

May 14, 1963

G. SMITH ETAL

3,089,694

TAB FORMING UNIT

Original Filed July 7, 1959

7 Sheets-Sheet 1

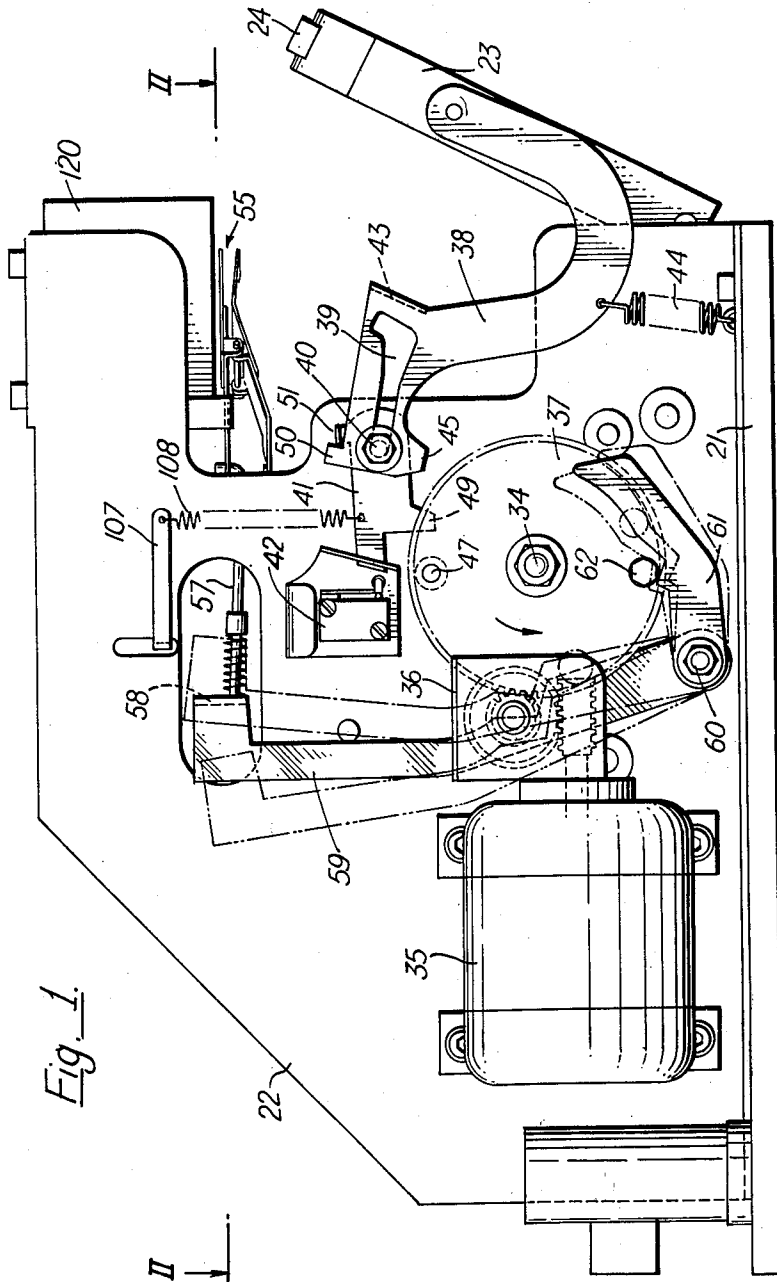


Fig. 1.

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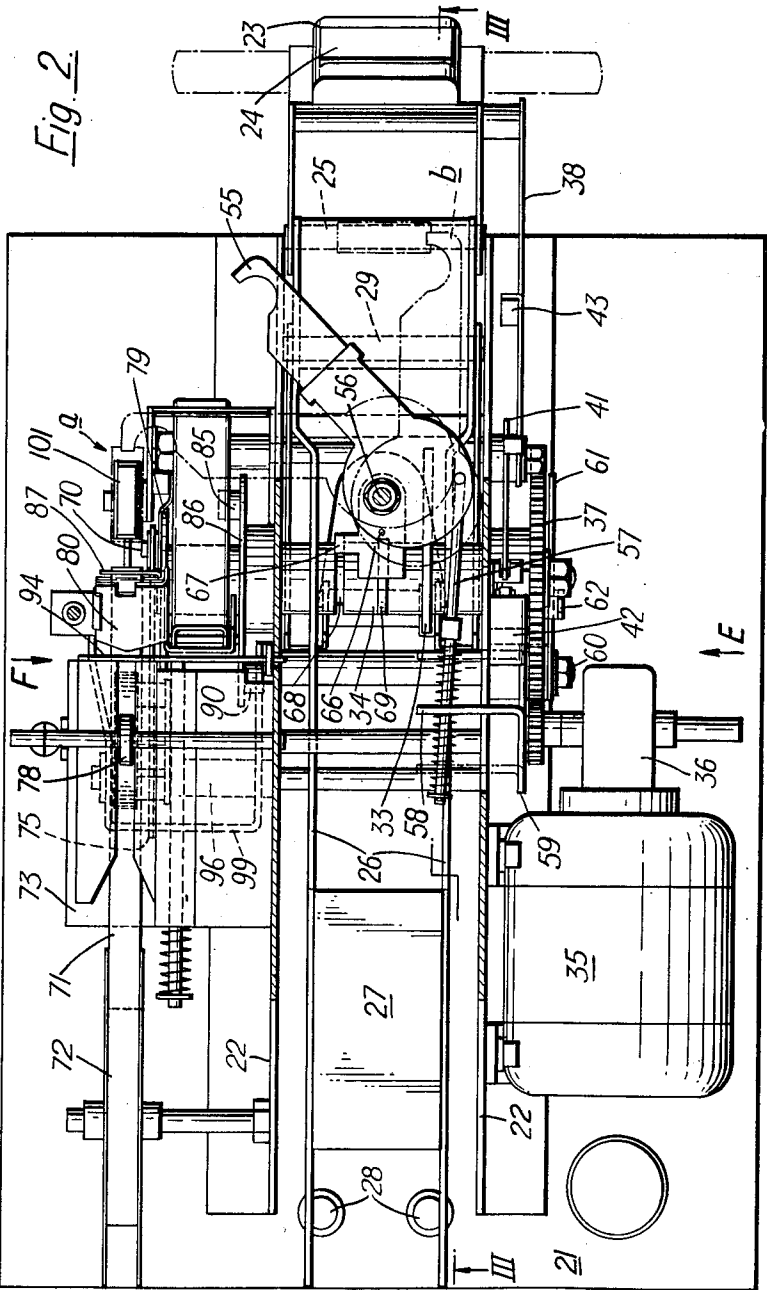
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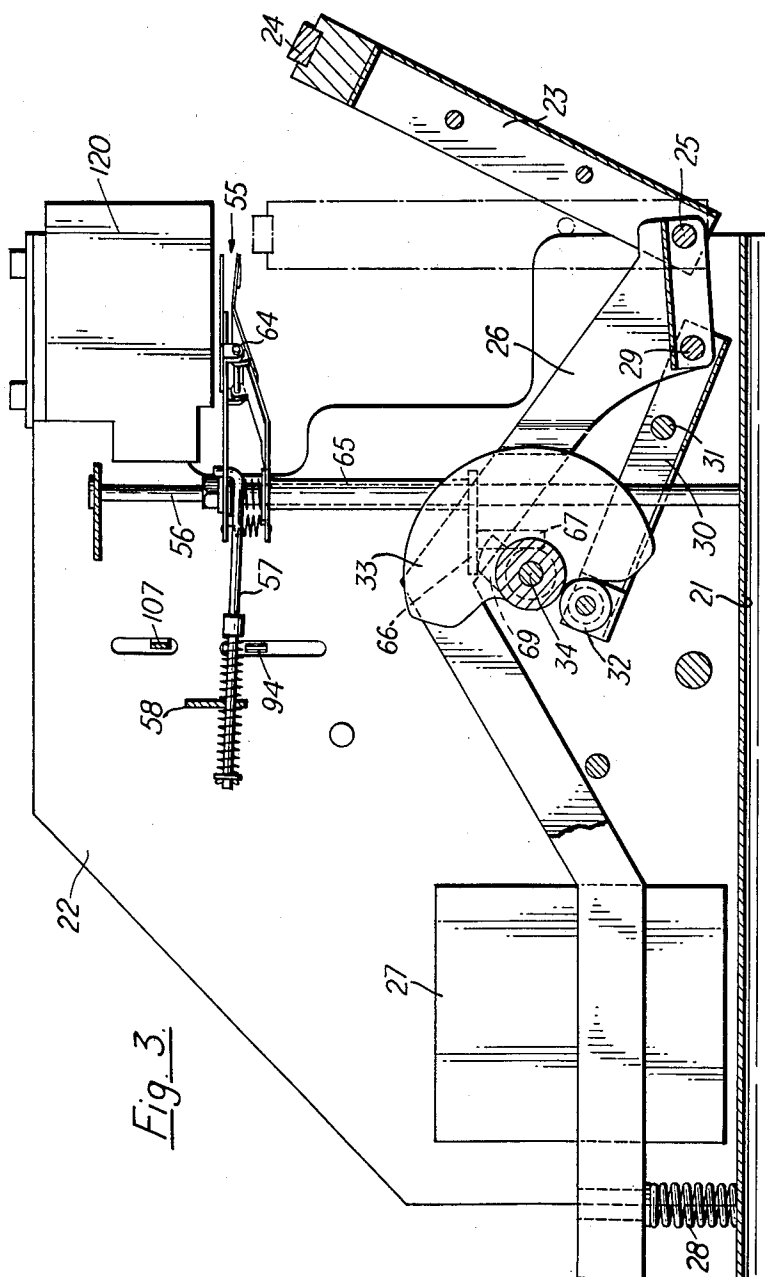
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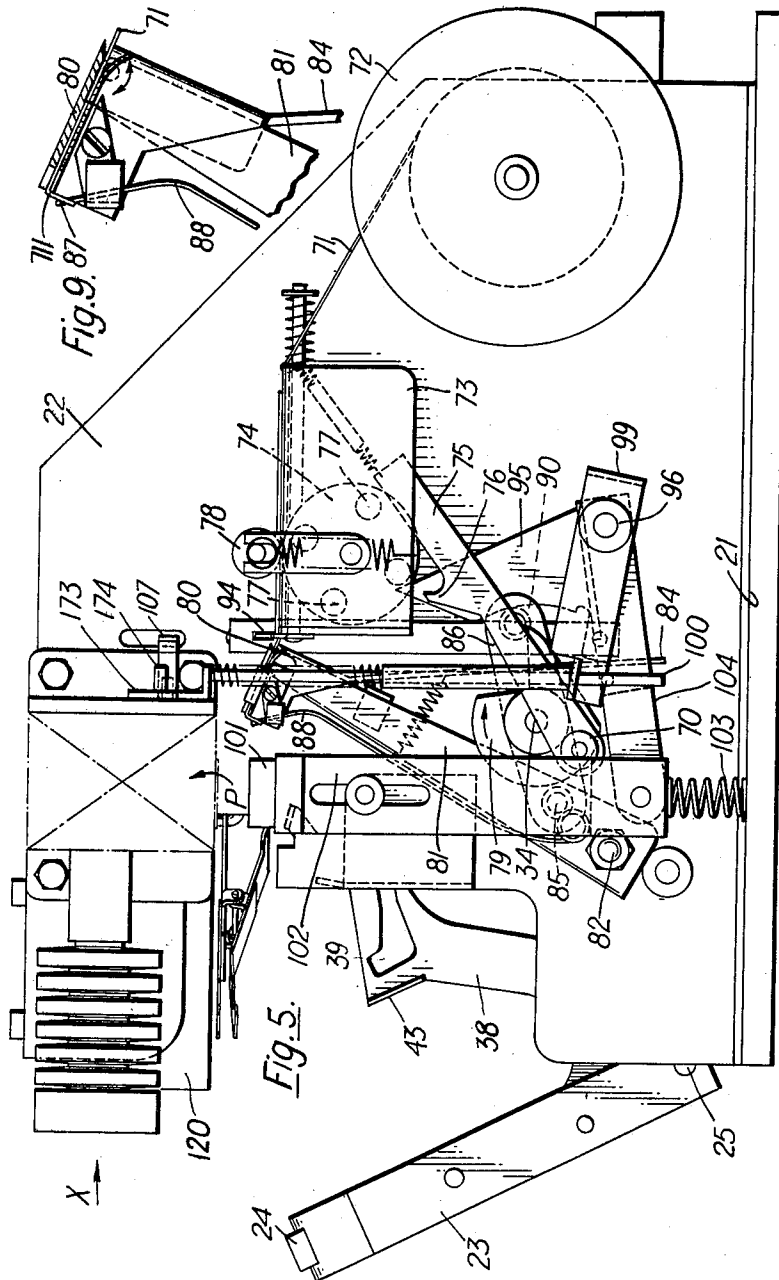
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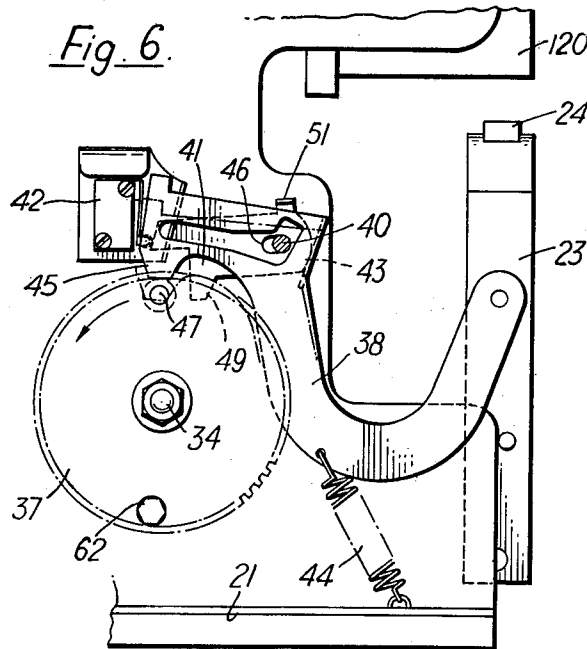
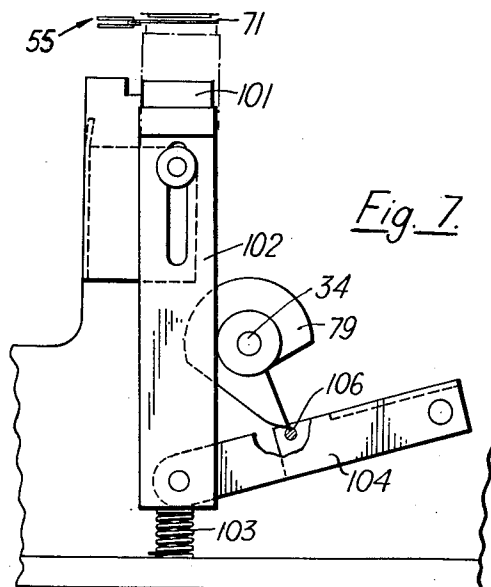
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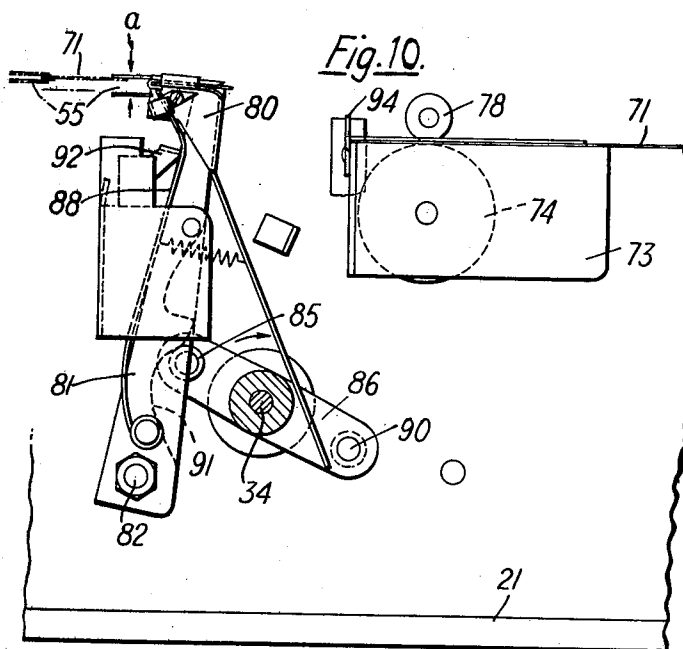
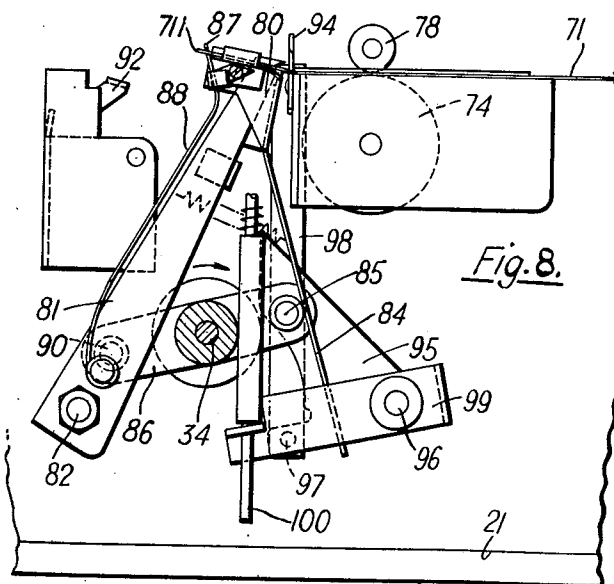
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3,089,694

TAB FORMING UNIT

Geoffrey Smith, 44 East India Dock Road, and Hans Meyer, 63 Jeddo Road, both of London, England
Original application July 7, 1959, Ser. No. 825,565, now Patent No. 3,078,910, dated Feb. 26, 1963. Divided and this application Dec. 2, 1960, Ser. No. 73,437
5 Claims. (Cl. 270—61)

The present invention relates to the marking of textile articles such as articles of clothing, more particularly for the temporary marking of articles intended to be subjected to laundry or dry-cleaning operations, by means of a tab or label provided with a thermoplastic component whereby it may be caused to adhere to the article by the action of heat and pressure and is divided from the G. Smith et al. application Serial No. 825,565, filed July 7, 1959, now U.S. Patent No. 3,078,910.

The object of the present invention is to provide a simple and effective means for forming a tab or label comprising a folded-under edge part which is incapable of becoming adhered to the article and thus forms a non-adherent finger grip to assist removal of the tab or label from the article at the end of handling operations.

In said application Serial No. 825,565, a machine has been described for marking textile articles wherein the articles to be marked are placed on a pivotally movable article support which is capable in one operative position of pressing the article and a tab placed thereover into contact with a heated presser member which presses the tab into adhering contact with the article. Said tabs or labels may be preliminarily marked with an identification marking by the mechanism described in co-pending application Serial No. 73,418 simultaneously divided from said application Serial No. 825,565.

A tab or label utilized in accordance with the present invention is conveniently formed from a strip of suitable material including a thermoplastic component exposed predominantly on one face whereby, when subjected to heat and pressure, it may be caused to adhere to the article to be marked so as to resist cleaning operations to which the article may be subjected, but such that the tab or label can be subsequently removed at the end of such operations by engaging the finger grip end part. This strip may have a width equal to the width of the finished tab or label, and the finger grip end part may be formed by turning under one end (the leading end) of the strip. Preferably this operation is performed by feeding a tab-forming length of the strip through a pivotal guide in such manner that the leading end of the strip projects from the guide and by movement of the latter is folded initially at right angles to the strip by the action of a presser bar. After severance of the tab-forming length of strip the guide is moved bodily to a point where it is engaged by a gripper and in the course of this movement the presser bar is moved relatively to the guide to cause the folded end of the strip to be folded re-entrantly with the adhesive face of the folded end part in contact with the adhesive face of the strip thus forming a non-adherent end part. The gripper positions the finished tab in the marking position and thereafter transfers the tab to a position overlying the article to be marked.

One construction of the machine incorporating the tab forming mechanism is shown on the accompanying drawings in which:

FIG. 1 is a side view of the machine with the protecting cover removed.

FIG. 2 is a part sectional plan view on the line 11—11 of FIG. 1.

FIG. 3 is a sectional elevation on the line 111—111 of FIG. 2.

FIG. 4 is a view similar to FIG. 3 showing the operating parts in the pressing position, FIGS. 1, 3 and 4 being taken in the direction of the arrow E in FIG. 2.

FIG. 5 is a side elevation view seen in the direction of the arrow F in FIG. 2 and is a view similar to FIG. 1 as seen from the other side of the machine.

FIG. 6 is a detail view showing the operation of the motor start-stop mechanism.

FIG. 7 is a detail view showing the operation of the printing platen,

FIGS. 8, 9 and 10 are detail views showing the operation of the tab forming mechanism.

As shown on the accompanying drawings, the machine comprises a main frame having a base plate 21 and side plates 22. It is enclosed in a casing, not shown, only the pivotally movable article support 23 and the selector wheels for the print unit being exposed. The support 23 has a yieldable presser face 24 and is pivotally mounted at 25 upon lever arms 26 (FIG. 3) which extend between the side plates 22 of the machine and carry a relatively massive weight 27 at the opposite end. The levers embody spring buffers 28 resting on the base plate 21 of the machine in the inoperative position of the article support 23 as shown for example in FIG. 3.

Intermediately of the levers 26 and preferably comparatively close to the pivot 25 is a pivot pin 29 pivotally interconnecting the levers 26 and a further lever 30 pivoted at 31 between the side plates 22. The other end of the lever 30 carries a follower roller 32 engageable by a cam 33 on a main shaft 34.

The main shaft 34 is driven by an electric motor 35 through suitable reduction gearing indicated at 36, the final drive being by means of a gear wheel 37 on the outer side of the main frame 22.

As shown in FIGS. 1 and 5 the article support is pivotally connected to a U-shaped latch arm 38 having an L-shaped slot 39 co-operating with a fixed pin 40 secured to one side frame member 22. The pin 40 also supports an actuator slide 41 which is slotted as indicated at 46 (FIG. 6) to permit the actuator slide 41 to come into operative engagement with a switch 42, which may be a micro switch, for starting and stopping the motor 35. The latch arm 38 is provided with an inturned flanged edge part 43 (FIG. 2) which, when the article support 23 is moved inwardly from the loading position shown in FIG. 1 to the pressing position shown in FIG. 3 (in chain-dot lines) and in FIG. 6 presses against the end face of the actuator slide 41 and moves the latter into operative engagement with the switch 42 to start the motor 35.

The U-shaped latch arm 38 is subjected to the action of a pull-down spring 44 and is provided with a depending nose 45 which, in the starting position shown in FIG. 6, engages a pin 47 on the gear wheel 37 and thus initially holds the forward end of the latch arm 38 in the uppermost position shown in full lines in FIG. 6. However, immediately after the article support 23 has been moved to the inward position shown in FIG. 6 the motor 35 will normally be started by the closing of switch 42 and the gear wheel 37 then rotates in the counter-clockwise direction as seen in FIGS. 1, 3, 4 and 6 so that the pin 47 disengages from the nose part 45 and allows the latch arm 38 to drop so that the nearly vertical part of the slot 39 drops on to the pin 40 thus locking the article support 23 in the vertical position of FIG. 6. If, however, the motor 35 has not been started for any reason, locking upon the pin 40 does not occur so that the article support 23 can be moved to its forwardly pivoted position.

Operation of the motor continues since the actuator slide 41 is held in its switch-operating position by the engagement of the flange 43 against the slide 41. The motor continues to operate for one complete marking cycle represented by one revolution of the gear wheel 37 and of the main shaft 34. Towards the end of this revolution the pin 47 engages a depending lug part 49 of the actuator slide 41 and lifts the end part of said slide out of engagement with the switch 42 so that the motor stops at about the same moment that the pin 47 again engages the nose part 45 to lift the latch arm 38 to disengage it from the pin 40, permitting the article support 23 to move to its inclined position as shown in FIG. 1. Towards the end of this return movement a projecting portion 50 of the latch arm 38 engages a lug portion 51 of the actuating slide 41 and returns it to its starting position ready for the next operation of the machine and permits the actuator slide 41 to return to its down position shown in FIG. 1 without further actuating the switch 42.

The means provided according to the invention for forming tabs and for positioning the formed tabs over an article applied to the article support 23 when the latter is moved to the vertical pressing position, are shown in FIG. 6. The tabs so formed are fed to the marking position by means of a gripper 55 comprising relatively movable jaws. This gripper is movable through an angle of approximately 90° from the tab receiving and marking position *a* to a tab-applying position *b* both indicated in FIG. 2. In the normal inoperative position of the machine the gripper 55 (FIGURES 1 and 7) is located at an intermediate position approximately as shown in FIG. 2 and is then moved first in the counter-clockwise direction to the tab receiving and marking position *a* and then swung through 90° to the tab applying position *b*. This gripper is rotatable on a vertical rod 56 and operated by an axially movable connector rod 57 by spring transmission means from a projecting arm 58 forming part of a lever 59 pivoted to one side frame 22 at 60, and lying between the gear wheel 37 and the frame 22. In FIG. 1 the lever 59 is shown in full lines in its normal intermediate position corresponding to the intermediate position of the gripper shown also in full lines in FIG. 2. The lever 59 is connected to a projecting arm 61 lying on the outer side of gear wheel 37, and which is shaped for co-operation with a pin 62 projecting from the outer face of the gear wheel 37, said cam being shaped so that when the motor is started the pin 62 presses the arm 61 in the downward direction so that the arm 58 moves the connecting rod 57 towards the right-hand side of FIG. 1 to move the gripper 55 to the position *a* to pick up a tab. As the pin 62 moves away from the arm 61 the pin 47 on the opposite side of the gear wheel 37 engages a side face part of the lever 59 and moves this reversely through to the end alternative position shown in chain double dot lines to actuate the gripper 55 to transfer the formed and marked tab to the position *b* in FIG. 2.

The construction of the gripper 55 is also shown on FIG. 3 of the drawings: it comprises upper and lower jaw members the lower jaw being pivotally mounted at 64 and engaged by the flanged head of a sleeve 65 slidable but not rotatable upon the rod 56 upon which the whole gripper 55 rotates when actuated by the connector rod 57. The sleeve 65 is guided at its lower end by a projecting plate 66 having a depending blade 67 fitting within a groove 68 of the main shaft 34, thus preventing rotation of the sleeve 65 while permitting vertical movement by the engagement of a cam element 69 on the main shaft with the plate 66. These means provide for the opening and closing of the jaws of gripper 55 as and when required.

The operation of the tab forming mechanism will now be described with reference to FIGS. 8 to 10. A strip 71 of tab-forming material is supplied from a suitable

storage reel 72 (FIGURE 5) mounted on the other side frame 22 of the machine and is fed over a guide unit 73 housing a serrated feed wheel 74 operated step-by-step on each operation of the machine by means of a feeder bar 75 having a lug 76 which engages successive driving pins 77 on the wheel 74. A suitable spring operated presser wheel 78 is arranged above the feed wheel 74 to provide counter pressure to ensure the feed of the strip 71 on each operation of the machine. The feeder bar 75 is rotatable upon a crank pin 70 on a cam disc 79 carried by the main shaft 34 so that on each operation of the machine the feed wheel 74 delivers (feed position in FIG. 8) a tab-forming length of the strip 71 into a guide member 80 pivotally mounted on the end of a lever 81 pivoted at 82 to one side frame 22 of the machine. During the feed motion of the strip 71 (FIG. 8) the guide member 80 is displaced relatively to the lever 81 by means of a projecting arm portion 84 depending from the guide 80 which engages a pin 85 on the outer side of an arm 86 fixed to the main shaft 34. Due to the pivoting motion of the guide member 80 the projecting tip part 711 of the strip 71 is located beneath a presser bar 87, this presser bar being formed by a bent end part of a spring blade member 88 extending along the leading edge of the lever 81.

After the new length of strip 71 has been projected so that the tip part 711 lies beneath the presser bar 87, the guide member 80 pivots on the lever 81, due to the rotation of the shaft 34 and the movement of the pin 85, and reaches the position shown in FIG. 9 so that the presser bar 87 serves to bend the leading tip part 711 downwardly at right angles to the length of the strip. On continuing movement of the main shaft 34 the pin 85 on the arm 86 engages a cam surface 91 associated with the lever 81 to move the latter to the position shown in FIG. 10 where a fixed projection 92 engages the spring 88 to cause the presser bar 87 to complete the folding under of the tip part 711 to form the finished tab. On first operation of the gripper 55, the finished tab held by the guide 80 is engaged by the gripper and is then ready to receive a printed marking. Before the lever 81 commences to move from the position in FIGS. 8 and 9 the tab-forming length of strip 71 is severed from the strip by means of a pivoted cutter 94 which is shown in FIG. 10 at the end of its cutting stroke. Actuation of the cutter 94 is performed from the main shaft 34 by engagement of the pin 90 on the opposite face of the arm 86 to the pin 85, with the cam-like edge of a rocker plate 95 pivoted on a pin 96 on the main frame 22. This rocker plate 95 is linked by pivot 97 to a vertical slide bar 98 operating the cutter 94. The rocker plate 95 is also attached to a U-shaped member 99 (as seen in FIG. 2) linked to vertical push-rod 100 serving to operate the print unit P.

The print unit P serves for marking identification numerals on the tab or label held by the gripper 55. Such unit comprises a number of type means for printing identification characters on the tab or label. The act of printing is performed by a platen member 101 and it will be seen that the operation of the guide 80 to the position shown in FIG. 10 brings the tab or label to a position over the platen 101 where it is engaged by the gripper 55. During the operating cycle of the machine a previously formed tab or label has been transferred from the guide 80 to the gripper 55 and held by the latter over the platen 101 after the guide 80 has returned to the FIG. 8 position.

At the commencement of the tab applying cycle a sharp upward movement is applied to the platen 101 to perform the printing operation. As shown in FIGS. 5 and 7 the platen 101 is carried by a vertically movable strip 102 subjected to the action of a spring 103 and pivotally connected to a lever 104 controlled by the engagement of a pin 106 with the cam 79 on the main shaft 34. Prior to the printing motion the cam 79 depresses the lever

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104 and the strip 102 thus compressing the spring 103 and when the pin 106 passes off the peak of the cam 105 the spring 103 becomes operative to force the strip 102 and the platen 101 upwardly with a hammer-like action to print a marking from the type faces of the print unit P on the tab or label carried by the gripper 55 thus marking a clear impression on the tab. After the printing operation a circular portion of the cam 105 holds the platen 101 in an intermediate position such as is shown in FIG. 5.

In operation of the machine as described so far it may be assumed that the parts are in the starting position shown in FIGS. 1 to 3, the gripper 55 is in an intermediate position and the tab-forming mechanism is in the starting position shown in FIG. 5, a length of tab strip 71 being already severed. An article to be marked is placed on the support 23 and the latter is pressed inwardly to the chain-dot line position shown in FIG. 3 thus starting the motor 35 and initiating one complete revolution of the main shaft 34. After a short interval the cam 33 on the main shaft depresses the roller 32 and lifts the article support 23 which is already latched in the vertical position by engagement of the nearly vertical section of the slot 39 on the pin 40. Initially the right-hand end of the lever 26 is raised to press the article and the tab or label positioned thereover into engagement with a heated fixed platen 120 supported between the side frame members 22. When operative engagement with the platen has been effected the continuing lift action of the cam 33 is transmitted through the lever 26 to the weight 27 so that the latter becomes operative to provide the effective upward pressure on the article support 23, the position of the parts at this time being indicated on FIG. 4. It will be appreciated that the cam 33 has a circular face portion the dimensions of which control the period for which pressure is maintained upon the article and the tab or label, it being assumed that the motor 35 and the main shaft 34 operate at constant speed.

Dealing now with the operation of the tab forming and feed mechanism, it will be seen that at the commencement of the operating cycle the guide 80 was in the position shown in FIGS. 5 and 9 and is then actuated to complete the formation of the tab and to position it over the platen 101 where it is engaged by the gripper 55 and thereafter the guide 80 returns to its starting position and the commencement of the formation of the next tab is initiated as shown in FIG. 8. The preceding tab now held by the gripper 55 receives a printed impression by the operation of the platen 101 and thereafter by the partial rotary movement of the gripper 55 the marked tab is brought to a position overlying the article fed into the marking position by the article support 23, these various operations being performed at the same time as the article is being brought into the marking position and before the support 23 is raised by the cam 33. The gripper 55 holds the folded-under end part 711 of the tab clear of the presser face 24 and due to this fact and to the fact the folded under end part of the strip is incapable of adhering to the article a non-adherent finger grip is thereby formed. On completion of the marking and tab-applying cycle the article support 23 is released and this moves to its starting position shown in FIGS. 1 to 3 ready for the next marking cycle and the gripper 55 returns to its intermediate starting position.

The print unit P embodies a cut-off arm 107 which is actuated on completion of the printing of the tab or labels for a series of articles. The cut-off arm 107 is adapted to disable the machine by preventing further operation of the motor 35. This may be performed by a separate switch connected in series with the switch 42 or conveniently and as shown the cut-off arm 107 extends through a slot in the side frame members 22 and is linked through a tension spring 108 to the actuator slide 41 so that after printing the last tab or label the

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slide 41 is lifted and is thus made inoperative when the article support 23 is moved inwardly.

It may be desirable to arrange for the print unit P to print an identification marking on the customer's receipt or token and for this purpose a hand-operating member may be provided for the platen 101 and arranged so that this printing does not actuate the batch register. This hand actuator may embody a cam device and depresses the plate 102 to compress the spring 103 and then releases it to perform the printing operation, these operations being performed independently of the cam 79.

In some cases it may be desirable to vary the operative pressing time and/or the effective pressure in order to adapt the machine for applying tabs or labels to widely varying types of article to be marked. For this purpose an externally operable control knob or dial may be provided which is adapted either to displace the weight 27 on the lever arms 26 so as to vary the pressure, and/or alternative cams 33 may be brought into operation so as to vary the pressing time. In many cases the adjustment may vary both factors, i.e. the operative pressure and the pressing time, simultaneously, and the operating means may be calibrated with markings representing the different types of article which may be marked.

What we claim is:

1. Mechanism for forming heat sealable tabs for attachment to textile articles, comprising a displaceable tubular guide, means to feed a strip of tab-forming material having one adhesive face through said guide from one end so as to project beyond the other end of said guide, a deflector member positioned adjacent the said other end of said guide, deflector moving means for imparting transverse relative displacement between said deflector member and said guide so as to bend the projecting part of the strip at an angle to the length of the strip remaining within said guide, means to sever a tab-forming length of strip from the length of said strip and means to displace the guide together with the deflector member from a first position to a second position, said deflector moving means including means to effect movement of the deflector member relatively to the guide in a direction parallel to the length of the strip so as to effect folding under of the projecting part of the strip with the adhesive face portions in mutual contact to produce a tab with a non-adherent finger grip portion incapable of adhering to an article to which the tab is applied.

2. Mechanism for forming and feeding heat sealable tabs for attachment to textile articles, comprising a pivotally movable guide, means to feed a strip of tab-forming material having one adhesive face through said guide from one end so as to project beyond the other end of said guide, a deflector member positioned adjacent the said other end of said guide, means to impart pivotal movement to said guide deflector moving means for moving said deflector across the path of said strip to bend the projecting part of the strip, means to sever a tab-forming length of strip from the length of said strip and means to displace the guide bodily together with the deflector member from a first position to a second position, said deflector moving means including means for effecting movement of the deflector member relatively to the guide in a direction parallel to the length of the strip so as to effect folding under of the projecting part of the strip with the adhesive face portions in mutual contact to produce a tab with a non-adherent finger grip portion incapable of adhering to an article to which the tab is applied and transfer means engageable with the folded under projecting part of the tab to transfer the tab to a third position where it is applied in contact with the article to be marked.

3. Tab-forming mechanism as claimed in claim 1 wherein the guide is pivotally mounted upon a lever carrying the deflector member, said deflector member being springily mounted on the lever, and comprising operating

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means to position the guide to receive the leading end of a strip of tab material received in said guide and projecting forwardly therefrom with the deflector member positioned above the projecting leading end of the strip received within said guide, means to effect pivotal movement of the guide relatively to the lever so as to effect initial downward bending of the leading end of the strip by co-operation with the deflector member, means thereafter to effect rotary displacement of the lever together with the guide to effect transfer of the severed tab length within the guide to a position in which the deflector member is yieldingly deflected beneath the guide to effect folding of the leading end of the tab in U-formation for engagement by the transfer member after which the lever returns to its first position, and a tab transfer member for gripping and feeding the tab.

4. Tab-forming mechanism as claimed in claim 1 further comprising a tab strip feeder means to project a tab-forming length of strip into the guide, said tab feeder means including tab strip severing means to cut off a predetermined length of strip material after the tab length has been inserted into the guide.

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5. Tab-forming mechanism according to claim 3 further comprising means to displace the lever from a first position receiving a tab-forming length of strip material there-after severed from the supply strip, to a second position where completion of the folding of the leading edge of the strip and transfer thereof to the transfer member is effected, after which the lever and guide return to the first position, printing means operative upon the tab to print an identification and means to actuate the transfer member to position the marked tab over an article to receive the marked tab.

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