Aug. 23, 1949. C. W. ADSHEAD 2,479,891

MACHINE FOR APPLYING HEAT-SEALING OR OTHER ADHESIVE TABS OR LABELS TO FABRIC AND THE LIKE

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Fig. 1.

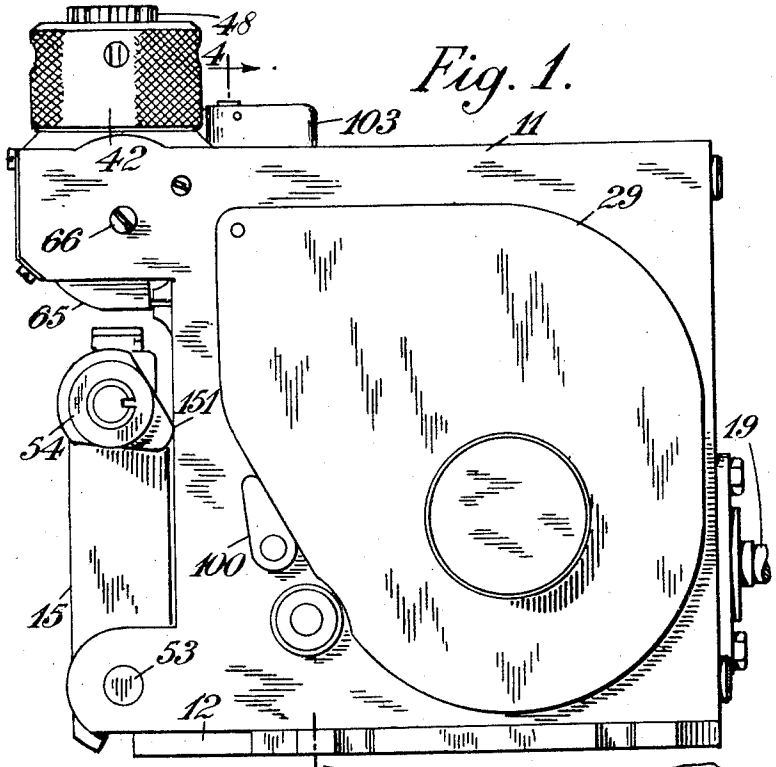
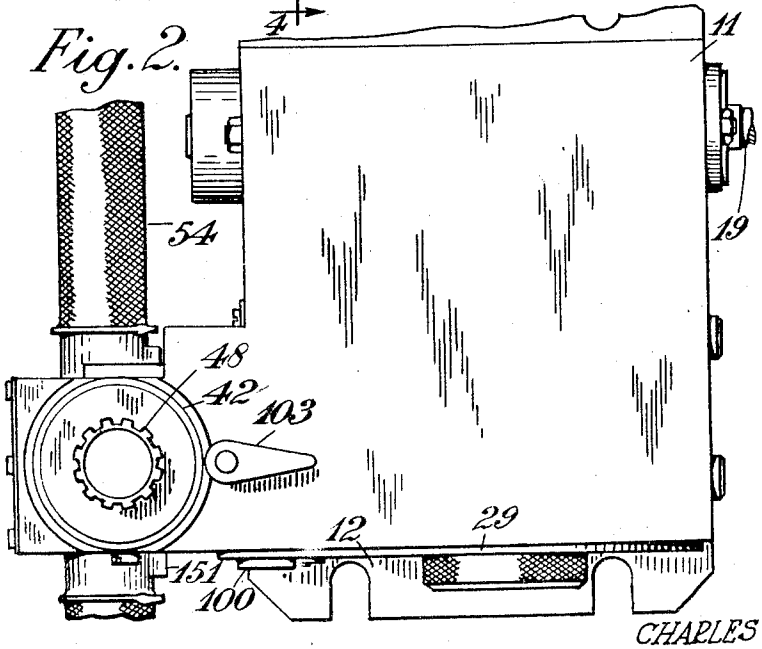


Fig. 2.



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Fig. 3.

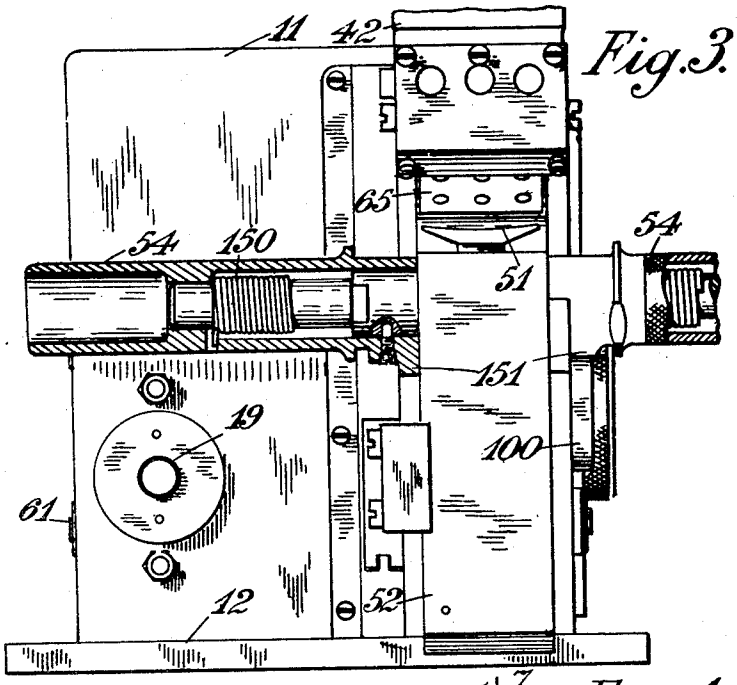
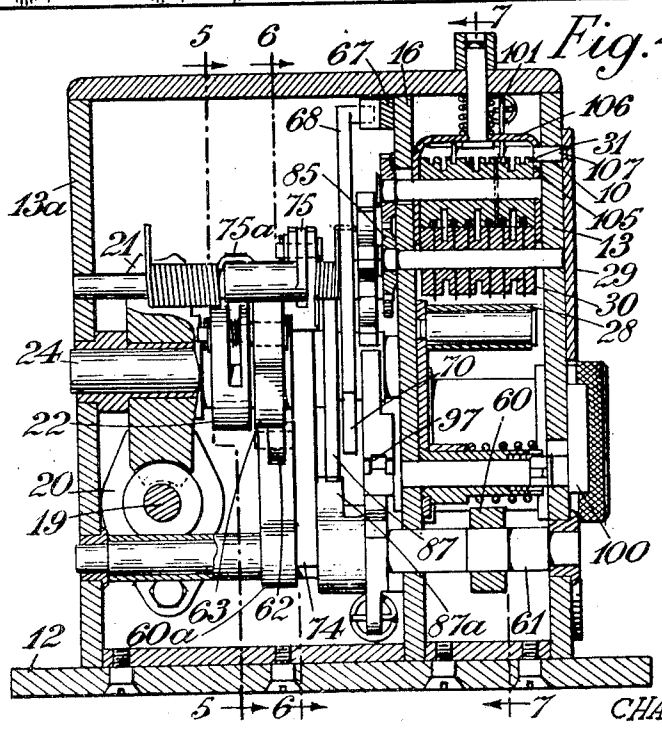


Fig. 4.



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Fig. 5.

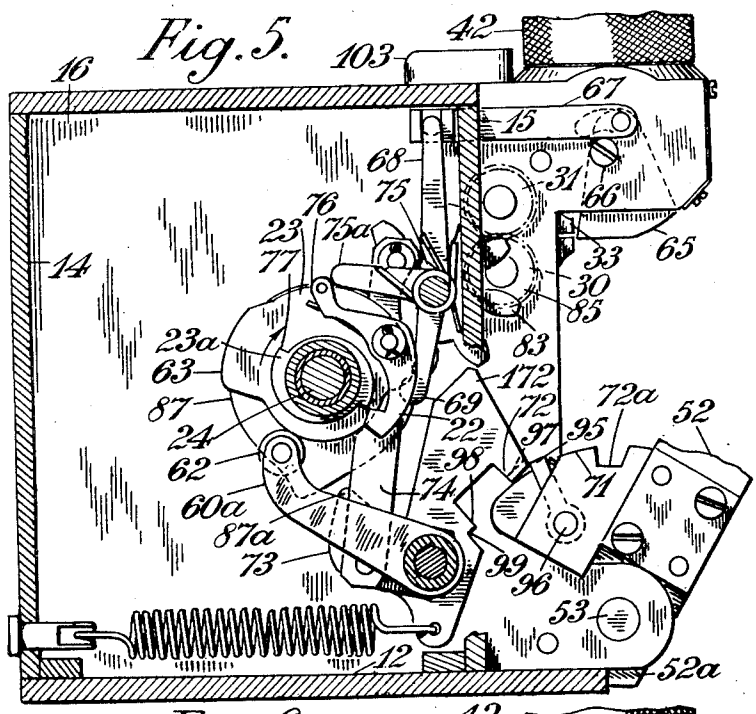
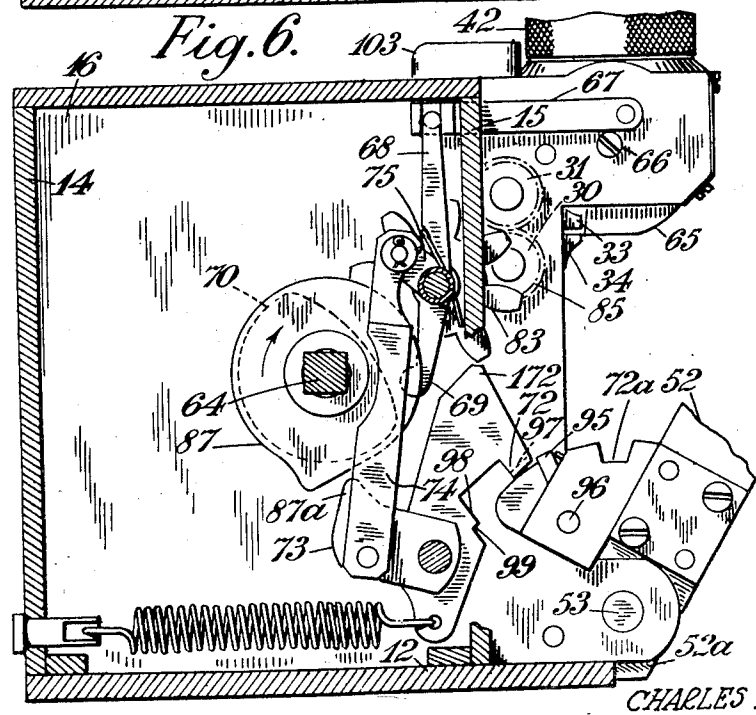


Fig. 6.



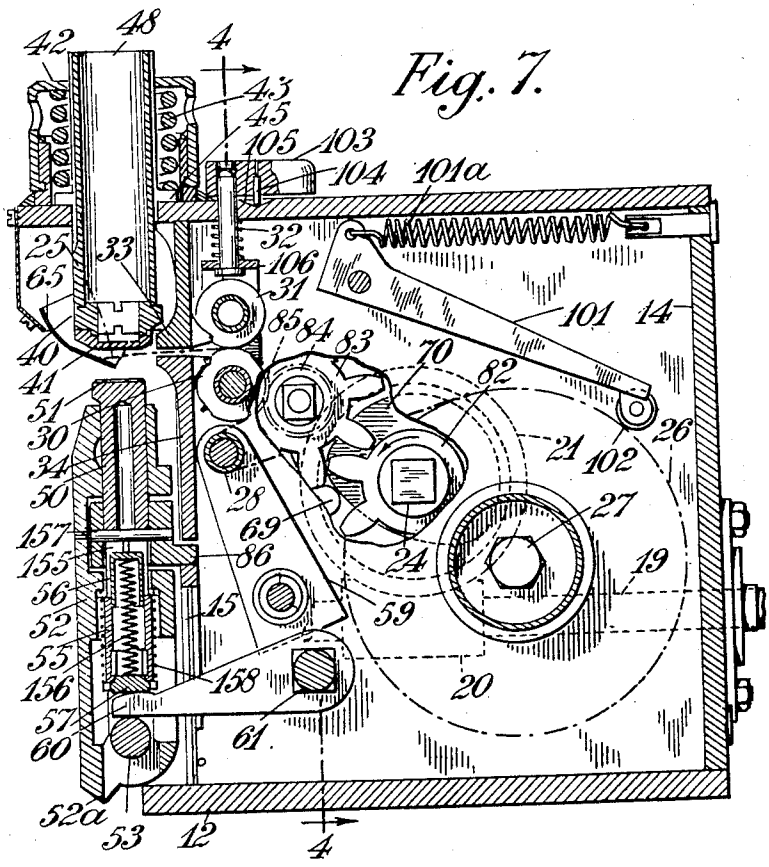
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Fig. 7.



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UNITED STATES PATENT OFFICE

2,479,891

MACHINE FOR APPLYING HEAT-SEALING OR OTHER ADHESIVE TABS OR LABELS TO FABRIC AND THE LIKE

Charles William Adshead, London, England, assignor of one-third to Chambon Limited, London, England, a British company, and one-third to Lakeland Laundries Holdings Limited, Barrow-in-Furness, Lancashire, England

Application July 29, 1947, Serial No. 764,372
In Great Britain June 13, 1946

Section 1, Public Law 690, August 8, 1946
Patent expires June 13, 1966

13 Claims. (Cl. 216—33)

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This invention relates to improvements in machines for applying heat-sealing or other adhesive tabs or labels to fabric and the like and deals particularly with the case in which the adhesive tabs form detachable units of a web on a reel or spool.

There is already in use a type of adhesive tab which is of particular service in laundry, dyeing and cleaning processes because the adhesive tab is heat-sealable to fabric, is not removed by such processes, and can be supplied in a web on a reel having transverse perforations or like easy-tearing lines to facilitate detachment of the successive tabs from such web.

The object of this invention is to provide a machine for applying tabs of the type indicated to fabric articles such as are sent to laundries, dye-works, cleaners, and the like.

This invention consists in a machine for applying adhesive tabs (from a web) to fabric which machine comprises two cooperating pressure members to receive fabric and tab between them, means for heating the tab while between the pressure members, two web-clamping jaws, means for feeding the web of tabs one tab length at a time between the jaws when open, means for closing the jaws to grip the web at, or closely behind, the trailing edge of the leading tab, means for bringing the cooperating pressure members together to grip tab and fabric together and means for subsequently effecting relative movement between the pressure members and the jaws in a direction to stretch the web and thereby to tear the leading tab from the web.

The pressure members may comprise two coaxial plungers of which one is axially movable to apply clamping pressure and the other is axially movable under resilient resistance under pressure from the first plunger thereby to effect the aforesaid relative movement between the pressure members and the jaws.

The invention includes the more specific form of such a machine in which the pressure plunger which is movable under resilient resistance is constrained for movement along a fixed axis and is provided with heating means, while the other cooperating plunger is slidable axially in a frame or buck pivoted on an axis transverse to the plunger axis so that the buck can move to take the contact face of its plunger away from the pressure axis to facilitate application of a fabric article thereto.

In a preferred form of the invention a machine for applying adhesive tabs (from a web) to fabric comprises two cooperating pressure plungers

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to receive fabric and tab between them, two web-jaws which can be brought together or separated in a direction substantially parallel with the axis of the pressure plungers, means for controlling the feeding of the web of tabs between the jaws when open, means for closing the jaws to grip the web at or close to the trailing edge of the leading tab, means firstly for bringing the cooperating pressure plungers together to grip tab and fabric between them in register with the edges of the jaws, and means secondly for effecting relative axial movement between the cooperating plungers and the said jaws to detach the leading tab from the web.

One or both of the cooperating plungers may be provided near its contact face with electric heating elements.

When a leading tab is fed out between the jaws it may be temporarily received on a pivoted shield or guard so that when a fabric article has been applied to the buck and brought into the pressure axis, the pivoted shield may be (automatically) swung out of the path of the plungers leaving the leading tab on the fabric.

The intermittent feed of the web (one tab-length at a time), the closing and opening of the web jaws, the removal or re-introduction of the shield or guard and the two-stage operation of the pressure plungers may all be effected automatically and in proper timed relationship through a main shaft and a clutch the engagement of which is initiated by the operator.

A specific embodiment of a machine according to the invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a side view of the machine,

Figure 2 is a plan view of the machine,

Figure 3 is a front view, partly in section, showing the parts of the machine in the stop position ready for the buck to swing forward for insertion of a new garment,

Figure 4 is a section on the line 4—4 in Figures 1 and 7 also showing the parts in the stop position,

Figure 5 is a section on the line 5—5 in Figure 4 with the buck swung out,

Figure 6 is a section on the line 6—6 in Figure 4 also with the buck swung out and

Figure 7 is a section on the line 7—7 in Figure 4 but showing the parts at the end of the feeding of a tab.

The machine forming the subject of this example has a casing 11 providing a main frame

12 with side walls 13, 13a, a back wall 14, a front wall 15 and a partition 16.

The drive may take any convenient form (e. g. an electric motor attached to the casing) but conveniently comprises a chain drive from an external motor to a chain wheel on shaft 19 journalled in back plate 14 and carrying worm 20 actuating worm-wheel 21 which (as described below) is coupled at appropriate times (by clutch 22 carried on the face of cam 23 engaging dogs 23a) to the main shaft 24 journalled in side walls 13.

The web of tabs 25 is carried on a supply reel 26 positioned in the compartment between the partition 16 and the side wall 13 and carried on a fixed axle 27 secured to the partition. A detachable cover 29 on the casing provides access to the supply reel. The web 25 tensioned by a roller 28 carried on a spring-urged pivoted arm 59 is fed around pin-wheel 30, supported in fixed bearings in the partition and side wall 13. A roller 31 supported in bearings in a yoke 106 is urged downwardly by spring 32 to maintain the web in contact with the pin-wheel 30. The pin-wheel 30 and roller 31 pass the leading tab through between two horizontal tab-holding jaws, the upper jaw 33 fixed to front wall 15 and the lower jaw 34 being slightly movable vertically in guides on the front wall to open or close the jaws. The jaws 33 and 34 may have appropriate heat insulation and may be provided with gripping surfaces.

An important part of the machine lies in the cooperating pressure plungers whose functions are to press the leading tab on to a fabric article, to heat-seal them and to tear or detach the leading tab from the stationary part of the web. The upper plunger 40 (having slightly convex contact face 41 at its lower end) is vertically movable through a short distance in guides 42 fixed to the front wall 15. The upper plunger 40 is normally pressed downwardly by strong helical spring 43. The downward movement of the plunger 40 is limited by collar 45 engaging the top of the casing. Behind the contact face 41, inside the upper plunger 40, is an electric heating element not shown. This element may be of any convenient known suitable type and is preferably provided with a thermostatic control to limit the temperature reached by the contact face 41 to that required to seal the tabs (e. g. 340° F.). The electrical connection to the element may be made by means of a plug and socket situated at the upper end 48 of the plunger 40.

The lower plunger 50 has a concave contact face 51 at its upper end and is axially slidable in a frame or buck 52 which is pivoted at its lower end on a transverse axle 53 journalled in the casing so that the buck can swing forwardly towards the operator to receive a garment or fabric article (laid over the top of the buck 50 and particularly over the contact face 51). The buck 50 has two handle bars 54 by which the buck may be swung towards and away from the operator and which in this example are slightly rotatable on their own axes in the buck against the return of springs 150. Each handle has a cam 151 adapted to abut against the front wall 15 and the arrangement is such that both handles must be rotated against their springs 150 to rotate the cams into the position shown in Figure 1 before the buck can be swung inwardly into operative position as shown in that figure. This ensures that both of the operator's hands are clear of the moving parts of the machine when it is put into operation.

The lower plunger 50 at its lower part takes the form of a hollow sleeve 55 slotted at 155 embracing a cylindrical or rectangular piston 56 spring urged upwardly in relation to the plunger by a spring 156 engaging a plug 57 in the lower end of the sleeve 55. A spring 158 urges the sleeve 55 downwardly. The sleeve 55 and plunger 50 are actuated (pressed upwards) by the forward end of two-part lever 60, secured to a rocking shaft 61 journalled in the side walls 13, 13a. A lever 60a also secured to the rocking shaft 61 carries a tappet roll 62 engaging a cam 63 on the main shaft 24 and the cam has two main positive functions. When the main shaft 24 rotates the cam 63 rocks the shaft 61 and levers 60, 60a to raise the plunger 50 (carrying the fabric) until the fabric meets the leading tab and thus the fabric and tab are together pressed against upper plunger face 41. Then after a slight pause to allow the tab to become heated, the plunger 50 makes a further short upward movement this time pushing up the upper plunger 40 against the action of the strong compression spring 43 and at the same time tearing the heated tab away from the standing part of the web 25 which is gripped between jaws 33 and 34.

To receive a leading tab when fed out between the jaws 33 and 34, to prevent buckling of said tab and to lay said leading tab smoothly on the fabric covering the contact face 51 of plunger 50 when raised, an arcuate shield 65 (on axle 66 pivoted in side wall 13 and partition 16) is held in the position shown in Figure 1, while said leading tab is being fed out; but as the plunger face 51 rises, the arcuate shield 65 is swung forward away from the axis of the plungers 40 and 50 through the intermediate position shown in Figure 7. The actuation of the shield 65 is effected by link 67, pivoted lever 68, tappet 69 and cam 70 on main shaft 24.

Before describing the timing gear, it will assist the description to specify the successive operations. Assuming the main shaft is at rest and the buck 52 free, the buck is swung outward into a position convenient for the application of a fabric article over its upper end or at least over the contact face 51 of the plunger. Then the handles are rotated and the buck is swung into the upright position shown in Figures 1 and 7. The jaw 34 being down, the leading tab is fed out, then the jaw 34 is raised as the plunger 50 is raised, shield 65 swung away, fabric and tab pressed together with a light pressure, say 15 lb./in.^{2} against contact face 41 which is continuously heated. Then after a short dwell (say 3 seconds) the plunger 50 is pushed up a short distance applying a high pressure (say 70–90 lb./in.^{2}) to fabric and tab: the tab is thus detached from the standing part of the web held in the jaws 33, 34. Thereafter all the parts are restored to their original positions (or freedoms) and the buck 52 is automatically swung outward again.

Dealing with the mechanism, when the buck 52 is pushed inwardly the quadrant 71 moves under the latch 72 until the latch falls into the notch 72a. This allows the rearward extension 73 of the latch 72 to rise slightly, thereby raising link 74 and rocking the two-part lever 75, 75a which lifts the part 75a clear of the tail 76 of the clutch 22 and allows the clutch to make clutching engagement with teeth 77 attached to the worm wheel 21 and putting the main shaft 24 into rotation.

The main shaft 24 carries a wheel 82 having

two teeth which engage the pinion **83** having eight teeth. This pinion **83** is geared through pinions **84** and **85** with pin-wheel **30** and feed roller **31** for the web of tabs. The pin-wheel **30** by its one quarter of a revolution feeds the web **25** forward by one tab-length out of the jaws **33** and **34** immediately above shield **65**. The current is switched on to the heating element at any appropriate time before use. By the rotation of shaft **24** the tappet roller **62** and levers **60**, **60***a* raise the plunger **50** till contact face **51** presses the fabric and tab against upper plunger face **41** with a slight pressure and in proper timed relation the abutment **86** projecting back from plunger **50** and urged by the spring **156** picks up the movable jaw **54** and presses it upwards to grip the web **25** just at or closely behind the perforated trailing edge of the leading tab. The cam **63** is so shaped as to give a short dwell to contact face **51** while the heat-sealing of the tab to fabric takes place and then the cam **63** provides for the further slight (and rather quick) raising of contact face **51**, tearing off the tab and giving the final pressure between fabric and tab. This additional raising of the contact face takes place relative to the jaw **34**, the relative movement being permitted by the pin **157** sliding in the slot **155**. After a very short interval the plunger **50** is lowered, and the latch **72** is raised by the action of cam **87** engaging the surface **87***a* on the rearward extension **73** of the latch. The downward movement of the extension **73** lowers the arm **75***a* into the path of the tail **76** which knocks the clutch **22** out of engagement. The buck **52** is now free to swing outwards until the dog **52***a* engages the end of the base of the casing as shown in Figures 5 and 6.

To prevent the possibility of feeding further tabs before a new fabric is put in position, a simple device is provided to stop operation of the machine after applying one label until the buck has been swung at least a short distance forward and returned. This device is illustrated in Figures 5 and 6 and comprises a latch **95** pivoted at **96** to the quadrant **71** and spring-urged to the left as viewed in Figures 5 and 6. The latch **95** passes through a slot **97** (Figure 4) in the latch **72** during the inward movement of the buck until it abuts against the face **98** and is held against that face by the spring during the remainder of the inward movement of the buck. When the latch **72** is raised by the cam **87** at the end of each operation of the machine the latch **95** moves, under the action of the spring, under the ledge **99** and prevents the latch **72** dropping into the notch **72***a* unless and until the latch **95** has been withdrawn from under the ledge by a substantial outward movement of the buck.

When it is desired to replace an empty tape reel **26** by a full one the cover **29** is removed and the arm **59** carrying the tensioning roller **28** is swung in the clockwise direction (Figure 7) by means of a handle **100** on the outside of the casing. It will be noted that the cover cannot be replaced until the handle has been returned to the operative position as shown. The brake lever **101**, which has a roller **102** engaging the tape on the reel and of which the purpose is to prevent over-running of the reel, is then lifted off the reel against the action of its spring **101***a* and the reel is taken off the axle **27**. A fresh reel may now be inserted and the brake roller allowed to fall on to the tape. The tape is then threaded over the roller **28** and the pin wheel **30** with the pins of the latter engaged by a transverse row of perforations in the tape marking the end of the leading tab. To facilitate the threading of the tape over the pin wheel the roller **31** may be lifted by rotation of a short handle **103** having a pin **104** which rides up the side of a depression **105** on the top of the casing. This lifts the bridge **106** and the roller **31**. The upward movement of the bridge lifts a hole **105** in the bridge out of register with a hole in the side plate **13** so that replacement of the cover **29** is prevented by a pin **107** carried by the cover; in this way warning is given if the bridge has not been lowered after replacement of the reel.

As a precaution against misplacement of the gear wheel **83** (e. g. during insertion of a tape reel) the latch **72** has an upward extension **172** which fits between adjacent teeth on the wheel **83** when the latch is raised. A leaf spring detent (not shown) may also engage between the teeth to ensure that the wheel **83** is properly presented for engagement by the wheel **82**.

The machine may be modified in various ways without departing from the invention. For example, instead of tearing off the tab, a cutter or guillotine may detach it from the web (even though perforations are provided in the web for engagement by the pin wheel and registration purposes). One particular mechanism for starting and stopping has been shown but other devices may be substituted: for example, a solenoid may actuate the starting and/or stopping and the handle bars may control an electric switch. Alternatively, the starting may be by foot pedal, knee or elbow switches, thumb presses, photo-electric cells or by actual pressure of the fabric on a light starting lever. The invention includes a machine in which no swinging buck is used, i. e. where the lower plunger moves only on a vertical axis and in that case the fabric or the like would be inserted immediately above the contact face of the lower plunger.

I claim:

1. A machine for applying adhesive tabs (from a web) to fabric, which machine comprises two co-axial pressure plungers to receive fabric and tab between them, two web-clamping jaws, means for feeding the web of tabs, one tab length at a time between the jaws when open, means for closing the jaws to grip the web behind the trailing edge of the leading web, supporting means for one of the plungers arranged to permit axial movement of the plunger under resilient resistance, means for causing axial movement of the other plunger to bring the two plungers together to grip tab and fabric and subsequently to move the two plungers together against the aforesaid resilient resistance and while gripping tab and fabric thereby to tear the leading tab from the web.

2. A machine as claimed in claim 1 in which the pressure plunger which is movable under resilient resistance is constrained for movement along a fixed axis and is provided with heating means and which machine includes a frame pivoted on an axis transverse to the plunger axis and constituting supporting guides for the other plunger permitting axial movement of the plunger; the frame being movable about its pivotal axis to take the contact face of its plunger away from the pressure axis to facilitate application of a fabric to the contact face.

3. A machine as claimed in claim 1 and including an electric heating element within the plunger movable against resilient resistance and arranged to heat the operating face thereof.

4. A machine for applying adhesive tabs from a web to fabric which machine comprises two co-operating pressure members to receive fabric and tab between them, two web-clamping jaws, means for feeding the web of tabs one tab length at a time between the jaws when open, and into position between the pressure members, means for closing the jaws to grip the web closely behind the trailing edge of the leading tab, means for supporting the leading tab beyond the jaws, means for removing the tab support when the fabric is positioned between the pressure members for reception of the tab, means for bringing the pressure members together to grip tab and fabric together and means for subsequently effecting relative movement between the pressure members and the jaws in a direction to stretch the web and thereby to tear the leading tab from the web.

5. A machine as claimed in claim 4 in which the aforesaid tab support comprises a pivoted shield.

6. A machine for applying adhesive tabs from a web to fabric which machine comprises two co-operating co-axial pressure plungers to receive fabric and tab between them, means for heating one of the pressure plungers, a buck supporting the other pressure plunger and pivoted for movement about an axis transverse to the axis of the pressure plungers to move the plunger into and out of the common axis of the plungers, two web-clamping jaws, means for feeding the web of tabs one tab length at a time between the jaws when open, means for closing the jaws to grip the web behind the trailing edge of the leading tab and for subsequently re-opening the jaws, means for bringing the co-operating pressure plungers together to grip tab and fabric together, means for effecting relative movement between the plungers and the jaws in a direction to stretch the web and thereby to tear the leading tab from the web, means for subsequently separating the plungers, driving means for operating in proper timed relationship the web feeding means, the jaw closing means, the two-stage operation and subsequent separation of the pressure plungers and control means for the driving means operable automatically to put the driving means into effect on movement of the buck to move the plunger into the common plunger axis.

7. A machine as claimed in claim 6 in which the control means include a clutch which is engaged by the movement of the buck into the pressure axis.

8. A machine as claimed in claim 6 and including a pivoted shield for supporting the leading tab between the pressure plungers, and means operated by the driving means controlled as aforesaid for swinging the shield out of the path of the plungers when the fabric is in position to leave the leading tab on the fabric.

9. A machine for applying adhesive tabs from a web to fabric which machine comprises two co-operating pressure members to receive fabric and tab between them, one of which members is a plunger arranged for axial movement towards and away from the other member to apply pressure to the fabric and tab, a carrier pivoted on an axis transverse to the plunger axis and carrying one of the pressure members, the carrier being movable about its pivotal axis to take the contact face of its pressure member away from the pressure axis to facilitate application of a fabric to the pressure face, means for heating the tab while between the pressure members, two web clamping jaws, means for feeding the web of tabs one tab length at a time between the jaws when open into position for application to the fabric by the pressure members, means for closing the jaws to grip the web behind the trailing edge of the leading tab, means for effecting axial movement of the plunger to bring the pressure members together to grip tab and fabric together and means for subsequently effecting relative movement between the pressure members and the jaws in a direction to stretch the web and thereby to tear the leading tab from the web.

10. A machine as claimed in claim 9 in which the axially movable plunger is carried by the carrier.

11. A machine as claimed in claim 10 in which the other pressure member is provided with the heating means.

12. A machine as claimed in claim 9 in which one of the pressure members is resiliently supported in the direction of the application of pressure.

13. A machine as claimed in claim 12 in which the means for effecting axial movement of the plunger are arranged to operate in two stages, firstly to apply one pressure and then a higher pressure with compression of the resilient supporting means.

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