

- [54] **STRIP FEED MECHANISM FOR A PLATEN PRESS**
- [75] Inventor: **Roger Lale-Demoz**, Pully, Switzerland
- [73] Assignee: **J. Bobst & Fils S.A.**, Prilly, Switzerland
- [22] Filed: **Mar. 23, 1971**
- [21] Appl. No.: **127,176**
- [30] **Foreign Application Priority Data**
Mar. 26, 1970 Switzerland..... 4673/70
- [52] **U.S. Cl.**..... **226/110, 226/157, 226/193, 226/173, 226/195**
- [51] **Int. Cl.**..... **B65h 17/42**
- [58] **Field of Search**..... 226/156, 157, 110, 226/109, 195, 190, 193, 186, 191, 181, 173
- [56] **References Cited**
UNITED STATES PATENTS
3,610,499 10/1971 Gallistel..... 226/157 X

2,855,997	10/1958	Schultz	226/109 X
2,363,112	11/1944	Bennett.....	242/68.4
3,285,484	11/1966	Johnson	226/191 UX
3,013,708	12/1961	Adams.....	226/156

Primary Examiner—Allen N. Knowles
Attorney—Hill, Sherman, Meroni, Gross & Simpson

[57] **ABSTRACT**

A strip of material such as a metalized band is conveyed to an operating station between platens of a platen press by a strip feed mechanism comprising a coil carrier means which supports at least one reel of strip material for unwinding, an unwinding and feed means which may be synchronized with the platens and operable with variable feed lengths or feed speeds to intermittently unroll predetermined amounts of strip material, a guide means to define a path of movement of the unwound strip of material between the platens and in a generally C-shaped path to a tensioning means which applies a continuous tensioning force to the strip material along its path of travel.

10 Claims, 2 Drawing Figures

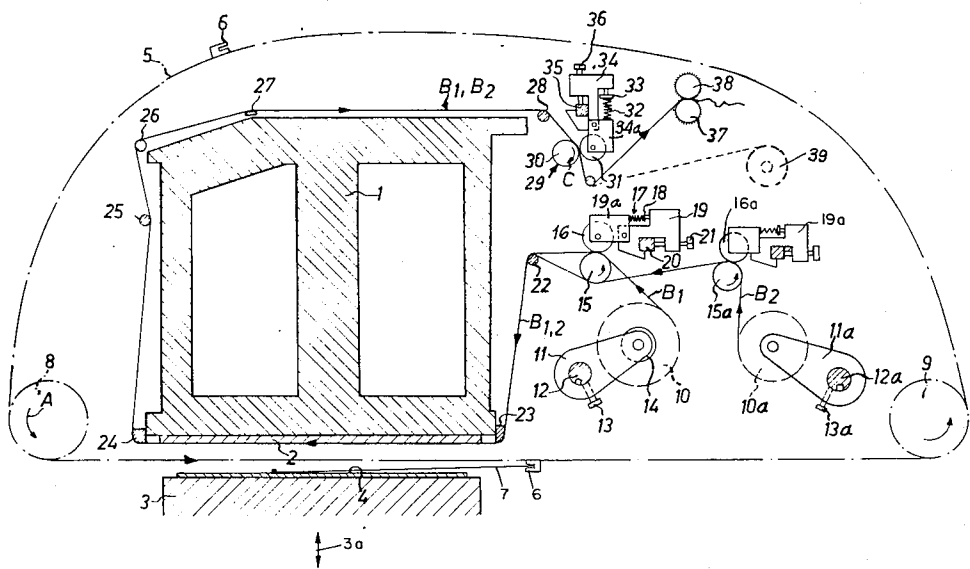
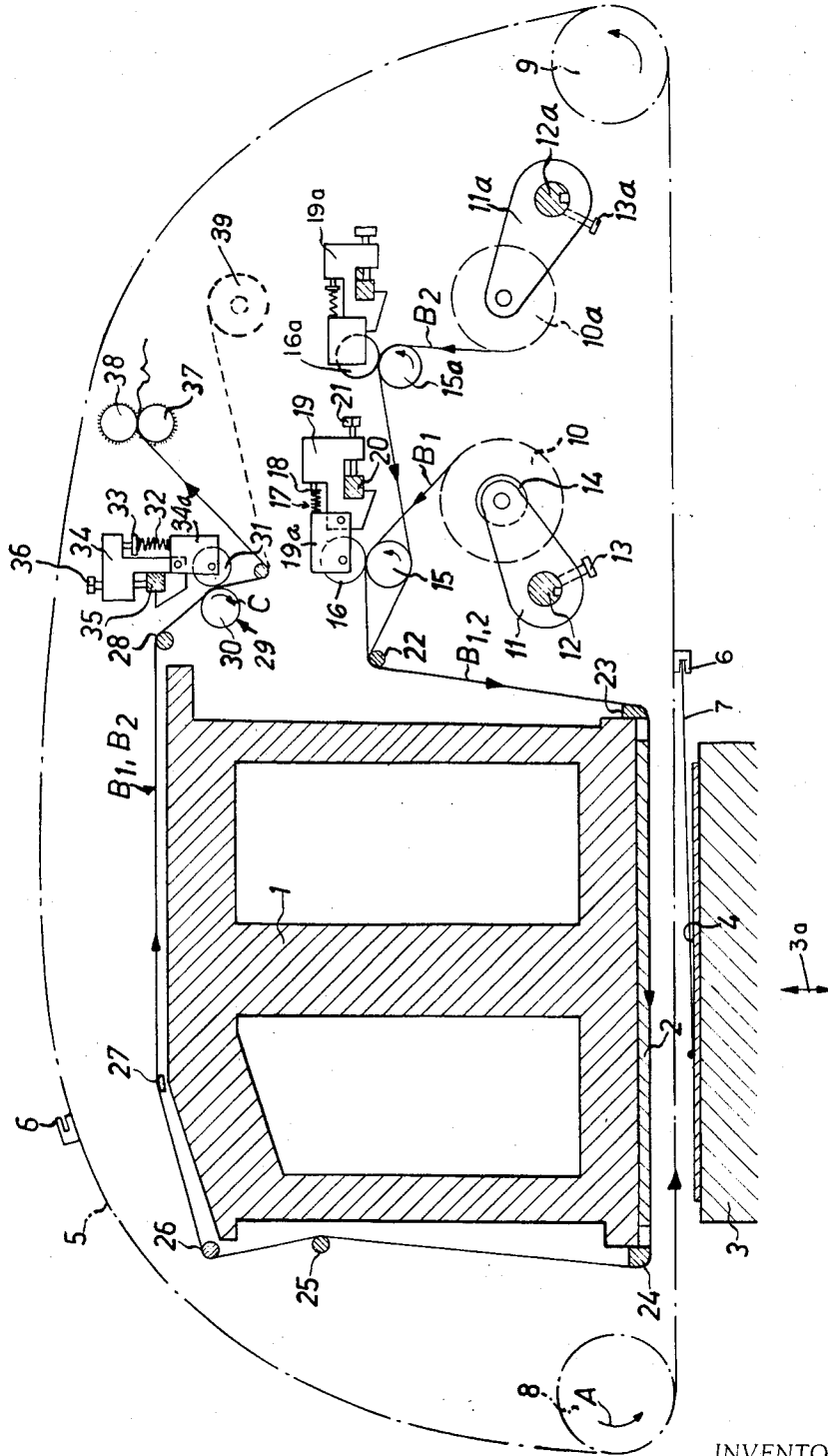


Fig. 1

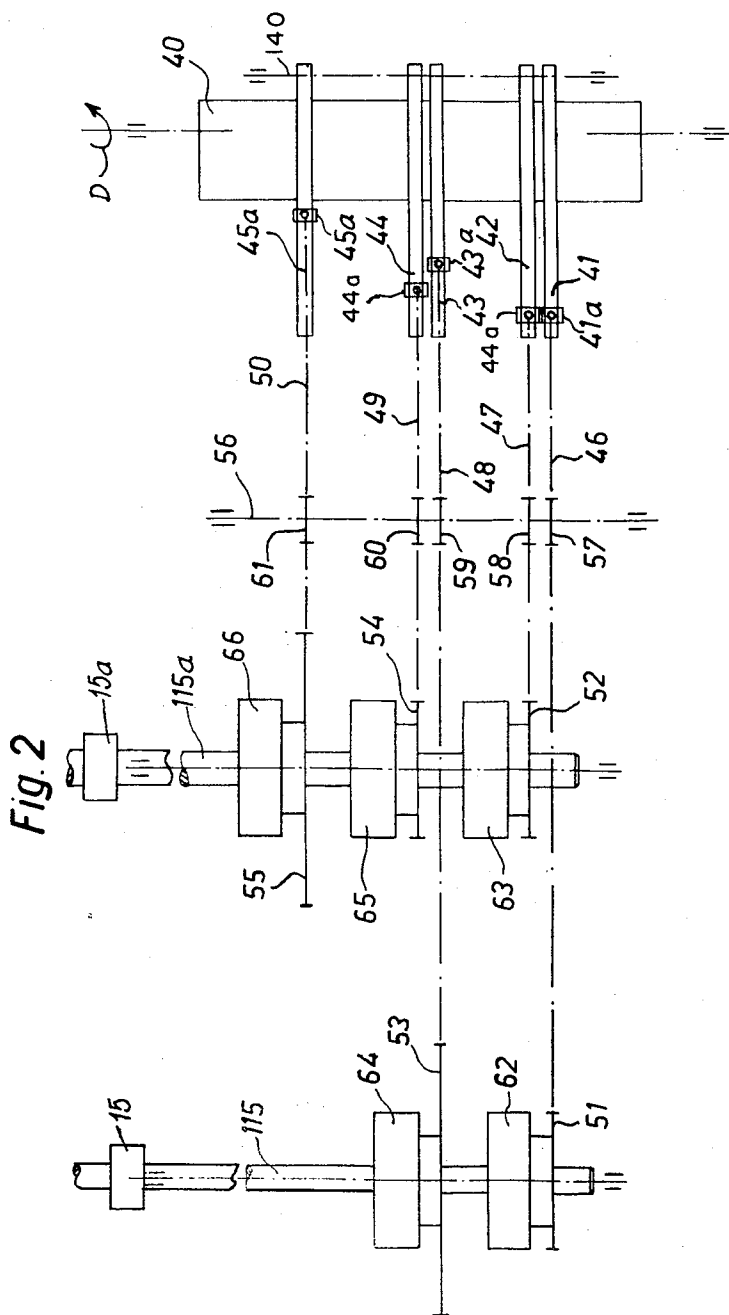


INVENTOR.
Roger Lale-Demoz

BY

Wich, Sherman, Meroniz, Gross & Simpson

ATTYS.



INVENTOR.

Roger LaLe-Demoz

BY

Hill, Sherman, Meroni, Cross & Simpson

ATTYS.

STRIP FEED MECHANISM FOR A PLATEN PRESS

BACKGROUND OF THE INVENTION

This invention generally relates to a reeling and unreeling apparatus in combination with a platen press and more particularly concerns a means for conveying a strip of material under tension from a coil, through an operating station in a platen press and back to a tensioning and pick-up means.

In a platen press wherein sheets of material such as cardboard, paper, plastic, etc., are transported by suitable feed means to an operating station where they are to be laminated and/or embossed, it is important to provide a conveying means of a material to be laminated or embossed, such as metal, film or foil, so that the application of the film or foil will be perfect for both "flat" and for embossing work so that a maximum use of the embossing material on the strip work is obtained. Thus, for example, where the strip material has adhered thereto a metallic foil which will be removed upon embossing, it is important that the maximum amount of foil on the strip be used. Since the platens are large and will emboss a great number of designs in one operation, the length of strip material fed for each operation may vary from operation to operation with the strip material moving just enough to supply a new area of foil to be applied, but not so much as would result in a high amount of waste.

SUMMARY OF THE INVENTION

In order to make possible the application of a film according to the design of a sheet of material being operated on by the press so that perfect results are obtained under the various operating conditions and so that maximum use of the surface area of the strip material is obtained, I have invented a strip feeding and conveying apparatus which comprises the advantageous combination of a coil carrier means that serves to carry at least one reel of strip material, an unwinding and feed means for the material which is operable to intermittently unroll predetermined strip feed lengths, a guide means to guide the unrolled strip into, through and away from the operating station of the apparatus in which it is to be used, and a tensioning means to put and keep the strip under tension along its path into, through and away from the operating station. This device provides particularly advantageous results in a platen press.

According to the invention herein one or a plurality of generally parallel strips of material may be fed from separate coils between the platens at separate, variable feed lengths. The unwinding and feed means for each strip of material comprise, as set forth in the preferred embodiment herein, at least one driven feed roller having a second adjustable pressure roller bearing thereagainst and on an opposite side of the strip so that the strip passes through the nip therebetween. In the coil carrier means each coil is fastened on a lever by means of an expandable chuck and has an adjustable braking system allowing for a more or less free unwinding or unreeling of the strip material in accordance with the feed and unwinding means. The guide means in a platen press are arranged so as to be able to guide the strip about the upper beam of the press along a generally C-shaped path through the operating station and to the tensioning means. The tensioning means comprises at least one driven roller operating continuously at a

peripheral speed higher than the unwinding and feed speed. A second pressure roller may be provided on an opposite side of the strip to allow adjustment of the pressure against the strip material and hence allow adjustability of the tension in the strip. A further strip take-up means may be provided to remove the used strip.

It may thus be seen that the tensioning means of the foremost roller operating at a higher speed than the material is being fed will provide a constant tension in the strip of material through the press regardless of the rate or length of feed of the material from the coils. This constant tension also serves to keep the strip material firmly in place and allow accurate positioning of the material. The tensioning means may take the form of a pair of rollers capable of handling a plurality of generally parallel strips or it may include a series of tensioning means for each individual strip passing through the machine.

The unwinding and feed means or what may be referred to as the feed control means comprises several feed rollers, each of the feed rollers being driven by one or more chain wheels through selective connection of the chain wheels with the feed rollers. This selective connection may be accomplished through electromagnetic clutches. A plurality of chain wheels, each mechanically operable to rotate a predetermined distance in accordance with a desired feed length, are loosely mounted on the feed roller, or on a shaft connected to the feed roller, so that by operation of an electromagnetic clutch they may be selectively engaged with the shaft to the exclusion of the other chain wheels and rotate the shaft so that a predetermined length of strip will be pulled by the constant tension on the strip to the working station. The electromagnetic clutches may be put in operation independently of each other in any order as by means of a programmed electronic computer. With a number of chain wheels connected with each feed roller it may be seen that a plurality of different lengths may be provided for each feed roller. In this manner the strip material may be fed into the operating station in a manner and rate to maximize the use of the strip material surface.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the invention will be readily apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure in which:

FIG. 1 is a schematic representation of a longitudinal cross section through a platen press equipped with a device according to the invention, and

FIG. 2 is a schematic illustration of the mechanical means for controlling the feed length of the feed rollers.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The platen press schematically shown in cross section in FIG. 1 comprises a fixed girder 1 having detachably connected on its lower side a printing or embossing plate or die 2. A lower beam or girder 3 carries a lower platen plate or die 4 on its upper surface and reciprocates in the direction of the arrow 3a to bring the platen

4 into a position against the upper platen 2. It is understood that the platens 2 and 4 may bear corresponding counterparts of the images or designs to be imprinted or embossed on the work pieces coming therebetween.

A pair of endless chains 5, one on either side of the beam 1 and positioned in generally parallel relationship, are each guided and driven in the schematically illustrated path by chain wheels such as shown at 8 and 9. Extending between the spaced, generally parallel chains 5, are a plurality of transverse gripper bars shown at 6, 6a for example, which serve to transport a plurality of sheets 7 of cardboard, paper, plastic or the like from a sheet feed station to an operating station between the platens 2 and 4. Normally, about seven gripper bars are spaced along and between the chains 5. The movement of the chains is intermittent and may be in the direction as indicated by the arrow A. While the feed means for the sheets 7 is not shown this will be understood by those skilled in the art without further elaboration.

In the platen press arrangement shown in FIG. 1 it is contemplated that sheet material 7 will be conveyed from a suitable supply means not shown by the gripper bars 6, 6a to a working station where they will be pressed by the reciprocating beam 3 between the platens 2 and 4. Where, for example, the sheet material 7 is to be embossed at various points on its surface, it may be desired to deposit a metallic foil in such places on the sheet 7. It is therefore necessary to convey metallic foil to such places. According to the invention herein this metallic foil is carried between the platens 2 and 4 on a continuous strip B1 and B2 in pressure releasable engagement therewith. Thus, upon contact of the sheet 7 with the foil surface of the strip B1, B2 the foil will be deposited on the sheet 7. Since in most cases the entire strip B1, B2 is covered with foil, it is important to utilize as much of the foil covered surface as is possible to keep the waste to a minimum. According to my invention the foil bearing strip material is kept to a width just slightly greater than the embossed image and passed through the operating station in the areas where the embossment is to occur. Usually the sheet 7 will comprise a plurality of repetitious designs in which case a plurality of embossments may be located along the length of the relatively narrow foil bearing strip. In many cases movement of the strip material B1, B2 the full length of the sheet 7 would leave large areas of the foil bearing strip unused. In such cases I have found it possible to utilize this otherwise wasted material by closely controlling the movement of the foil bearing strip material so that it will move only so far as is necessary to provide full foil surface in the next area to be embossed. In addition, the strip of material is held in firm engagement with the platen 2 so that perfect results are obtained for both flat and embossing work. The advantageous results are obtained by my mechanism as set forth hereinbelow in greater detail.

As shown in FIG. 1 coils 10, 10a of strip material B1, B2 are each rotatably mounted on a lever means 11, 11a which lever means in turn are mounted on horizontal bars 12, 12a extending parallel to the axes of the coils 10, 10a. The lever means 11, 11a are transversely displaceable along the length of the horizontal bars 12, 12a respectively and may be stopped and held in a desired position by a set screw 13, 13a respectively. The bars 12, 12a may have their ends anchored on side panels of the press not shown and may also be mounted for

controlled rotation. While it is contemplated that one, two or more coil carrier means and feed control means may be provided it will be understood that the construction of each will be similar and accordingly the details of construction and operation will be explained only with regard to one of the coil carrier means except insofar as they cooperate together.

The coil of strip material 10 is fastened on its lever 11 by means of an expansible chuck 14. The chuck 14 has an adjustable braking system which allows for a more or less free unwinding or unreeling of the strip material B1. Since such chucks are known in the prior art a further detailed description is unnecessary. It will be understood by those skilled in the art that where the width of the strip B1 is considerably less than the width of the platen 2 that a plurality of coil-carrier levers 11, 11a may be mounted on each of the bars 12, 12a. It is also obvious that the device may comprise only one bar 12 or a greater number of bars such as four.

From the coil carrier means 12, 13 and 14 the strip material unwinds from the coil 10 and passes into a feed control means which controls the feed of strip material B1 by intermittently unrolling predetermined feed lengths. The feed control means, which may also be termed a feed and unwinding means, includes a feed roller 15 having a pressure roller 16 bearing thereagainst with a pressure determined by, a pressure adjusting means 17 through 21. As shown, the strip material B1 passes over a portion of the circumference of the feed roller 15 and is held thereagainst by pressure roller 16 to assure that the length of strip B1 will be accurately fed. The force with which the pressure roller 16 forces the strip B1 against the feed roller 15 is adjustable by a spring 17. The spring 17 may be compressed more or less by an adjustment screw 18. The member 19 carrying the pressure roller 16 is transversely adjustable on a bar 20 in relation to the position of the coil 10 along the bar 12. A locking screw 21 allows the member 19 to be secured in position along the bar 20. A plurality of feed rollers such as 15 will be present depending upon the number of strips of material being fed to the operating station. In all cases there will be at least as many feed control devices as there are strips of material. For conveying wide strips of material it is preferably to use several pressure rollers 16 per band. A second feed roller 15a with a pressure roller 16a and a transversely displaceable support member 19a is shown for the strip B2 which originates from the coil 10a.

From the feed roller 15, the strip B1 is subsequently guided about the upper beam 1 in a direction of displacement opposite the direction of displacement of the sheets 7 by means of guide returns 22, 23, 24, 25, 26, 27 and 28. One or more of the strips, as for example, the strips B1 and B2 may pass in side-by-side, generally parallel relationship over the guides. All or certain ones of the guides 22-28 may be provided with a system creating an air cushion between the guide and the strips of material, B1, B2. The guides 23, 24 are set so that the strip of material B1, B2 may be accurately positioned with respect to the platen 2 and the work station or between the platens 2 and 4.

After passing in a generally C-shaped configuration about the upper beam 1, the strip material B1 is then picked up by a tensioning means generally indicated at 29 which includes a tension roller 30 operating continuously in the direction of the arrow C at a peripheral

speed substantially higher than the feed speed of the strip material B1. At least one pressure roller 31 urges the strip B1 against the tension roller 30. The pressure in the nip between the rollers 30 and 31 may be adjusted by a system identical to the one used to urge the strip B1 against the feed roller 15. That is, the pressure roller 31 may be rotatably mounted in a support member 34a which support member in turn is pivotally attached to a supporting member 34. A spring 32 mounted between the supporting member 34 and the pivotal portion 34a may have its tension adjusted by an adjustment screw 33. The support member 34 in turn is slidably mounted along a bar 35 and can be fixed in any desired position along the bar by means of a locking screw 36. Where the strip B1 is wide, a plurality of pressure pulleys 31 may be used.

The fact that the tension roller 30 is operated continuously at a speed substantially higher than the feed speed of the strip B1 from the coil 10 and through the feed control roller 15 assures a constant tension of the strip along its path between the feed control roller 15 and the tension roller 30, particularly in the area of the path which is between the platens 2 and 4. This tension is adjustable by changing the force of the pressure pulley 31 upon the tension roller 30 to thereby change the friction force between the strip B1 and the tension roller 31. It goes without saying that there may be as many or more pressure rollers 31 as there are strips. Also there may be several tension rollers.

From the tension roller 30, the strip B1 may be extracted continuously from the press by a system of two rotary brushes 37, 38, for example. It would also be possible to rewind the used strip B1 about a winding shaft 39 mounted in sequence after the tension roller 30. My invention also contemplates that there could be several winding shafts rotating substantially faster but in synchronous with the feed roller 15. The winding shaft must then be equipped with a system permitting the sliding of the used strip coil to avoid breaking of the strip.

From the foregoing it may be seen that the strips B1, B2 are kept continuously under tension by the tensioning means 29 and that the strips move only when the feed control means permit. The regulation of the feed control means as to the length of feed and the sequence of feed may be effected as shown in FIG. 2 by a mechanical means. In this system a cam 40 rotating in a direction indicated by the arrow D contacts a plurality of levers 41 through 45 pivoted about a common axis 140 and mechanically oscillates them. The cam 40 is driven by a suitable driving force of the press and may be synchronized with the press operation. A plurality of lengths of chain 46 - 50 respectively, are suitably fastened along the levers 41 - 45 by blocking members 41a - 45a respectively. The opposite ends of the chains 46 through 50 engage chain wheels 51 through 55 respectively. The chain wheels 51 - 55 are mounted loosely on shafts 115, 115a connected to the feed rollers 15, 15a respectively. Where required the chains 46 through 50 may pass over a shaft 56 carrying chain guide wheels 57 through 61. An electromagnetic clutch 62, 63, 64, 65 and 66 is suitably connected to each of the chain wheels 51 through 55 and, when not activated, turns loosely on the shafts 115 and 115a. When energized the magnetic clutch engages its respective shaft 115 or 115a and causes the shaft to rotate thereby moving the feed rolls 15, 15a. The electro-

magnetic clutches may be put in operation independently of each other in any order by means of a programmed electronic computer for example.

In operation the rotating cam 40 causes the levers 41 through 45 to oscillate up and down about the axis of the shaft 140 in a regular predetermined order, thereby causing the levers to draw in the respective chains and rotate the respective chain wheels 51 through 55 a distance dependent upon the point of attachment of the chain to the lever and the diameter of the chain wheel. Movement of the chain gears 51 through 55 will occur on each cycle, however, this movement will not be transmitted to the shafts 115 or 115a unless the electromagnetic clutches 62, 63, 64, 65 or 66 are energized. With this arrangement it may be seen that each feed roller 15, 15a may be operated by one of a plurality of chain gears mounted loosely on the shafts 115, 115a respectively by means of the independent transmission of the chain gear movement to the shaft with the aid of the electromagnetic clutch. The chains 46 to 50 connected to the levers 41 to 45 by the blocking members 41a to 45a, respectively, are trained about the sprockets 52 to 55, respectively, and may depend from their respective sprockets and be returned by gravity when the respective magnetic clutches are disengaged and the sprockets are freely rotatable on their shafts 115 and 115a. With the system shown it is possible to unwind the strip B1 by means of feed control roller 15 at two preset predetermined feed lengths and to unwind the strip B2 through feed control roller 15a with three different preset feed lengths. It is of course possible to add further chain gears to each shaft and thereby increase the number of different feed lengths. The chain wheels receive their movement for example from the chains being moved a certain lineal distance. This distance may be different and individually adjustable for each chain wheel. The coupling of one or another of the chain wheels will produce a different rotation of the feed roller. The intermittent unreeling of these strips thus is caused by an oscillating mechanical system on which the desired feed lengths are directly transmitted. The electromechanical clutches may be put in operation independently of each other in any order, by means of a programmed electronic computer.

From the foregoing disclosure it may be seen that I have invented an efficient strip feed mechanism for a platen press wherein a strip of material may be quickly and efficiently passed through an operating station to allow delivery of perfect results both for flat work and for embossing work and to assure a complete utilization of the strip material.

Although minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such modifications as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. In an embossing and laminating platen press, opposed lower and upper platens movable toward each other to produce laminating and embossing operations, endless conveyor means having gripper means spaced therealong gripping and advancing sheets of material to said lower platen, at least one elongated strip of metallic material, a reel for said material at one end of said platens, means guiding the material along the underside of the upper platen and top of the sheet of material ad-

vanced thereto by said conveyor means, said guide means including a feed roll and a pressure roll establishing a pressure nip for the metallic material, means intermittently driving said feed roll and drawing the material from said reel in predetermined lengths, means guiding the sheet of material from said platen including a series of guide rolls, and a tension roll and a pressure roll maintaining the pressure nip for the sheet of material, said tension roll being driven at a higher rate of speed than said feed roll to maintain the strip of material under predetermined tension and draw the material from said platen for coiling or further use.

2. The press of claim 1, wherein the pressure rolls are spring-biased and means are provided for adjusting the pressure of said rolls against said feed rolls and tension rolls respectively.

3. The apparatus of claim 2, wherein the guide means guiding the strip of material to said tension roll guides the material about said platen and said tension roll is on the same side of said platen as said feed roll.

4. The apparatus of claim 3, wherein the reel, feed roll and tension roll are adjustable in a direction transversely of the length of the strip of material being conveyed, to accommodate the training of more than one strip of material along said upper platen in side-by-side relation with respect to each other.

5. The apparatus of claim 3, including at least two reels mounted for adjustable movement laterally of the platen to accommodate the training of metallic material from said reels in side-by-side relation with respect to each other and individual feed rolls and pressure

rolls for each strip of material.

6. The apparatus of claim 5, including independent drive means for each feed roll and a magnetic clutch for each feed roll effecting a selective drive to each feed roll.

7. The apparatus of claim 4, including cooperating pressure rolls having a nip therebetween and brush-like surfaces drawing the material from said tensioning roll and allowing a predetermined amount of slippage of the rolls over the surface of the strip material.

8. The apparatus of claim 5, wherein the means driving the feed roll comprise a rotatably driven cam, a series of levers oscillatably moved up and down by said cam and flexible drive connections from said levers to said rolls including sprocket wheels coaxial with the axes of said rolls and clutch means connecting said sprocket members in driving engagement with said rolls.

9. The apparatus of claim 8, wherein the drive to said feed rolls is varied by varying the drive connection of said flexible drive members to said oscillating levers and thereby varying the length of stroke of said flexible drive members.

10. The apparatus of claim 9, including individual shafts for said feed rolls, sprockets on said shafts in side-by-side relation with respect to each other and magnetic connecting selectively connecting said sprockets to said shafts to effect the drive to said feed roll at preselected speeds and feed lengths.

* * * * *

35

40

45

50

55

60

65