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AUTOMATIC CONTROL FOR UPHOLSTERY AND LASTING MACHINES

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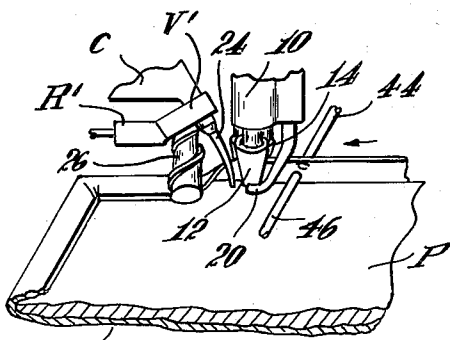


Fig. 1

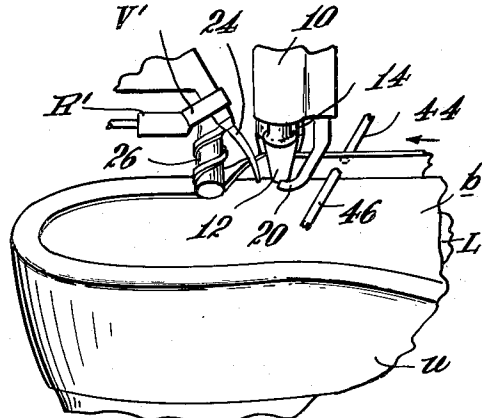


Fig. 2

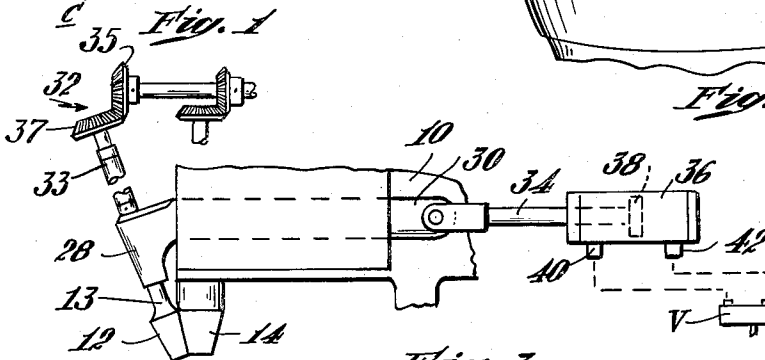


Fig. 3

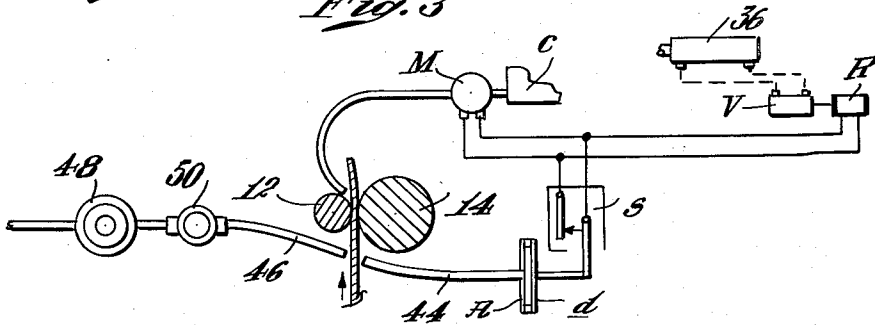


Fig. 4

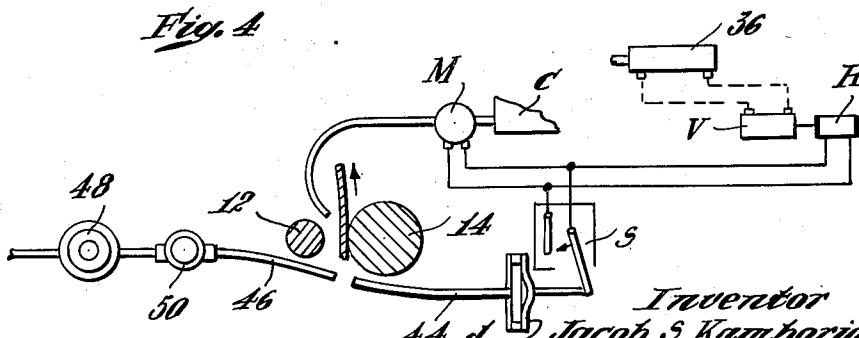


Fig. 5

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2,970,330

AUTOMATIC CONTROL FOR UPHOLSTERY AND LASTING MACHINES

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3 Claims. (Cl. 12—8.3)

This invention relates to machines for stressing a flexible material over one side of a form and attaching a marginal portion of the material to the opposite side of the form or to an element disposed on the opposite side of the form, such machines being used for covering large panels with a decorative fabric in the automobile industry and for lasting shoes in the shoe industry.

Machines of the foregoing type, examples of which are shown in my Patents Nos. 2,571,140 and 2,576,121 respectively granted on October 16, 1951 and November 27, 1951, and application Serial No. 529,247, in the names of myself and Thomas A. Weisz, filed August 18, 1955, have a pair of cooperating feed rolls which are constantly rotating when the machine is running, a strong spring or the like for holding the rolls engaged with the opposite sides of the work and a treadle for separating and holding the rolls separated to permit the operator to introduce the work therebetween as the operation is started and to permit it to be removed when the operation is finished. These machines may be provided, as shown in the aforesaid application, with means for applying adhesive to the work just after the margin leaves the feeding rolls and with folding means for folding the margin down against the work following application of adhesive thereto, to cause the margin to adhere to the work. Flow of the adhesive from the nozzle is initiated, on the one hand, as the rolls move together and terminated, on the other hand, as the rolls move apart.

The principal objects of this invention are to eliminate the treadle means for separating and bringing the feed rolls together, so that the operator can stand firmly on both feet throughout the entire operation and thus will be in a better position to present the work to the operating instrumentalities and to concentrate his attention on obtaining the best possible results with the least amount of fatigue, which is especially important in making large covered panels and high grade shoes and to initiate the flow of the adhesive and terminate it so as to eliminate reruns as the work enters and drip as the work leaves the rolls by controlling the flow so that issue commences substantially simultaneously with the entrance of the work between the rolls at the ingoing side and terminates substantially simultaneously with the arrival of the terminal extremity of the work between the rolls at the ingoing side.

In accordance with the invention there is means mounting a pair of rolls for rotation in opposite directions and for movement to and from each other, driving connections for effecting continuous rotation of the rolls without interfering with the relative movement of the rolls to and from each other and means for effecting separation of the rolls to permit introduction of the work therebetween and for moving them into engagement with the work to effect feeding and stressing thereof, and means operable in the presence of a course of work at the ingoing side of the rolls automatically to effect operation of the means to bring them together to grip the work, and in the absence of work automatically to effect oper-

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ation of the means to separate the rolls. The means for effecting relative movement of the rolls may be a fluid motor to which pressure fluid is supplied in one direction to separate the rolls and in another to bring them together by valve means, the operation of which is effected by the presence or absence of work at the ingoing side of the rolls. There is also a valve for controlling the flow of the adhesive to the nozzle and operation of this latter valve is controlled by the same switch and switch operating means as operates the fluid motor, so that adhesive is applied to the work as soon as it passes through the rolls and so that there is no drip when the end of the work is reached.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

Fig. 1 is a perspective view of operating instrumentalities of the kind designed to grip and advance the marginal portion of a flexible material substantially perpendicular to the side of a form opposite that over which the flexible material is applied and to fold it over on this side;

Fig. 2 is a view corresponding to Fig. 1, showing the instrumentalities operating on a shoe;

Fig. 3 is a side elevation of the feed rolls showing means for mounting them for relative movement to and from each other;

Fig. 4 is a diagrammatic view of control means in which the feed rolls are shown in horizontal section and the control means is shown in its operative position so that the feed rolls are engaged with the work and adhesive is being delivered to the margin; and

Fig. 5 is a corresponding view showing the control means in its inoperative position after the margin has moved beyond it with the rolls separated and discharge terminated.

Referring to the drawings, Figs. 1 and 2, there are shown the operating instrumentalities of machines such as are illustrated in Patents Nos. 2,571,140 and 2,576,121 noted above, in which there is means 10 for supporting a pair of work gripping rolls 12 and 14, in engagement with the opposite sides of the work, for example a flexible covering *c* applied to one side of a panel *P* (Fig. 1), or of an upper *U* mounted on a last *L* to which a bottom member *b* has been previously tacked. The rolls are tapered so as to produce an updrafting stress on the margin as it is advanced between the rolls, as is customary in this type of machine, and when the machine is running the rolls rotate continuously. In order to hold the work down against the updrafting stress there is a hold-down finger 20 fastened to one side of the means 10 which has a curved lower end for sliding engagement with the upper side of the work. A rotary wiper 26, carrying a helical rib, is arranged adjacent the discharge side of the rolls for folding the margin down as it leaves the rolls against the surface of the work. An attaching material is applied to unite the folded margin to the surface of the work. The attaching material preferably takes the form of adhesive supplied to and discharged from an end of a nozzle 24, arranged in a position to deliver adhesive within the angle between the margin of the covering and the form just before it is laid down by the wiper, the latter also being continuously rotating.

While it is quite possible for skilled operators to introduce the lasting margin of a shoe between the feed rolls without separating them, unskilled operators find it difficult to do this and when the apparatus is used for covering large panels, separation of the rolls is desirable because the panels are awkward to handle.

As herein shown, the roll 14, having contact with the outer surface of the margin, is mounted in fixed bearings on the frame and the roll 12, having contact with the inner side of the margin, is mounted in a bearing 28 which in turn is mounted on a slide 30 on the frame

10 for sliding movement to and from the roll 14. There are suitable driving connections 32 (Fig. 3) for maintaining rotation of the rolls continuously regardless of the movement of the rolls into and out of operative position. The driving connections may take any form desired. Preferably, the shaft 13 on which roll 12 is mounted has a flexible section 33 therein to permit movement of roll 12 toward and away from roll 14 without interfering with the drive, this arrangement being similar to the arrangement disclosed in my pending application Serial No. 748,971 filed July 16, 1958. Alternatively, shaft 13 may be made rigid and the teeth on gears 35 and 37, which form part of driving connections 32, may be made deep enough to allow the teeth to mesh when gear 37 is moved away from gear 35 due to the movement of roll 12 away from roll 14.

The treadle separation of the rolls, heretofore employed, required that the operator stand on one foot at the very moment when he was trying to start the operation and when thus unbalanced it was difficult for him to introduce the margin of the work between the rolls so that it would be gripped to the best advantage and advance without tearing or wrinkling. To avoid this and to provide for better control and less fatigue on the part of the operator the treadle has been eliminated herein so that the operator can stand firmly on both feet and means has been provided for automatically bringing the rolls into engagement as the work is introduced between them, initiating delivery of adhesive thereto, and then separating the rolls and terminating delivery of adhesive at the end of the operation. To this end the slide 30 has pivotally connected to its rear end the forward end of a rod 34, the rear end of which enters a cylinder 36 and has on it a piston 38. Fluid connections 40 and 42 are provided at opposite ends of the cylinder and the latter constitutes a fluid pressure motor operable by delivery of fluid under pressure to one end to separate the rolls and by delivery of fluid under pressure to the other end to bring them together. A single acting cylinder with a spring could be used in place of the double acting cylinder. Delivery of fluid to the ends of the cylinder is controlled by a self-venting valve V, which in turn is shifted from one position to another by a solenoid R. The solenoid is of the double acting type and is connected to a switch S (Fig. 4), which in turn is opened and closed by an air valve A, which will be described in greater detail hereinafter.

The adhesive is supplied to the nozzle 24 under pressure from a container C (Figs. 1 and 2) and between the container and the nozzle there is located a solenoid operated control valve V¹ (Fig. 1), or a motor driven pump M (Fig. 3), which is connected to the switch S.

In order that the feed rolls shall be brought together automatically as the work is entered between them and separated as it leaves them and that the adhesive will be started soon enough so that it will be applied to the work as it emerges from the feed rolls at the commencement of the operation and will be terminated soon enough so that there will be no drip at the end of the operation, the air valve A is located close to the ingoing side of the feed rolls (Figs. 4 and 5). As illustrated, the air valve has a displaceable diaphragm *d* connected to the switch S, which when collapsed, as shown in Fig. 4, brings the contacts of the switch into engagement but when displaced (Fig. 5) separates the contacts. A pipe 44 extends from the air valve A to a position close to the ingoing side of the feed rolls and at a level such that it will be opposite the margin of the work when the latter is about to enter the feed rolls. Another pipe 46 is disposed at the opposite side of the path of movement of the work with its end spaced from that of the pipe 44 and in alignment therewith, and this pipe is supplied with air under pressure by way of a reducing valve 48 and pressure regulator 50, so that a stream of air constantly issues from a pipe 46 toward the end of the pipe

44. In the absence of pressure in excess of atmospheric pressure the diaphragm *d* remains collapsed and hence the contacts of the switch are held closed. When thus closed both solenoids R and R¹ are excited with the result that air is delivered to the fluid motor 36 by way of valve V to bring the rolls together and the cement control V¹ is opened to permit adhesive to flow from the container C through the nozzle 24. By properly adjusting the proximity of the ends of the pipes to the ingoing side of the feed rolls, the actuation of the feed rolls and cement valve may be timed so that the feed rolls close on the work at substantially the moment when the margin enters the rolls and adhesive is delivered to the work at substantially the moment it commences to leave the feed rolls. As long as there is work between the ends of the pipes the air valve A will remain collapsed however as soon as the end of the work is reached, as shown in Fig. 5, air from the pipe 46 will enter the pipe 44, expand the diaphragm, open the contacts of the switch S and thus effect operation of the solenoids R and R¹, to effect separation of the feed rolls and terminate delivery of adhesive. By the time the rear extremity of the work issues from the feed rolls the last of the adhesive is delivered thereto and there will be no drip between the end of a given operation and the next operation.

It can be readily seen from the foregoing that the control means initiated and terminated by the presence of the work makes it possible for the operator to devote his entire attention to manipulating the work and hence of securing better covering operations and with less fatigue, that the automatic control provided for effecting separation and movement of the rolls into cooperative position and for starting and stopping the delivery of adhesive helps to speed up the work, lessens the likelihood of damage and re-runs and results in cleaner operations with substantially no loss in adhesive by excessive drip.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. In a machine of the kind in which a pair of rolls turning in opposite directions continuously and uninterruptedly apply pulling and feeding stresses to the margin of a flexible material applied to one side of a form, driving connections for effecting continuous rotation of the rolls, means mounting the rolls for relative movement to and from each other without interrupting the continuous rotation thereof, means operable to effect movement of the rolls to and from each other and sensing means operable by the presence of a course of the margin at the ingoing side of the rolls automatically to effect operation of the last means to effect movement of the rolls together to grip the margin and in the absence of the margin automatically to effect operation of said last means to effect movement of the rolls apart.

2. In a machine of the kind in which a pair of rolls turning in opposite directions continuously and uninterruptedly apply pulling and feeding stresses to the margin of a flexible material for attachment to one side of a work piece and a folding element operates on the margin as it is released by the rolls to press it against the work piece, driving connections for effecting continuous rotation of the rolls, means mounting the rolls for relative movement to and from each other, power operated means for effecting movement of the rolls to and from each other, a device situated at the delivery side of the feed rolls for applying attaching material to the margin as it escapes from the rolls and is laid down against the work piece to unite it to the work piece and means operable by the presence of a course of the margin at the ingoing side of the rolls to effect operation of the power operated means to bring the rolls together and concomitantly to

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effect operation of said device, said means in the absence of the margin effecting operation of the power operated means to separate the rolls and terminate operation of said device.

3. A machine of the kind in which a pair of rolls turning in opposite directions continuously and uninterruptedly apply pulling and feeding stresses to the margin of a flexible material for attachment thereof to a work supported adjacent to the rolls and a folding element operates on the margin as it leaves the rolls to press it against the work, driving connections for effecting continuous rotation of the rolls, means mounting the rolls for relative movement to and from each other without interrupting the continuous rotation thereof, means for effecting movement of the rolls to separate them and to bring them together, an applicator nozzle situated at the

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discharge side of the rolls for delivering adhesive to the work within the angle between the stressed margin and the work just before the margin is folded into contact therewith, means operable to supply adhesive to the nozzle, and means operable by the presence of a course of the margin at the ingoing side of the rolls to effect operation of the two last-named means concomitantly to move the rolls together and initiate delivery of the adhesive and in the absence of the margin to move the rolls apart and continue the delivery of adhesive.

References Cited in the file of this patent

UNITED STATES PATENTS

15	2,203,977	Bennett	June 11, 1940
	2,843,863	Weisz	July 22, 1958