buttons are to be set, as indicated in dotted lines in Fig. 1. I preferably provide a door 3 in the casing 2 which permits the operative to fill the hopper 4 with shoe buttons and the top of the casing 2 may be, except for this door frame, entirely of glass if desired, in order that the moving parts may be easily inspected without removing the casing 2. On one side of the machine is mounted a bracket 5 adapted to support a reel of wire 6, the latter being fed through the frame 1 at 7 and thence to the wire feeding rolls 8.

With the hopper 4 filled and the wire 6 in place on the bracket 5, the entire action of the machine is automatic, depending, as shown in the drawings, entirely upon the operation of a treadle slide 9, and the proper positioning of the upper *u*. Of course, my machine may be adapted for power by slightly extending the shaft 10 and mounting thereon a clutch mechanism of any well known type, and proper pulleys, or gearing; but as these machines are designed mainly for use in places that are without power, I have illustrated my preferred embodiment as of the foot power style.

A raceway 11 and wings 12 are provided within the hopper area and also a perforated disk 13 adapted to tip out of the raceway 11 and back to the hopper 4 all such buttons as have not been properly seated in the raceway. The toe 14, similarly provided with a raceway 11¹ and wings 12¹, takes a steeper incline to hurry the buttons B (see Fig. 11) forward until the most forward brings up against a yielding stop 14¹ whence the cup shaped arm 15 descends to grasp and carry it forward until its loop S registers with the feed of the wire 6. (See Fig. 3).

When the arm 15 moves forward with the button within its grasp, the stop 14¹ yields sufficiently to permit its passing and then springs back to place to hold the following

button. Buttons are supplied to the raceway 11 by means of the sliding carriages 4¹. The carriages 4¹ are vertically disposed slides having inwardly sloped ends slightly raised to form cups for holding the buttons. As the ends of the carriages 4¹ rise through the hopper 4 they lift the buttons, raising them to the level of the slideway 11 upon which they fall by gravity. A part of these buttons center themselves with their loop within the central slot of the slideway 11, the remainder falling back into the hopper to be picked up upon subsequent movements of the carriages 4¹.

For the operation of the carriages, I mount on the shaft 10 a so-called broken gear 17 which is keyed to the shaft 10 and supplied with two sets of teeth 18 each adapted to engage teeth 19 of the vertical slide 20. Each gear segment has a leading pawl tooth. From the slide 20 a projecting arm 21 is provided with a pair of forks 22 which engage the pins 23 on the carriages 4¹. The slide 20 and the carriages 4¹ drop by gravity as soon as either set of teeth 18 passes out of engagement with the teeth 19 and the gear 17 will be so mounted upon the shaft 10 that when the machine is at rest, the carriages 4¹ are down and the lower end of the slide 20 protrudes through and below the frame 1. The spring tooth 19¹ yields in each segment when it begins to engage the rack, (see Fig. 12), in order to permit the engagement of the teeth of the gear 17 with the teeth 19 of the rack without liability to break the last tooth on the rack upon which the first impact of engagement falls. The single revolution of the shaft 10 for such button fastening operation causes a double rise of the carriages 4¹, but if this should not suffice to keep the raceway 11 properly supplied, the operator may grasp the slide 20 and work it up and down several times while the machine is at rest until a sufficient quantity of buttons has been supplied to the raceway 11. Ordinarily, the automatic action of the carriages 4¹ will suffice and the hand operation just described is only for emergencies.

The wire feeding rolls 8 are provided with intermeshing gears 25 and 25¹, the latter of which is in mesh with the gear 26 loosely mounted on the shelf 27 by a stud 28. Fast on top of the gear 26 is a ratchet 29 adapted for engagement by a spring controlled pawl 30 attached pivotally to the under side of a lever 31 which, in turn, is pivotally mounted on the stud 28. The opposite end 31¹ of the lever 31 is adapted for engagement with either of the lugs 32, 32 on a slide bar 33 pivotally mounted on the frame 1 by a screw bolt 34 which works loosely through a slot 35 in the bar 33, said slot being adapted to permit the passage therethrough of the wire 6. Near its opposite end the bar 33 is

forked at 36 to engage the head 37 of an oscillating double arm 38, the latter being pivotally mounted on the frame 1 at 39. A spring controlled pawl 40 pivotally mounted at 41 on the bar 33 is adapted to engage with the ratchet 42 of the counting mechanism later to be described. The stop pin 43 limits the action of the spring 44 on the pawl 40. The rear end of the bar 33 is adapted for engagement by a finger 45 of a lever pivotally mounted on the frame 1 at 46 (Fig. 1) for the purpose of raising the rear end of the bar 33 on its pivot 34 until the fork 36 is disengaged from the head 37. The movement of the bar 33 is prompted by the loose fit of the bolt 34 in the slot 35. The object of said raising will be later described.

The arm 38 is adapted to be oscillated by a finger or screw 47 on the collar 48 fast on the shaft 10. A spring 49 tends to keep the arm 38 always against the collar 49. At the opposite end of the shaft 10 is keyed a cam 50 adapted to operate the arm 51 to which the cup-shaped arm 15 is adjustably attached at 52 (see Fig. 4). The arm 51 is pivotally mounted on the stud 53 by means of a slotted opening 54 and a shoulder 55 thereon is kept in engagement with the cam 50 by a spring 56 until the lug 50¹ of the cam 50 enters into engagement with a hinged plate 57 normally held down by a spring 58. The rear end 59 of the arm 51 is adapted to raise, under certain conditions, the short arm of the lever 60 which is pivotally mounted on the frame 1 at 61. The opposite arm of the lever 60 is adapted to depress the short arm of the lever 45 rocking it on its pivot 46.

The dies 62, 63 and 64 are slidably mounted in the frame 1 for forward and backward movement, their rear ends being forked at 65 to engage the heads 66 of their respective fingers 67 pivotally mounted on a pin 68 (see Figs. 2 and 3.) They are adapted to be operated by the cams, 69, 70 and 71, respectively, said cams being fast on the shaft 10. Although springs could be employed to hold the fingers 67 against their respective cams, I prefer to control said fingers by means of a slide 72, the forward end of which is provided with an arm 73 adapted to engage all of the fingers 67. The rear end 74 is adapted for engagement by a cam 75 fast on the shaft 10 to cause the arm 73 to move the fingers 67 rearwardly when required.

A block 76 with a forming head 77 is slidably mounted within the frame 1 and is adapted to be raised and lowered by the pin 78 which loosely engages the slotted end of a cam lever 79. The cam lever 79 is pivoted between its ends at 80 and is engaged at its opposite end by a cam 81 on the shaft 10.

The counting mechanism comprises three pointers 83, 84, and 85, each adapted to co-

operate with an indicating dial 86 on a cover plate 87. The stud 83¹ carries fast thereon the ratchet 42 and a finger 83² for engaging the teeth of a pinion 88 on the stud 84¹. The stud 84¹ also carries a finger 84² for engaging the teeth of a pinion 89 on the stud 85¹. The stud 85¹ also carries a finger 85² (see Fig. 6) adapted to engage a lug 90 on a ratchet lever 91, pivotally mounted on the frame 1 at 92 and held outwardly by a spring 95 against the walls of an opening 93 in the shelf 27, or if preferred, against a head (not shown) on the pivot 92. The ratchet lever is held by gravity against the teeth of a ratchet 94 fast on the shaft 10, its width being somewhat less than said teeth as best seen in Fig. 6. The ratchet 94 is fast upon the shaft 10 while the pulley 111 is loose thereon, being retained in position by a collar 96.

The shaft 10 is designed to advance one complete revolution for each depression of a treadle 9 and a weight 112 carries the pulley 111 back to starting position when the pressure on the treadle 9 is removed where it is ready to cause another advance of the shaft 10. The clutch mechanism by which this is accomplished comprises a pin 94¹ slidably supported within the pulley 111 and held against the ratchet 94 by a leaf spring 94³. An inclined cam groove 94² is adapted to receive the forward end of the pin 94¹ and provide a shoulder with which it will engage during the depression of the treadle 9. On the return of the pulley 111, the cam groove 94² forces the withdrawal of the pin 94¹ which is free to again drop into said groove at the completion of the return. I do not claim this mechanism as new in itself nor do I limit myself to its use.

When it is desired to prepare the machine for operation a starting weight 100 is dropped on the free end of the lever 91 and raises its heavier end free from the teeth of the ratchet 94 and against a stop pin 101 in the frame 1. The weight 100 forms one of a series which are locked within a chute 102, the lower end of said chute being adapted to receive one at a time while the upper end of the weight that rests on the lever 91 projects into the path of the remaining weights in the chute 102 and prevents them from feeding forward into dropping position. To prevent friction between these adjacent weights from interfering with the free dropping of the first mentioned, I prefer to add a spring pressed pin 103 mounted on said chute, the inner end of which bears normally against said remaining weights. A spring controlled sliding cam lug 104 mounted on the casing 2 directly above the pin 103 is adapted to retract the pin 103 against its spring 105 at the desired moment. Beneath the chute 102 and secured to the frame 1 is an inclined

trough 106 which carries the dropped weight 100 to a box 107 which is locked in said frame by means of a lock 108.

The treadle 9 is attached to a cord or wire 110 which passes around a drum 111 fast on the shaft 10 and to a weight 112.

When the machine is set up for operation by a workman, the chute 102 is filled with weights 100 and locked by a lock 113, the triangular block 114 serving to hold the weights 100 in vertical position. The box 107 is empty and the counting mechanism is set at zero. The keys to the locks 108 and 113 are then taken away by the setter up so the operator has no access to the interior except through the door 3 in the casing 2. The operator then fills the hopper 4 with buttons B through the door 3 and places a reel of wire 6 on the bracket 5, feeding the wire 6 through the opening 7 to the feeding rolls 8. He then places a key on the stem 8¹ and feeds the wire 6 through the block 1¹ in the frame 1 until the end is flush with the farther face of said block. The glass top 2² enables him to watch his operations. This feed of the wire 6 through the block 1¹ causes one or more complete unit lengths of the wire 6 to pass the rolls 8 and I prefer to tongue and groove said rolls for the purpose of forming a crimp 6¹ at the center of each unit length for a purpose to be described. The operator next depresses the cam lug 104 which retracts the pin 103 and allows the nearest weight to drop on the forward end of lever 91 and raise the same out of engagement with the ratchet 94 and against the stop pin 101. He next places by hand some of the buttons B on the raceway 11, on which they slide till the yielding stop 14¹ detains the most forward button. With a reel of the wire 6 sufficiently long and sufficient buttons B in the hopper 4 he is now ready to fasten one thousand buttons on the uppers *u* by successive foot pressures on the treadle 9, he meanwhile holding the upper *u* against a forming block 120 (see Fig. 1) and properly positioning it to receive each button.

The first cam to operate when the treadle is depressed is 50 which carries the cup shaped arm 15 down to grasp the end button and carry it forward, guided by its shank S in the raceway 11¹ to the position shown in Fig. 3, the lug 50¹ pushing against the pivoted plate 57 and raising the rear end of the arm 51 with the plate 57 about the pivot 53 and against the action of the spring 56. When the cup shaped arm 15 meets the button B the further upward movement of the rear end of the lever 51 (due to the superior stiffness of the spring 58 over that of the spring 57) is arrested before the lug 50¹ finishes its lifting movement. The further lift of the lug 50 compresses the spring 58 allowing the plate 57 to recede within the

notched recess in the arm 51. When the lug 50¹ meets the shoulder 55 on the arm 51, the latter is moved forward (by reason of the slot 54) against the action of the spring 56 until the lug 50¹ is carried beyond the influence of the shoulder 55, whereupon the arm 51 immediately raises its forward end with the cup shaped arm 15 and retreats to its initial position, both through the influence of the spring 56. While the forward button is reaching the position shown in Fig. 3 the cam action of the screw head 47 (see Fig. 5) is causing the slide bar 33 to move forward, registering one count through the ratchet 42 and pawl 40. This causes the lever 31 to carry the pawl 30 back for a fresh tooth on the ratchet 29. Next, the cam 48 causes the return of the slide 33, brings the pawl 40 into position to make another count and feeds the wire 6 across the space in front of the forming dies 62, 63, and 64 and through the shank S of the button B. (See Fig. 7.) The cams 69, 70 and 71 next operate to move the fingers 67, and the dies 62, 63 and 64 forward against the forming head 77 which has been brought up to position by its cam 81. When the die 63 meets the block 77 its cam 70 causes a pause while its mates 62 and 64 are carried forward to the position shown in Fig. 8, a slight hump on the two cams 69 and 71 being indicated by a dotted line marked 69 in Fig. 3.

Fig. 8 shows the wire 6 turned and cut the action of the die 64 against the block 1¹ and supported in horizontal position in the half grooves X on the face of the die 63 (Fig. 10) and the inner sides of the dies 62 and 64. The three dies 62, 63 and 64 now pause while the forming head 77 descends to its original position and then further action of the cams 69, 70 and 71 moves all three dies with the turned wire 6 forward until the dies 62 and 64 contact with the upper on the block 120, whereupon they pause while the center die 63 is forced forward by its cam 70 to form the clench shown in Fig. 9. The three dies are then retracted to the original position and the sequence of operations just described is repeated. After the wire 6 has been cut by the die 64, the severed portion is but slightly retained within the half groove X on the face of the die 63 and the half grooves Y in the faces of the dies 62 and 64. By forming the crimp 6¹ at the feed rolls 8 this crimp, hanging on the shank S serves to help the wire 6 retain its position until the forward motion of the dies 62, 63 and 64 clench its position.

When one thousand buttons have been set the lug 85² engages the lug 90 to push the lever 91 against the action of the spring 95 until the weight 100 is free to drop through and into the trough 106. This permits the lever 91 to engage the teeth of the ratchet 94 and lock the machine. To continue op-

erations, the sliding cam lug must be depressed, thereby permitting the next weight 100 to drop on the short end of the lever 91 which has meanwhile sprung outward to position. The counting device has automatically reached zero and is ready to begin its next series, while the weight in the box 107 keeps tally on the series just gone. When the inspector makes his rounds he opens the locks 108 and 113 and transfers the weights in the box 107 to the chute 102, keeping count of the number so transferred.

Referring to Figs. 1, 2, 4, and 5, the purpose of the pivoted plate 57 and the levers 60 and 46 will be explained. It will be remembered that the wire is fed into the machine through the rolls 8 and the buttons by means of the raceway 11. If through carelessness of the operator the foot lever 9 is depressed when there is no button B against the stop 14 it is preferable to prevent wire feed and count for that revolution. In mentioning the action of the arm 51 reference was had to the button operating to limit the upward movement of the rear end of said arm. Should there be no button in position the cup shaped arm 15 is free to descend through a greater arc and as there is no resistance the rear end of the arm will be further raised than when the button B is in place. This extra lift of the tail 59 causes an operation of levers 60 and 46 to cause the arm 45 to raise the bar 33 about its pivot 34 until the fork 36 is entirely out of engagement with the head 37. Consequently, for this revolution, no wire is fed nor count made, although all of the cams perform their functions.

Various modifications may obviously be made in the various parts of the embodiment shown, all without departing from the spirit of my invention if within the limits of the appended claims.

What I, therefore, claim and desire to secure by Letters Patent is:—

1. In a button setting machine, a hopper, a raceway within said hopper, mechanism for setting buttons, a reciprocating carriage for lifting the buttons to the raceway, a rack on said carriage having a spring pressed leading tooth, and a segmental gear for engaging said rack.

2. In a button setting machine, a hopper, a raceway within said hopper, mechanism for setting buttons, a reciprocating carriage for lifting the buttons to the raceway from whence they feed to the setting mechanism, a vertical slide for said carriage, said slide having a series of fixed rack teeth and a spring pressed ratchet tooth, a segmental gear for initially engaging the spring tooth and subsequently engaging said rack teeth, and means for actuating said gear to cause it to alternately raise said slide and permit it to drop.

3. In a button setting machine, a frame, a button hopper supported on said frame, a forming die, a shaft rotatably mounted on said frame, and a carrying arm arranged to be operated by said shaft to present the buttons singly within the influence of said forming die, said arm being slidably and pivotally mounted upon said frame.

4. In a button setting machine, a frame, a button slide for delivering one of a plurality of buttons, forming dies, a shaft rotatably mounted on said frame, a cam fast on said shaft, and a carrying arm slidably and pivotally mounted on said frame and within the influence of said cam, the forward end of said arm adapted to descend upon and seize the head of the button to be fed and carry it forward within the influence of the forming dies, in combination with yielding means mounted on said arm and positioned so as to cause the forward end of said arm to be depressed beyond normal, said yielding means being adapted to permit the further revolution of said cam when the button is properly grasped by said arm.

5. In a button setting machine, a frame, forming dies, a button slide adapted for delivering one of a plurality of buttons within the influence of the forming dies, a wire feeding mechanism, a shaft rotatably mounted in said frame, means for causing the intermittent action of said wire feed by said shaft, a cam fast upon said shaft, a carrying arm slidably and pivotally mounted on said frame within the influence of said cam, the forward end adapted to grasp

in its descent the head of the foremost button and advance it within the influence of the forming dies, a yielding mechanism secured to said carrying arm and effective under the action of said cam to cause the forward end of said carrying arm to make a further descent than is permitted when the button is in place to receive it, said yielding means being adapted to permit the further revolution of said cam when the button is properly in place and the downward movement of said carrying arm is thereby limited, in combination with a mechanism effective to permit said carrying arm to release the wire feeding mechanism from the influence of said shaft when no button is presented to said carrying arm.

6. In a button setting machine, a frame, a drive shaft mounted in said frame, a casing on said frame, a hopper in said casing, a wire feed, a raceway along which the buttons move, slide carriages to supply buttons to said raceway, means comprising a broken gear on the drive shaft having two sets of teeth, a toothed slide arranged to be vertically reciprocated by said teeth of said broken gear, and an arm connecting said slide with the carriages for operating said carriages, and a member effective to grasp a single button at each actuation thereof to present it to the wire feed.

In testimony whereof I affix my signature in presence of two witnesses.

ELIS F. STENMAN.

Witnesses:

R. B. ELLMS,
ELLIS SPEAR, Jr.