

May 25, 1943.

E. C. MILLER

2,320,092

MACHINE FOR MAKING ADHESIVE PADS

Filed Oct. 23, 1940

2 Sheets-Sheet 1

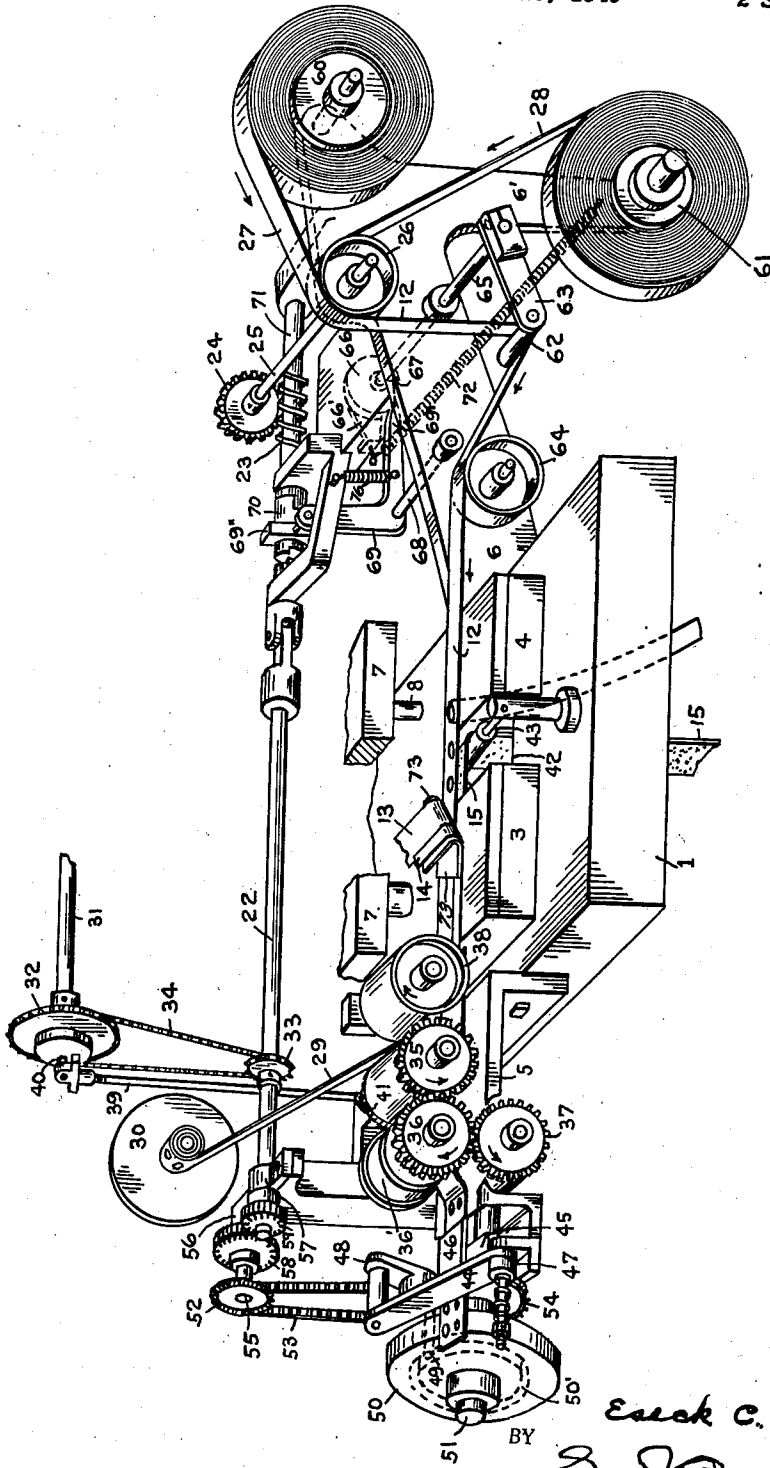


FIG. 1

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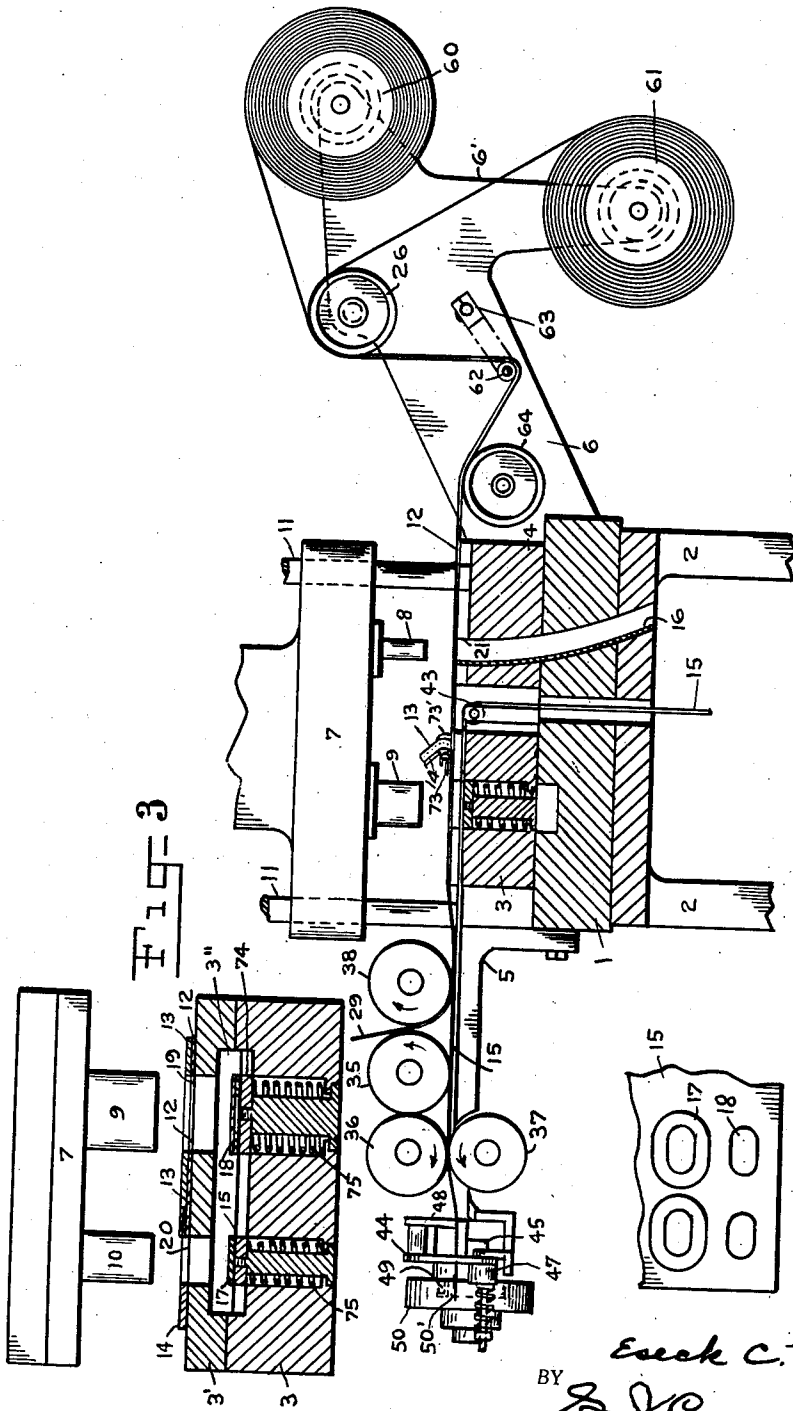


FIG-2

FIG-4

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# UNITED STATES PATENT OFFICE

2,320,092

## MACHINE FOR MAKING ADHESIVE PADS

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Application October 23, 1940, Serial No. 362,318

10 Claims. (Cl. 154—1)

The improvements relate to machines for making pads or plasters for the treatment of corns, callouses, bunions and the like, and have for their objects among others improvements in the construction, operation and efficiency of such machines and in the corresponding product.

In the machines of the character to which the present improvements relate, a strip or web of material having an adhesive on its under side is usually fed to punching dies which form one or more apertures therein at short intervals, then has a cover strip with an adhesive on its under side applied to the upper surface thereof to cover the apertures and form a two-ply strip, then this two-ply strip is passed under other dies which punch out the complete pads with edges a short distance outside the apertures of the under disk, and the male portion of these dies passing through the female portions and carrying the pads with them apply the pads to a strip of open-mesh stiff fabric such as crinoline and deposit them on the upper surface thereof as the crinoline strip is passed under the dies. All three strips are advanced step by step and the perforating and punching-out operations are performed between steps. The crinoline strip carrying the pads is then passed over a shearing device and cut thereby into sections, each section carrying the desired number of pads. These machines are well illustrated in Patent No. 2,033,736, granted March 10, 1936, to George H. Perryman, to which reference may be had for details of construction and operation not herein fully set forth, and to the general subject matter to which the present improvements relate.

As the pads are required to have considerable thickness it is sometimes desirable to unite two strips each having adhesive on its under surface to form a two-ply strip, before the perforating operation is performed, and as the adhesive on the under surface of this or a single strip has a tendency to adhere to the guiding and conveying rollers over which it passes and to the upper surface of the dies, suitable provision must be made for overcoming this adhesion, unless the adhesive is temporarily rendered relatively non-adhesive, as by moistening or air conditioning. The step by step movements of the strips must also be carried on with certainty and accuracy to obtain proper results and slippage and backlash must be avoided. The punched out pads must also be deposited on the open-mesh carrying strip without too much pressure and yet with sufficient pressure to cause them to adhere lightly and firmly thereto, and provision must be made

for cutting this carrying strip into sections having different lengths according to the number of pads to be carried by each section and the size of the pads, which varies greatly according to the purposes for which they are to be used.

Small medicated disks are also punched out and deposited on the crinoline strip simultaneously with the punching out of the pads and automatically positioned side by side with the pads with their under adhesive surfaces in contact with the carrying strip. These medicated disks are designed to be located in the apertures of the pads with their adhesive medicated surfaces down by first applying them to the corn or the like before the pads are applied to the foot of the user, and the pads then placed over them.

It is to make better provision for these operations and requirements that the present improvements are primarily designed. Therefore, in the present improvements two strips or webs are passed under an idler roller accurately aligned with the spools upon which they are wound and then over a driven roller after being accurately brought together with the under adhesive surface of the upper strip in contact with the upper surface of the under strip, constant tension being maintained on the strip at this stage, by means of a tension roller beyond the driven roller over which the united strips pass, thus forming them into a two-ply strip or web. At the end of the machine on the opposite side of the dies are pulling rollers through which the web passes after being perforated and which are actuated step by step to pull the web through the dies. At each pull of these rollers the tension roller on the opposite sides of the dies is caused to move upward by the straightening of the web under tension from the other side, and this upward motion of the tension roller actuates a clutch on the shaft operatively connected with first named driving roller to engage it and cause the roller to be driven one step, alternating with the steps of the pulling rollers, thus feeding the strip and permitting the tension roller to drop again and disengage the clutch. The third or cover strip is fed from the back of the machine at right angles to the strip to be perforated and beyond the perforating dies and mounted on a rod 73', but is turned by means of a twisted guide into a position parallel with the perforated strip and firmly and accurately applied thereto to cover the perforations, this guide also maintaining the cover strip under tension, in addition to the ten-

sion of its spool, and pressing it firmly against the perforated strip.

Fed with the cover strip and parallel therewith at one side is a web or strip having medication on its under surface, so that it passes to punching out dies operating simultaneously with the dies for punching out the pads and depositing these medicated disks on the open-mesh carrying strip therewith, so that each section of the carrying strip bears a certain number of pads and a certain number of medicated disks, commonly one disk for each pad. For varying the timing of the shears, interchangeable gears of different sizes are employed operatively connected with the pulling rollers for the carrying strip, so that the cutting movement of the shears is varied with respect to the travel of the strip from which the pads are punched out and the carrying strip and larger or smaller sections thus severed.

The improvements are illustrated in the accompanying drawings, which show an exemplary embodiment of them and in which—

Fig. 1 is a perspective side view;

Fig. 2 is a side elevation with lower die parts in vertical section;

Fig. 3 is a transverse medial section of the lower punching out die parts and upper die members in elevation enlarged; and

Fig. 4 is a plan of a portion of the finished pads and disks.

In the said drawings, 1 is a base for the dies, supported on a rigid frame 2 and having die members 3 and 4 thereon. Frame members 5 and 6 extend from either side of the base to support other parts of the machine.

The die head 7 carries the depending die members or punches 8, 9 and 10 and is reciprocated on posts 11 by suitable power apparatus, as in the said patent, so that as the strips of textile material 12, 13 and 14 pass between the dies, step by step, they are perforated and punched out to cut therefrom recessed pads and medicated disks which are deposited by the punches on the carrying strip 15 (Fig. 4). The punch 8 merely punches apertures in the web 12, and permits the punched out blanks to be discarded by gravitating through the chute 16, while the punches 9 punch out complete recessed pads and deposit them on the carrying strip 15 and the punches 10 punch out medicated disks and deposit them on the said strip in juxtaposition to the pads, as shown at 17 and 18. The cutting edges of the apertures 19, 20 and 21 cooperate with the reciprocating die members 8, 9 and 10 to sever the material. It will be understood that as many dies as desired of each size and for each purpose may be employed, the width of the web permitting, and one or less of the medicated disks may be punched out and deposited for each of the pads. In the illustrative embodiment the pads may be assumed to be large pads for the treatment of bunions or the like and one pad with one medicated disk stamped out at each reciprocation of the dies and deposited on the carrying strip.

A power shaft 22 adapted to be rotated by any suitable power transmitting means feeds the web, and the carrying strip moving mechanism and web pulling means are synchronized with the dies so that they act alternately to move the web and strip and perforate and punch out the pads and disks, the punching operation taking place in the pauses between the step by step movements of the web and strip and the movements of the latter taking place between the die operations. This

shaft at one end is provided with a worm 23 engaging a gear 24 on a shaft 25, to the opposite end of which is keyed a feeding roller 26 over which pass the webs 27 and 28 and where they are united to form the two-ply web or strip 12. At the opposite end of the shaft is mounted a winding spool 30 on which the combined strips 29 are wound after the pads and disks have been severed therefrom by the dies. The shaft 22 is driven continuously from the shaft 31 through the sprocket 32 on the latter and the sprocket 33 on the former by means of the chain 34, but the strip pulling rollers 35, 36 and 37 are driven step by step, as is also the idler 38, by the reciprocating rod 39 eccentrically connected at 40 with the sprocket disk 32 and engaging a ratchet 41 at its lower end on the rear end of the roller 35. It will be understood that the propelling movements of the rod 39 alternate with the downward movements of the dies.

The perforated composite strip 29 of pad and disk making material passes from the dies between the rollers 35, 36 to the winding spool 30, being compressed between the said rollers to a sufficient extent to pull it through the dies and also to pull the four webs which compose the strip over the dies, while the rollers 35 and 37 serve to draw the mounting strip 15, from any suitable spool or other source through the aperture 42 in the base 1, over the roller 43, between the die blocks 3 and 4, and through an aperture in the member 3—or it may run under said member—to the rollers 36 and 37, receiving the pads and disks as it passes through the member 3, as hereinafter described. The rollers 36 and 37 being geared to the roller 35 draw the carrying strip with the pads and disks thereon at the same speed and in the same manner as the other strips are drawn, but engage the carrying strip 15 only near its longitudinal edges, so as to avoid interfering with these articles thereon, the upper roller 36 being offset medially, as indicated at 36', whereas the roller 35 is elevated, and has its surface raised slightly above strip 15. However, should any of these articles not lie flat on the carrying strip they will be pressed down against it by the medial surfaces of the roller 36'.

In order to shear the carrying strip 15 with pads and disks thereon and form short sections thereof a knife 44 acting against the shearing edge of a plate 45 is provided, the strip passing under a guide plate 46 and between it and the shearing plate. This knife is pivotally mounted at 47 at one end and has its opposite end connected with an arm 48 extending from a pin 49 engaging the eccentric slot 50' in the disk 50 mounted on a shaft 51 and rotated by the sprocket 52 and chain 53 through the sprocket 54 secured to said disk. The sprocket 52 is mounted on a stub shaft 55 mounted on a bracket 56 which also supports the end bearing 57 of the shaft 22. The shaft 55 is driven by the gear 58 keyed thereon and meshing with the gear 59 keyed on the end of the shaft 22, and as these gears are removable and replaceable by gears having different ratios, the shearing of the strip 15 may be timed so as to cut off a longer or shorter section of said strip. This provision is important in view of the fact that the pads vary in size and the number of pads of any given size to be carried by each severed section of the strip are varied, according to the quantity to be contained in the packages to be sold. It also provides for clean and accurate cutting off of the strip sec-

tions and long and dependable operation of the parts involved.

In order to feed the webs 27 and 28 and the two-ply strip 12 accurately and provide against undue tension or backlash, the said webs are unwound from their spools 60 and 61 by the driven roller 26, on the upper surface of which they are united with the under adhesive surface of 27 in contact with the upper surface of 28 and the lower adhesive surface of 28 in contact with said roller, and the two webs thus united to form the two-ply strip 12 passing under the roller 62 mounted on the end of the rocking arm 63, after which they pass over the idler roller 64 to the perforating die 8. The rocking arm 63 is mounted on one end of the shaft 65, on the opposite end of which is a cam 66 having a notch 67 therein. Mounted on a rocking shaft 68 is an L lever 69 having its lower end 69' engaging the periphery of the cam 66 and adapted to fall into the notch 67 under the pull of spring 76 when the cam is rotated by the rising of the roller 62 and the resulting arcuate movement of the arm 63 and shaft 65. This rocks the lever 69 and causes its upper end 69' to close the clutch 70 between the shaft 22 and the shaft section 71 (at the left end of the clutch) thereby rotating the worm 23 and gear 24 to drive the roller 26. The upward movement of the roller 62 is caused by tension on the strip 12 and its downward movement is caused by gravity and the action of the tension spring 72 secured at its lower end to the downward extension 6' of the frame member 6 and at its upper end to an extension 66' of the cam 66. When this downward movement of the roller 62 takes place the cam 66 is rotated in counterclockwise direction causing the lever 69 to open the clutch 70 and interrupt the feed of the webs and the strip 12. By this arrangement the strip is held under constant tension at all times and is fed to the dies only as it is drawn through them and taken up by the pulling rollers 35, 38, while at the same time the adhesion of the lower surface of the strip to the rollers and the dies is overcome and the danger of interruption of the feed thereby avoided.

For convenience and efficiency of operation and other reasons it is desirable to have the feed spool of the cover strip 13 and medicated strip 14 mounted at the back of the machine and at an angle to the line of travel of the strip 12, and this necessitates means for turning these two strips so that they will join the strip 12 while exactly parallel thereto. For this purpose the twisted guide 73 located close to the strip 12 and the punching out dies is provided. It consists of a piece of sheet metal bent on a curve so that its lower end is at an angle to its upper portion and the two ends of the guide are offset angularly with relation to each other and over which the strips 13 and 14 pass under tension with their non-adhesive surfaces in contact therewith thus inverting the said strips, bringing them into parallelism with the strip 12 with their adhesive surfaces down and applying the strip 13 to the upper surface of the strip 12. The strip 14 extends to one side of the strip 12 so that it is not united therewith but is punched separately by the dies 10 and its disks deposited separately on the carrying strip 15. In the operation of the twisted guide 73 the cooperation of the tension maintaining and backlash preventing devices is important since any slack or backlash

in the strip 12 would interfere with the proper joining and positioning of strips 13 and 14 on the strip 12. It will be noted that the medicated strip 14 overlaps one edge of 13 and that the overlapping portion is joined by its adhesive coating to the strip 13, so that all these strips become in effect a multi-ply strip and move to the dies and are punched thereby in unison.

In Fig. 3 the details of the punching out operation and parts performing that operation are shown. Each of the punches 9 and 10 has a receiving base 74, supported on a spring 75, over which the carrying strip 15 passes, so that each of these bases will yield when the punch presses the punched out part against it and will rise to normal position when the punches are raised, thus giving an individual yielding application of each of said parts to the carrying strip and causing the adhesive to take hold evenly yet lightly thereto, for quick and easy removal by the user, and at the same time preventing the edges of the parts from being turned up, as where a yielding base extending beyond the punches is used. At the same time the slight stretching of the fabric of the carrying sheet at the moment of application and immediate contraction of its meshes thereafter prevents the adhesive from spreading.

The strip 15 passes through the flat horizontal aperture 3'' extending through between the base 3 and its top section 3' which carries the cutting apertures 19, 20, thence to the pulling rollers 36 and 37 and thence to the shearing knife 44.

What I claim is:

1. In a machine of the character described, the combination of means for automatically uniting a plurality of fabric webs while under tension to form a multiple ply strip, an automatically adjustable tension device for maintaining said tension, means for feeding said strip under said tension to perforating dies, means for applying thereto another web after perforating the former by said dies and means for feeding the combined web strip thus formed to other dies for punching out plasters therefrom, a clutch device for said feeding means and a clutch opening and closing device in constant operative connection with said tension device, whereby tension on the webs is maintained at all times.
2. In a machine of the character described, the combination of means for automatically uniting a plurality of fabric webs while under tension by passing them over a driven roller simultaneously to form a multiple ply strip, an automatically adjustable tension device for maintaining said tension, means for feeding said strip under said tension to perforating dies, a clutch for said feeding means and means for constantly maintaining a connection between said clutch and the tension device, means for applying thereto another web after perforating the former by said dies and means for feeding the combined web strip thus formed to other dies for punching out plasters therefrom.
3. In a machine of the character described, the combination of means for automatically drawing a fabric web through perforating and stamping out dies to form pads therefrom, means for releasing said web from a supply thereof as it is drawn through the dies while maintaining tension thereon, means for applying to said web from a source angularly disposed thereto a backing and cover strip after the former has been perforated comprising a guide curved

in vertical and lateral planes the two ends of the guide being offset angularly with relation to each other extending into proximity thereto over which the latter passes and to which it conforms in passing.

4. In a machine of the character described, the combination of means for automatically drawing a fabric web through perforating and stamping out dies to form pads therefrom, means for releasing said web from a supply thereof as it is drawn through the dies while maintaining tension thereon, means for applying to said web from a source angularly disposed thereto a backing and cover strip and a medicated strip parallel therewith after the former has been perforated comprising a guide curved in vertical and lateral planes the two ends of the guide being offset angularly with relation to each other extending into proximity thereto over which the latter passes and to which it conforms in passing.

5. In a machine of the character described, the combination of means for automatically drawing a fabric web through perforating and stamping out dies to form pads therefrom, means for releasing said web from a supply thereof as it is drawn through the dies while maintaining tension thereon, means for applying to said web from a source angularly disposed thereto a backing and cover strip and a medicated strip parallel therewith after the former has been perforated comprising a guide curved in vertical and lateral planes the two ends of the guide being offset angularly with relation to each other extending into proximity thereto over which the latter passes and to which it conforms in passing, adhesive matter on said backing and medicated strips adapted to come in contact with said web to pass the punching out dies therewith and said medicated strip extending beyond the latter and into the operating zone of dies for punching out therefrom disks of medicated material.

6. In a machine of the character described, the combination of means for automatically passing a fabric web to perforating and punching out dies to form pads therefrom, punching out dies comprising female dies and punches passing through said web and female dies and into a recess in a die member, said die member provided with a recess below said female dies, and individual yielding bases in said recess to receive the impact of said punches, said bases conforming in lateral dimensions to said female dies and punches and a carrying strip passing through said recess between said punches and said bases and said member having recesses below said bases of a size to receive the pads punched out and applied to said strip by said yielding impact and the portions of said strip to which they are applied.

7. In a machine of the character described, the combination of means for automatically passing a fabric web to perforating and punching out dies to form pads therefrom, a driving shaft connected with said means, rollers operatively connected and associated with said shaft for drawing the web through the dies, means for imparting to said rollers a step by step movement, a carrying strip for the punched out pads passing beneath the dies, rollers connected with said first named rollers to operate in unison therewith for moving said carrying strip, a shearing device operated from the web operat-

ing means to shear off sections of said carrying strip measured by said rollers with the pads thereon after they have passed the dies and removably mounted gears adapted to be interchanged with larger and smaller gears to vary the timing of said shearing device and the resulting size of said sections.

8. In a machine of the character described, the combination of means for automatically passing a fabric web to perforating and punching out dies to form pads therefrom, a driving shaft connected with said means, rollers operatively connected and associated with said shaft for drawing the web through the dies, means for imparting to said rollers a step by step movement, a carrying strip for the punched out pads passing beneath the dies, rollers connected with said first named rollers to operate in unison therewith for moving said carrying strip, a shearing device operated from the web operating means to shear off sections of said carrying strip measured by said rollers with the pads thereon after they have passed the dies, and removably mounted gears adapted to be interchanged with larger and smaller gears to vary the timing of said shearing device and the resulting size of said sections, said gears operatively connected with and driven from said shaft.

9. In a machine of the character described, means for automatically uniting a plurality of adhesive strips of material and feeding them to perforating dies under constant tension, means for perforating the strips comprising suitable dies, a driven feed roller over which the said strips pass and on which they are united, means beyond the dies for drawing said strips through between the dies and exerting a tension thereon, a tension roller intermediate said feed roller and dies and a pivoted arm on which the same is mounted, said roller being constantly pressed against said strips by its gravity and the gravity of the arm, a spring also constantly pressing said roller against the strips, a clutch connecting the feed roller with a source of power and means for operating said clutch to connect and disconnect said feed roller, said means being operatively connected with the tension roller.

10. In a machine of the character described, means for automatically uniting a plurality of adhesive strips of material and feeding them to perforating dies under constant tension, means for perforating the strips comprising suitable dies, a driven feed roller over which the said strips pass and on which they are united, means beyond the dies for drawing said strips through between the dies and exerting a tension thereon, a tension roller intermediate said feed roller and dies and a pivoted arm on which the same is mounted, said roller being constantly pressed against said strips by its gravity and the gravity of the arm, a spring also constantly pressing said roller against the strips, a clutch connecting the feed roller with a source of power and means for operating said clutch to connect and disconnect said feed roller, said means being operatively connected with the tension roller at all times and said connection comprising a rock shaft on which said arm is mounted, a cam device fixed to said shaft and a lever having its power arm in contact with said cam device and its weight arm connected with the clutch.

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