To all whom it may concern:

Be it known that I, GEORGE W. PERKINS, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Button-Fastening Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to a machine for attaching buttons to shoes and other articles by metallic fasteners, and is especially intended for that class of such machines in which the fastener is formed from a wire which is fed through the eye of the button, the wire then being formed into shape for the fastener, the button and attached fastener then being carried to position to be secured to the shoe or other article.

The invention relates especially to means for properly positioning a button to receive the wire for the fastener.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features will be pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is a side elevation of a portion of a raceway and connected parts embodying the invention and showing a portion of the operative parts therefor, the parts being shown in position where a button has been carried under the placer and the placer is in clamping position and the carrier members have been withdrawn. Fig. 2 is a side elevation of the parts shown in Fig. 1 after the slide has descended to carry the button with attached fastener from beneath the placer to the anvil, and the carrier members which position the button beneath the placer in Fig. 1 have been moved back and are in engagement with the then lowermost button in the raceway. Fig. 3 is a view of the parts shown in Fig. 2 looking in the direction of the arrow. Fig. 2. Fig. 4 is a section on line 4—4 of Fig. 3, some of the parts being stripped away to show more clearly the engagement of the carrier members with the button. Fig. 5 is a section on line 5—5 of Fig. 3. Fig. 6 is a section on line 6—6 of Fig. 8. Fig. 7 is a view taken in the same direction as Fig. 3 showing the carrier members at the forward end of their stroke in engagement with the button under the placer. Fig. 8 is a view of the parts shown in Fig. 7 showing the carrier members part way back to their rearward position and in engagement with the spreader cam.

Referring now to the drawings,—1 represents the raceway and 2 the raceway cover, the buttons traveling down the raceway with the eyes of the buttons in the groove of the raceway in the usual manner.

Any suitable form of mechanism for feeding the wire through the eye of the button and forming the loop and legs of the fastener and severing the blank of which the fastener is formed from the length of the wire may be employed, one form of said mechanism being shown and described in Patent No. 982,440, dated January 24, 1911, granted on my application, and it is not deemed necessary to show such mechanism in detail. In the accompanying drawings of the present application a portion of the mechanism for forming the fastener is shown similar to the mechanism shown in said patent.

3 is an arbor on which the wire 4 rests after it has been threaded through the eye 5 of the button 6.

7 is what is termed the former which forms the loop of the fastener and is attached to a former holder 8 which is reciprocated by an arm 9 carried by a lever 10 which is actuated by suitable mechanism, said arm 9 engaging with a slot 11 in the former holder. The legs of the fastener are formed by a slide 12 which is actuated by an arm 13 carried by a lever 14, said arm 13 engaging with an elongated slot 15 in the slide 12. Means for actuating said levers 10 and 14 is fully shown and described in said patent above mentioned. Briefly, the mechanism consists of a rotary cam 32 which is provided with cam grooves which are engaged by rolls carried by the levers 10 and 14, whereby the former 7 and the slide 12 are actuated at the proper periods of time in the movement of the machine. The roll on lever 10 engages with a cam groove 53 and the roll on lever 14 engages with a cam groove 54 on the opposite face of cam 32. When the button is in the position for re-
ceiving the wire for the fastener, as shown in Fig. 1, means should be provided for holding the button against movement during the feeding of the wire and the forming of the fastener.

The means which I have provided are as follows: The placer block 16 is formed with a cupped out under side which is adapted to fit over the head of the button and is mounted on a movable stud 17 which may be moved down to clamp the button at the proper time and which may be lifted to release the button when the fastener is formed. Said stud 17 is connected with a lever 18 which is actuated and controlled in a manner to be hereinafter described. Said lever 18 is pivoted at 19 to a fixed part of the machine. In the form of construction shown the lower end of the lever 18 is bifurcated vertically to straddle a block 17 which is loose on the stud 17 and is also laterally bifurcated, forming ears between which a pin 20 projects from both sides of the block 17 to engage with said ears and form a connection with the said lever 18. Elongated recesses 21 between the ears 22—22 allow play for the pins 20 during the locking movement of the lever 18. A spring 23 is coiled around the stud 17 between the block 17 and the placer block 16 enables the lever 18 to move the placer down with a yielding pressure upon the button.

When the parts are in the position shown in Fig. 1 with the former 7 and the former holder 8 retracted the bent rear arm of the lever 18 rests upon the upper face of the former holder 8, thereby holding the lever 18 in position where its forward end is turned down to hold the placer 16 in engagement with the head of the button. A spring 451 its lower end secured to the frame and its upper end secured to the lever 18. Said spring exerts a downward pull on the rear arm of the lever 18, and when the former holder 8 moves downward far enough for the former holder to ride out from under the rear arm of the lever 18 said spring 451 will pull down the rear arm of said lever 18, thereby turning said lever on its pivot and raising the forward end of said lever which thereby raises the placer 16, as shown in Fig. 2.

It is important that the lowermost button in the raceway should at the proper time be advanced to the proper position beneath the placer to receive the wire for the fastener and that the other buttons behind the advance button shall be held in check. The means for thus feeding and positioning the lowermost button in the raceway and which forms the subject of the present application is shown in the drawings.

Two carrier fingers or jaws 24—24, one on each side of the raceway, are slidably mounted respectively in a carriage in such manner that said carrier fingers are slideable at right angles with the raceway and said carriage is slideable longitudinally of the raceway. Said carriage as shown consists of two blocks 25, 25, one on each side of the raceway and tied together so as to move in unison. The tie shown in the drawings is in the form of a yoke 26 which is arched over the top of the raceway, forming a bridge, and which is secured to the lower end of a rod 27, the other end of said rod 27 being pivotally connected at 29 to one end of a lever 28, said lever 28 being fulcrumed at 30 to the frame of the machine, the other end of said lever 28 carrying a cam roll 31 which engages with the cam 32 mounted on shaft 33 which actuates the former 7 and slide 12 through the levers 10 and 14. Said cam 32 is so formed as to the portion which engages with the said roll 31 as to give the proper time of movement to the lever 28 and therefore to the bar 27 in relation to the movement of the former 7 and slide 12. The roll 31 is held in engagement with the cam by a spring 56, one end of which is connected with the lever 28 and the other end is connected with the frame.

The inner ends 55 of the carrier fingers 24 are preferably concave so as to fit the curved side of the head of the button. These fingers are formed with stop portions or shoulders 24 which project to one side sufficiently to engage the end of the blocks 25 at the edge of the slot in which the said carrier fingers slide so as to prevent the said carrier fingers from being moved inward beyond a limited distance sufficient to grip the buttons. Secured to the lower end of the raceway cover 2 is a block 35 which is perforated to receive a slideable pin 36 having a head 37 which is engaged by a tension spring 38 to normally hold the lower end of the pin down in front of the lowermost button in the raceway, as shown in Fig. 6, so as to hold the line of buttons in the raceway against movement until the proper time. Preferably the lower end of said pin is rounded or cam faced on its rear side so that if the lever 18 is immediately behind it is moved down with pressure against the pin the said pin 36 will be pushed upward, the spring 38 yielding for that purpose and allowing the button to be carried down beneath the pin, said spring 38 forcing the pin downward again as soon as the head of the button has ridden down beneath it. When the carrier fingers 24 are in their most rearward position the inner ends thereof which engage the button are directly in alignment with the lowermost button in the raceway which is in engagement with the said stop pin 36.

Two swinging finger cams 39—39, one on each side of the raceway at a little distance therefrom, are respectively fulcrumed on studs 40 which rise from the head of the ma-
chine, said cams having cam faced portions 41 which are adapted to be engaged by pins 42-42 respectively rising from the outer portions of the carrier fingers 24. A spring 43 extends across above the raceway connected at its opposite ends with pins 44 rising from the finger cams 39, said spring being under tension and tending to draw the lower arms of said cam fingers toward each other, but being limited in their pulling movement by the pins 45 rising from the head of the machine which engage the outer faces of the upper arms of the said finger cams. When the carrier fingers are in their uppermost or rearmost position, as shown in Fig. 3 the pins 42 which rise from the carrier fingers are on the inner sides of the finger cams 39, the concave inner ends of the carrier fingers being then in engagement with the opposite sides of the lowermost button in the raceway. When the carrier fingers are moved down by the movement of the bar 27 said pins 42 engage the inner cam faces of the portions 41 of the finger cams, thereby swinging the finger cams 39 on their pivots and spreading open the cam portions 41 so as to allow the said moving fingers to move downward with the button. When said carrier fingers have moved down far enough for the pins 42 to ride past the lower ends of the cam portions 41 the spring 43 which will have become distended by the swinging movement of the finger cams will contract and pull the finger cams back into normal position to the limit allowed by the stop pins 45 which engage the rear arms thereof, while the carrier fingers will continue to the lower end of their stroke, namely sufficient to position the button immediately beneath the placer 16. The bar 27 and therefore the carrier fingers 24 will remain in the lowermost position holding the button until the proper time for returning the carrier fingers to the position to engage another button. The cam 32 which has cam portions which actuate the former 7 and the slide 12 as well as the carrier bar 27 are so constructed that the return movement of the carrier bar 27 and fingers 24 will take place at a predetermined time with relation to the movement of the former and the slide. The rear arm of the lever 18 is formed with a cam projection 46 which is engaged by the rear end of the former holder 8 on the upward movement of the former so as to turn down the lower end of the placer lever 18 and thereby bring the placer 16 into engagement with the head of the button which has been positioned by the carrier fingers. The return movement of the carrier fingers may occur at any time after the button has been threaded with the wire for the fastener. The timing for the wire feed should be such that the wire will be fed after the placer lever has engaged the button. When the movement of the cam 32 causes the return movement of the carrier blocks 25, 25 the tension of the placer on the head of the button will hold the button with sufficient firmness so that on account of the rounded edge of the button head and the concave form of the ends of the fingers 24, 24 the fingers 24, 24 will be slightly spread during the initial rearward movement of the blocks 25, 25 while the button is held stationary by the placer. As soon as the blocks 25, 25 have moved back a short distance the pins 42 which rise from the carrier fingers will engage the outer faces of the cam portions 41, as shown in Fig. 8 and in the continued upward movement the outer cam faces of said portions 41 will spread the carrier fingers apart from each other against the tension of the springs 47 which engage the outer ends of the said carrier fingers until the said pins 42 have ridden up past 85 the rear ends 48 of the cam portions 41, whereupon said springs 47 will cause the carrier fingers to snap in toward each other and engage the lowermost button which is then against the stop pin 36, thus 90 gripping the button ready for the next downward movement of the carrier fingers. When the carrier fingers move down they grip the button with sufficient firmness so that the pressure of the button will lift the stop pin 36 out of the way of the button as already described, so that the button can ride beneath it.

Guards 49 and 50 extend over the path of the blocks 25 in which the carrier fingers 100 24 are mounted to prevent the blocks 25 from jumping out.

As previously explained, the placer lever 18 is actuated by the former holder 8 engaging with the cam projection 46 to turn the placer into clamping engagement with the button on the retrograde movement of the former and slide. The threading of the wire through the eye of the button will take place while the former and slide are at rest. The continued rotation of the cam will cause the former and slide to move forward again while the placer still clamps the button, and on this forward movement as soon as the former holder 8 rides down below the cam 115 portion 46 of the placer lever 18 the placer will be released from the button which will then be held in place by the wire. A continued downward movement of the former and slide will form the fastener and then 120 carry the button with attached fastener down to the fabric 51 on the anvil 52, as shown in Fig. 2, and will drive the legs of the fastener through the material on the anvil. The formation of the engaging surfaces of the cam 32 is such that the carrier fingers comprising the blocks 25 and rod 27 will be moved back into position for the car-
rrier fingers to engage the then lowermost button in the raceway before the former and slide move down.

What I claim is:

5. In combination with a button raceway, a reciprocable carriage straddling the raceway and movable parallel with the raceway, two slidable fingers mounted on said carriage with relation to the raceway and slidable laterally with relation to the raceway toward and from the pathway of the buttons, tension mechanism which causes the said fingers to move toward each other and grip a button in the raceway while the carriage is in its rearward position, means for reciprocating said carriage so arranged that during the forward movement of the carriage the button gripped by the fingers will be carried to a predetermined position, and means for spreading said carrier fingers during the return movement after the button has been positioned.

2. In combination with a button raceway, a carriage having carrier portions on opposite sides of the raceway united together, means for reciprocating said carriage parallel with the raceway, two fingers mounted respectively in said carriers and being slidable in said carriers laterally with relation to the raceway independently of the movement of the carriage on which they are mounted, tension mechanism which moves said carrier fingers toward each other, so arranged that they grip a button in the raceway, means for moving the carriage with the fingers and gripped button forwardly to a predetermined position, and means for moving the carrier fingers apart to enable them to grip another button.

3. In combination with a button raceway, a carriage having carrier portions on opposite sides of the raceway united together, two fingers mounted respectively in said carriers and being slidable therein laterally with relation to the raceway, tension mechanism which moves said fingers toward each other so arranged that they grip a button in the raceway, means for reciprocating said carriage parallel with the raceway, so arranged that when the carriage moves in one direction the button gripped by the fingers will be moved to a predetermined position, means for clamping the positioned button, the head of the clamped button causing the said fingers to slightly spread during the initial rearward movement of the carriage, and means for further spreading the carrier fingers during the return movement.

4. In combination with a button raceway, two carrier members on opposite sides of the raceway and which are movable laterally with relation to the raceway to grip a button, a reciprocable carriage on which said carrier members are mounted, means for moving said carrier members into engage-
gripping engagement with a button in the raceway, and means for reciprocating the carrier members so arranged that the movement in a forward direction will move the 5 carrier members and gripped button to a predetermined position, means for holding the button in its said predetermined position against return movement with the carrier members, and cams which engage the carrier members during the retrograde 10 movement and spread them to a position for another gripping movement.

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

GEORGE W. PERKINS.

Witnesses:

WILLIAM A. COPELAND,

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Copies of this patent may be obtained for five cents each, by addressing the “Commissioner of Patents, Washington, D. C.”