

[54] **DEVICE FOR HOT EMBOSsing WITH COLORED ROLL FOILS**
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[22] Filed: **Nov. 20, 1970**
[21] Appl. No.: **91,330**
[30] **Foreign Application Priority Data**
Nov. 22, 1969 Germany.....P 19 58 824.0
[52] **U.S. Cl.**.....**101/25**
[51] **Int. Cl.**.....**B41f 3/18, B41k 3/58**
[58] **Field of Search**....101/25, 27, 250, 281, 55, 336, 101/8, 9, 10, 11, 21

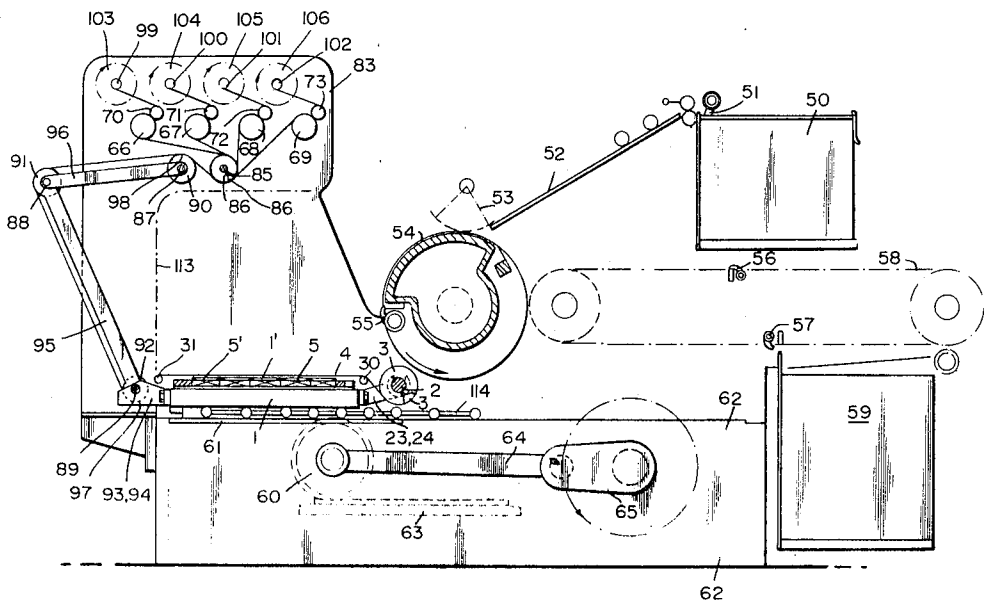
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[57] **ABSTRACT**
Cylinder printing press includes a press bed, a device for hot embossing with colored roll foil including means for mounting a plurality of stamping dies on the press bed, a spindle for carrying a colored foil roll located at one end of the press bed, foil transfer rollers and a take-up spindle for depleted colored foil roll located at the other end of the press bed, and a plurality of guide rods disposed between the spindles for guiding the foil in a path over and slightly spaced from the stamping dies, a machine frame for carrying the foil transfer rollers, the foil take-up spindle being mounted on the machine frame, oscillating drive or transmission means forming a connecting bridge between the type bed and the machine frame, the oscillating transmission means comprising a coupling member and a rocker arm pivotally connected to one another and respectively connected pivotally to the type bed and to the machine frame, a plurality of deflecting rollers mounted respectively at the pivotally points of the coupling member and the rocker arm, the oscillating transmission means being actuable for drawing discharging foil lengths stepwise over the deflecting rollers from the foil transfer rollers and the take-up spindle located at the machine frame.

6 Claims, 4 Drawing Figures



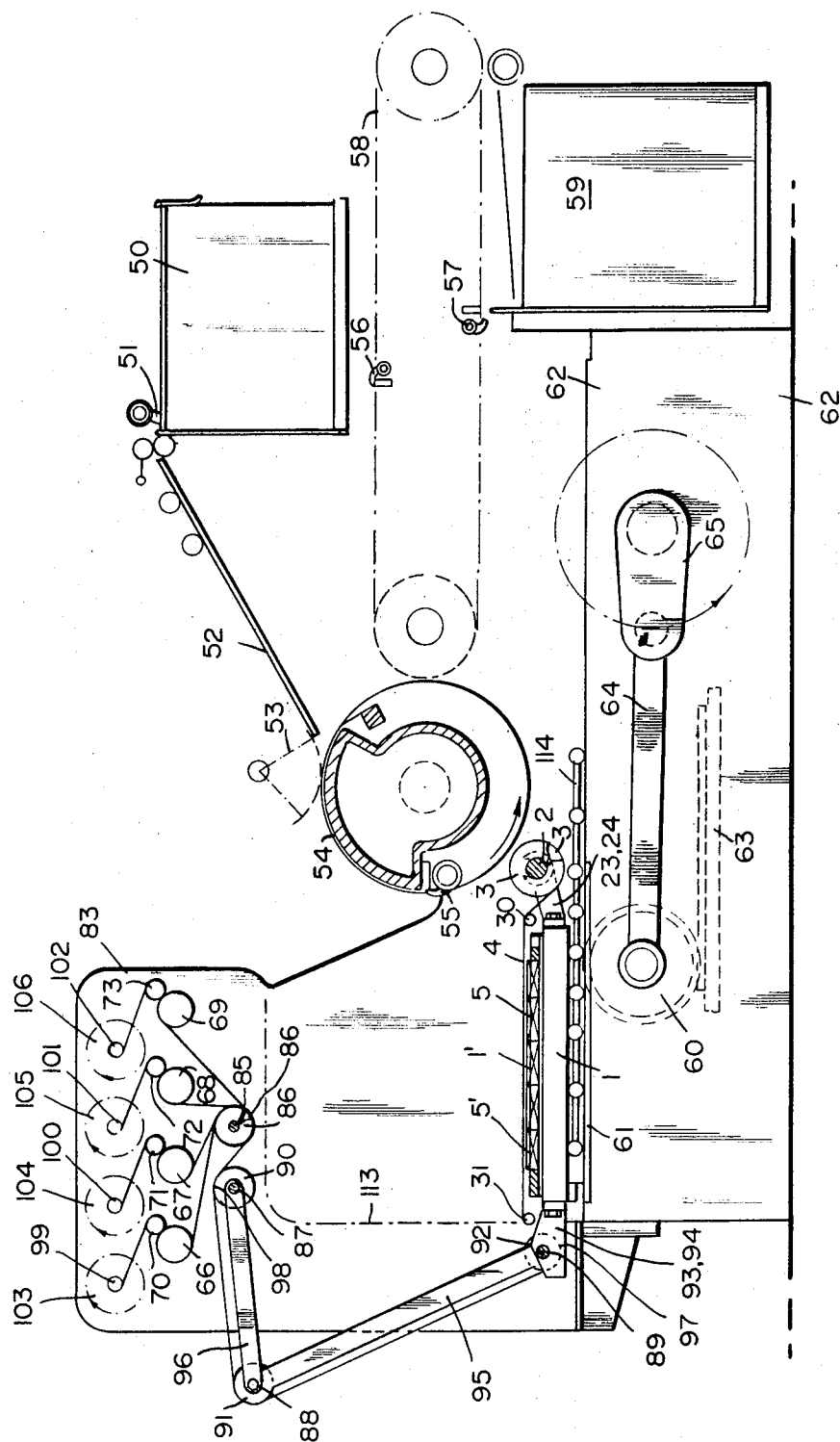


FIG. 1

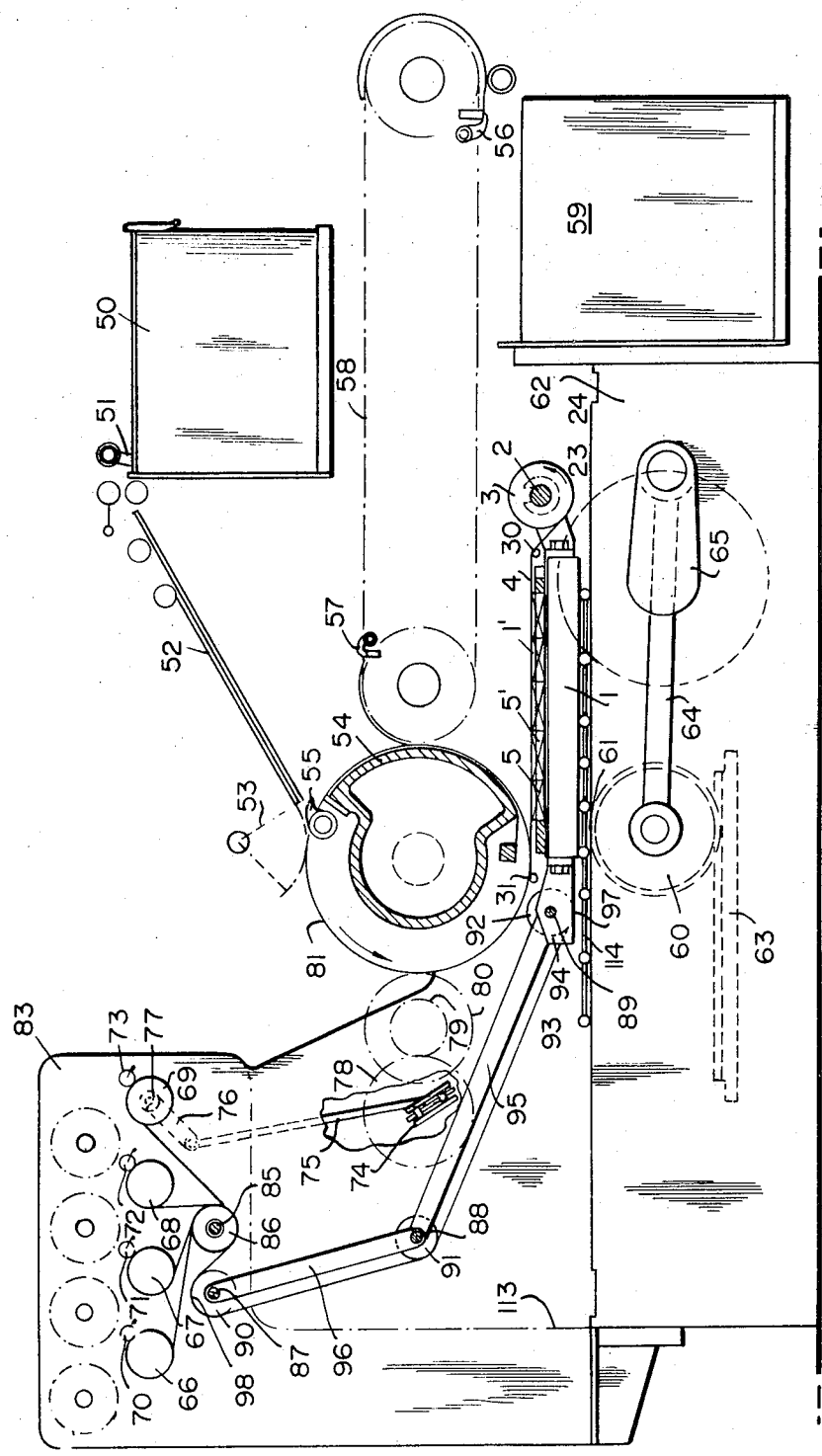


FIG. 2

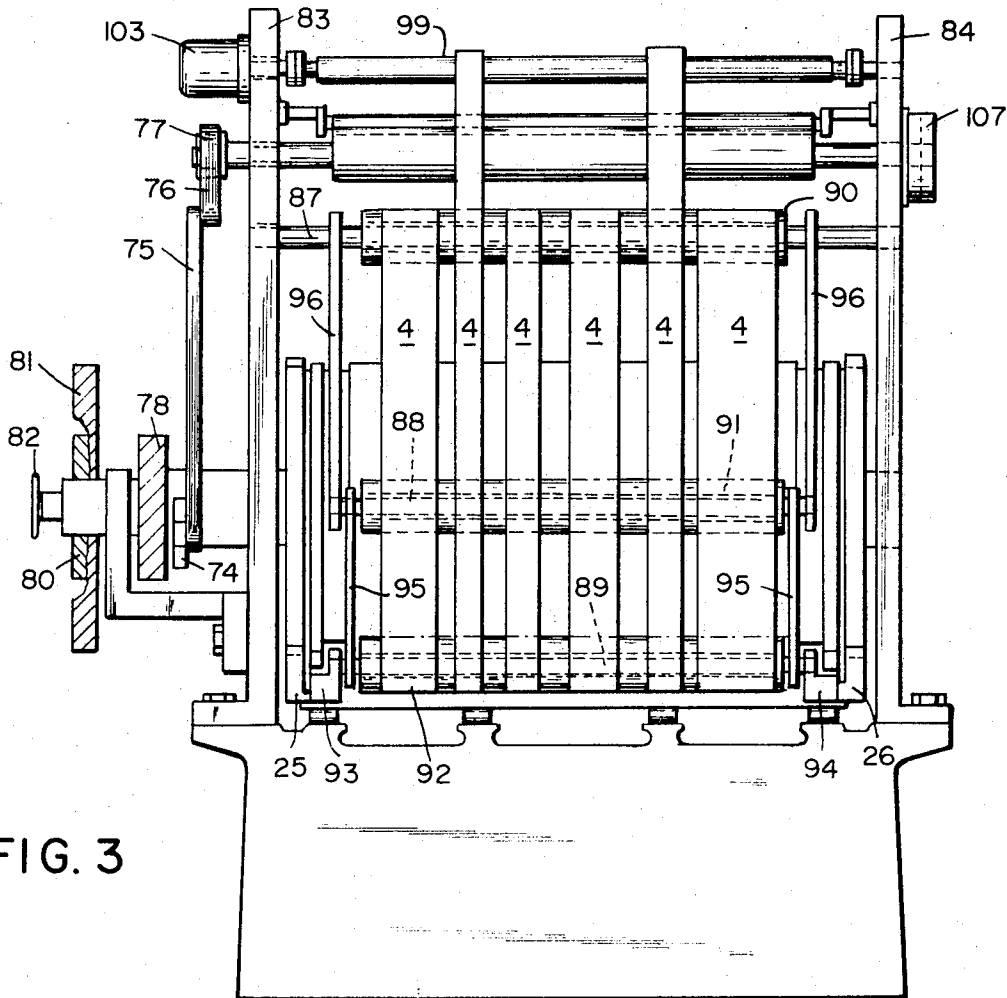


FIG. 3

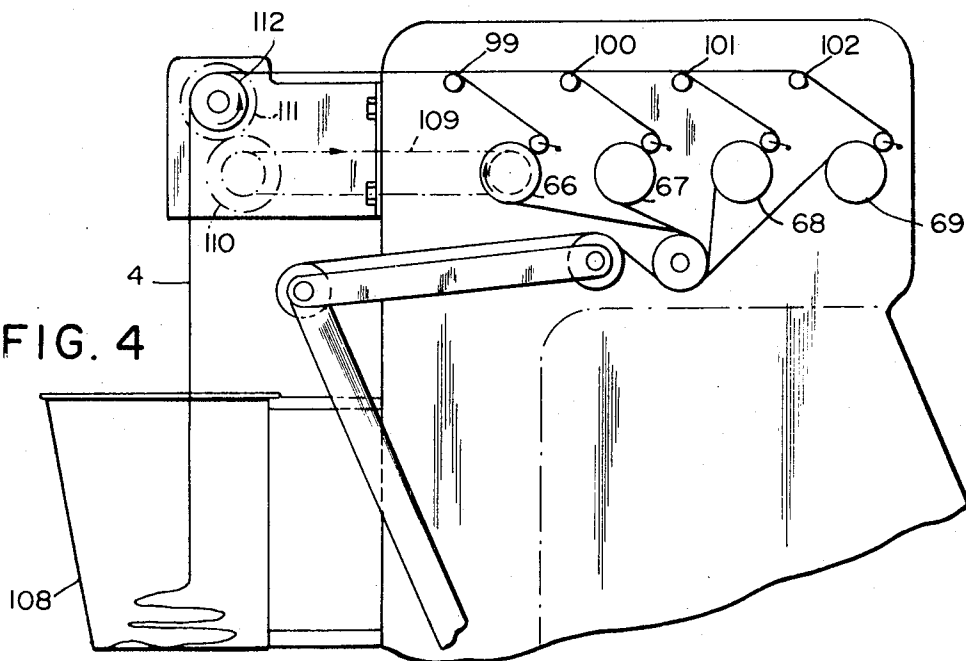


FIG. 4

DEVICE FOR HOT EMBOSsing WITH COLORED ROLL FOILS

The invention relates to a device for hot embossing with colored roll foils in high-speed cylinder presses of all types, and more particularly in a cylinder press which includes a press bed, a device for hot embossing with colored roll foils including means for mounting a plurality of stamping dies on the press bed, a spindle for carrying a colored foil roll located at one end of the press bed, foil transfer rollers and a take-up spindle for depleted colored foil roll located at the other end of the press bed, and a plurality of guide rods disposed between the spindles for guiding the foil in a path over and slightly spaced from the stamping dies.

A feature of the corresponding application Ser. No. 28,882 of A. Buttner, filed Apr. 15, 1970 and assigned to the same assignee as that of the instant application, is that the reciprocating type bed of the high-speed cylinder press carries, in addition to the required heating device for the embossing operation, the means for supplying the still unused foil to the stamping dies and the means for recycling the used foil. This means comprises essentially the still unused foils rolls proper, devices for producing an intermittent travel in point of time occurring beyond the embossing or stamping operation proper, and preferably varying for the individual foils, as well as take-up drums for the depleted foils which are driven independently of one another. The advantage of this construction is that all motions that are produced by the travel elements and by the take-up mechanism are solely effected as relative motion of the foils with respect to the type bed. The reciprocating motion of the type bed remains without influence or effect kinematically on the drive means of the foil transfer. For high requirements demanded of the machine with respect to the most economical utilization of the foils, especially for large formats with sharply varying and irregularly distributed embossing or stamping surfaces, the necessity arises for employing a multiplicity of foil lengths with varying travel paths over the width of the machine.

With respect to their disposition at the type bed, the weight of the devices provided therefor considerably increases the force of gravity on the drive means of the type bed producing the reciprocated motion. Also, limits are placed upon the possibility of spatially locating the device for producing the intermittent travels.

It is accordingly an object of the invention to provide a device for hot embossing with colored roll foils with a stationary machine frame at which means for producing the intermittent travel of the individual foil length as well as means for recycling the previously used foils at the stationary machine frame are located so that the reciprocating motion at the type bed freed from these devices produces no significant additional gravity force.

It is a further object of the invention to attain freedom of choice in the selection of the travel transmissions being used with respect to the quantity and the type of construction thereof.

It is also an object of the invention to avoid any influence or effect upon the foil motion by the reciprocation of the type bed.

With the foregoing and other objects in view there is provided a cylinder printing press includes comprising a press bed, a device for hot embossing with colored

roll foil including means for mounting a plurality of stamping dies on the press bed, a spindle for carrying a colored foil roll located at one end of the press bed, foil transfer rollers and a take-up spindle for depleted colored foil roll located at the other end of the press bed, and a plurality of guide rods disposed between the spindles for guiding the foil in a path over and slightly spaced from the stamping dies, a machine frame for carrying the foil transfer rollers, the foil take-up spindle being mounted on the machine frame, oscillating drive or transmission means forming a connecting bridge between the type bed and the machine frame, the oscillating transmission means comprising a coupling member and a rocker arm pivotally connected to one another and respectively connected a pivotally to the type bed and to the machine frame, a plurality of deflecting rollers mounted respectively at the pivot points of the coupling member and the rocker arm, the oscillating transmission means being actuable for drawing discharging foil lengths stepwise over the deflecting rollers from the foil transfer rollers and the take-up spindle located at the machine frame.

The type bed forms, so to speak, the driving transmission. The rocker arm is mounted above the type bed in the machine frame and is connected by a coupling member to the type bed. Preferably, two completely congruent transmissions, respectively pivotally connected to one side of the type bed are used, the pivot points thereof being connected through shafts extending transversely to the longitudinal axis of the machine. These shafts form virtually one member of the lower member pair employed herein, in accordance to the conventional method of indicating the same as known in the transmission art.

The guidance of the foil bands is effected parallel to the center lines of the rocker arm and the coupling member that is in fixed spacing with respect thereto and through freely rotatable rollers which are located on the connecting shafts of both oscillating transmissions. The radius of the freely rotatable deflecting rollers corresponds to the spacing of the foil bands from the center lines of the rocker arm and the coupling member. It can be shown that the length of the band portion taking part in the transfer or transmission remains constant independently of the respective position of the type bed. Thereby, relative motion of the foil bands with respect to the type bed does not take place in spite of the reciprocating motion. Beginning with the pivot point of the rocker arm at the machine frame, the individual bands are separately supplied to different travel and take-up units that are located at the machine frame in an adequately large number and in a freely available choice of the driving means. The travels imparted by the travel units to the foil bands alone effect the desired adjustable relative motion of the foils with respect to the type bed, in point of time beyond the embossing or stamping operation proper and preferably during the return motion of the type bed.

While the still undepleted or unused foil rolls are mounted on the type bed, the relatively heavy travel and take-up units are located at the stationary machine frame and do not thereby produce any gravity forces. The transmission members pivotally connected to the type bed are considerably lighter than the aforementioned

tioned units. Furthermore, the mass thereof does not interfere fully with the motion of the type bed.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

Although the invention is illustrated and described herein as embodied in device for hot embossing with colored roll foils, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing, in which:

FIG. 1 is a schematic side elevational view of a high speed cylinder press, with an inking mechanism thereof omitted to avoid obliterating details thereof, showing the type or press bed of the printing press in a position before the start of the printing operation with a device for hot embossing roll foils installed on the type bed; travel and take-up units installed at the machine frame, as well as a device for transferring the foil lengths from the type bed to the travel and take-up units;

FIG. 2 is a view similar to that of FIG. 1 showing the high speed cylinder press in a stage thereof before the reverse run of the type bed;

FIG. 3 is a much enlarged top plan view of the left-hand side of the high speed cylinder press shown in FIG. 1; and

FIG. 4 is a fragmentary enlarged view of the left-hand side of FIG. 1 with the take-up unit omitted, and showing a modified form of the high speed cylinder press wherein the depleted foil is advanced into a waste container.

Referring now to the drawing and first, particularly to FIGS. 1 and 2 thereof, there is shown a high speed cylinder press wherein a sheet is removed by suckers 51 from a sheet feed pile 50 and fed over a feed table 52 to advance grippers 53 which, with the sheet gripped thereby, swing in a direction toward an impression cylinder 54 rotating in the direction of the arrow associated therewith and transfer the sheet to cylinder grippers 55 located on the impression cylinder 54.

A press or type bed 1 is mounted in the printing press and is reciprocatingly displaced in a conventional manner in synchronism to the revolving impression cylinder 54, the toothed racks 25 and 26 (FIG. 3) meshing with nonillustrated tooth segments fastened to the impression cylinder 54. Embossing stamps or stamping dies 5 are mounted on the press bed 1, and as these pass below the impression cylinder 54, the hot embossing operation occurs wherein color pigments are melted under pressure out of the roll leaf foil along the path 4 thereof. Delivery grippers 56 and 57, which are secured to a revolving endless chain 58, pass the sheet to a delivery pile 59. The reciprocating motion of the press bed 1 is effected in a conventional manner, for example by means of a roller wheel 60 having a toothed periphery which meshes in a toothed rack 61 at the press bed 1, as well as with a toothed rack 63 firmly secured to the stationary base frame 62. A connecting

rod 64 connects the roller wheel 60 with a crankshaft 65 rotating in the direction of the arrow associated therewith, and the roller wheel 60 and press bed 1 are thereby reciprocatingly displaced. The press bed 1 runs in a conventional manner in several runways or courses on roller carriages 114.

In the description of the figures hereinbefore, only the conventional devices of high speed cylinder presses have been mentioned. The novel feature of my invention is the coordination of the hot embossing device proper with the reciprocably displaceable press bed 1 and the foil conveying transmission at the stationary machine frame.

A heat insulating bed 1' is carried by the press bed 1, and at the end of the latter facing the sheet feed table, there is mounted in bearings 23 and 24, a spindle 2 which is insertable from above and on which leaf foil rolls 3 are disposed. As can be readily seen in FIGS. 1 and 2, the spindle 2 and the foil rolls 3 mounted thereon can be easily removed from the bearings 23 and 24 by raising the same therefrom so that, after the foil rolls 3 have been used up, replacement rolls can be inserted in the bearings 23 and 24. In a conventional manner, the foil rolls 3 are fixed against lateral movement on the foil roll spindle 2. The foil extends from the foil roll spindle 2 along a path 4 over a guide rod 30. Thereafter the foil path 4 extends across the embossing or stamping dies 5 which are heated to about 120°C and is slightly spaced therefrom. The foil then passes over a guide rod 31 at the other end of the press bed 1. The embossing dies 5 are secured on a heating plate 5' in a suitable array. The heating plate 5' proper is clamped as a locking frame in a conventional manner on the press bed 1 or, in a variation therefrom, is tightly screwed thereon. Through a nonillustrated electric cable towing device, energy is supplied to the heating plate 5' which is thereby brought to the required temperature. The temperature is maintained constant by suitable nonillustrated temperature sensing devices and thermostatic controls.

In the course of the displacement of the press bed 1 from the position thereof shown in FIG. 1 to the position thereof shown in FIG. 2, the foil embossing occurs wherein the material or sheet seized by the gripper 55 and which is disposed on the impression surface of the impression cylinder 54, is pressed against the heat embossing or stamping dies 5. The color pigment of the stretch or length 4 of the foil, which is disposed between the embossing dies 5 and the sheet which is to be embossed, is transferred to the sheet. As is generally known, the colored roll foils are formed of cellophane foils on which, with the addition of wax or paraffin, the color pigments, such as gold or silver dyes, are deposited. Preferably, the heating plate 5', which carries the embossing dies 5, is insulated in a conventional manner from the press bed 1, for example by means of asbestos foils 1', so that no heat or only a very small amount of heat is transmitted downwardly.

During the period in which the press bed 1 reverses its travel from the position thereof shown in FIG. 2 to the position thereof shown in FIG. 1, if necessary also somewhat shortly before the start of the embossing operation proper, further travel of the foil in the required and adjustable length thereof, is produced. So-called foil transfer rollers 66, 67, 68 and 69 effect

the foil feed; in this illustrated embodiment, four members for four independent travel paths. In a conventional manner, these rollers have a rippled or corrugated surface. Rollers 70, 71, 72 and 73 have a rubber surface pressing against the surface of the rippled rollers 66, 67, 68 and 69, under biasing action of nonillustrated springs, and are swingable away from engagement with the respective rippled rollers in order to cut off the travel paths of the individual foils. The rippled rollers 66, 67, 68 and 69 and the rubber rollers 70, 71, 72 and 73 are mounted in the lateral walls 83 and 84 of the machine frame. Between each of the foil transfer rollers 66, 67, 68 and 69, that are formed with rippled surfaces, and the respective rubber-surface rollers 70, 71, 72 and 73, one or more foil lengths are passed. The foil transfer rollers 66, 67, 68 and 69 are rotated intermittently in a conventional manner, for example, by means of small electric step motors that have switching steps that are infinitely adjustable, to a setting which corresponds to the maximum size of the sheet to be imprinted, or are rotated mechanically by a sliding pin drive or throttle crank 74, as is shown in FIG. 2 only for one of the travel units 73, 69, in the interest of clarity. The crank 74 that is infinitely adjustable in the radius thereof, drives the rocker arm 76 through the coupling arm 75, the rocker arm 76 experiencing displacements in alternating rotary directions. The size of the oscillating angular displacements is independent of the adjusted crank radius. The one-way coupling or clutch 77 (directional coupling or free-wheeling) only transmits the rotation in the direction of the associated arrow to the foil transfer roller 69 and thereby to the respective foil length or lengths. The setting of the crank 74 through the reduction gears 78, 79, 80, 81 is coordinated with the impression cylinder 59 so that the foil transfer is completed in the desired time interval. The length of foil travel is determined by the radius of the crank 74 which is infinitely adjustable by a nonillustrated spindle transmission at the handwheel 82 (FIG. 3).

The guidance of the foil length from the type bed 1 to the foil transfer rollers 66, 67, 68 and 69 takes place over the deflecting or idler rollers 92, 91, 90 and 86, respectively. There are always present as many deflecting rollers 92, 91, 90 and 86 as the number of foil lengths or paths that are employed.

In the lateral walls 83 and 84 of the machine frame, a spindle 85 is mounted in divided form, i.e., half thereof being suspended from one of the lateral walls and the other half in the other of the lateral walls, so that the spindle 85 is able to be removed quite readily. The freely rotatable deflecting rollers 86 are disposed with respect to the number and width thereof in accordance with the disposition of the foil lengths or paths over the spindle of the machine so that they are freely rotatable relative to one another and with respect to the spindle 85. In a similar manner, the deflecting rollers 90, 91 and 82 are rotatably mounted on the spindles 87, 88 and 89, respectively.

The spindle 89 is also mounted in divided form so as to be easily removable, in the bearing brackets 93 and 94 that are secured to the type bed 1, and serves not only for receiving the deflecting rollers 92 but also serves simultaneously as articulated rod pin or wrist pin for the coupling arms 95 of an oscillating slide trans-

mission formed of the members 1, 95 and 96. The coupling arms 95 are moreover mounted so as to be freely rotatable on the spindle 88, while rocker arm 96 is rigidly connected to the spindle 88 and the spindle 87. The spindle 87 is freely rotatable in the frame lateral walls 83 and 84. The spindles 88 and 87 are advantageously constructed in divided form so that an interchange of the deflecting rollers 90 and 91 can be effected rapidly and without disassembling of the transmission component when instituting other operations. The deflecting rollers 90, 91 and 92 have the same diameter. The foil lengths are thereby guided parallel to center lines of the transmission components. If one were to consider the point 97 as being the supply point, and the point 98 as being the discharge point of the foil length, then the section of the foil length participating in the transfer, independently of the respective position of the type bed 1, is always so long as the sum of the spacing from the spindle center 87 to the spindle center 88 and from the spindle center 88 to the spindle center 87, with the addition of three arcuate members having the radius of the deflecting rollers 90, 91 and 92 over a total central angle of 180°. The reciprocation of the type bed 1 is not imparted to the foil length and thereby to the adjacent travel path due to these length constants that are independent of the type bed movement.

Wind-up of the foil lengths 4 that have been depleted due to the embossing operation is effected by take-up spindles 99, 100, 101 and 102 by means of rotary field magnets 103, 104, 105 and 106. Wind-up of all the lengths of the foils, respectively, independently of one another is thereby effected. The rotary field magnets 103, 104, 105 and 106 are polyphase, alternating current, asynchronous motors. They serve to produce torques when at a standstill or when running slowly over given rotary angles. These rotary field magnets are always subjected to current and require no control. As soon as the foil lengths 4 are drawn past the transfer rollers 66 through 69, the depleted foil band is wound with slight force tightly on the take-up spindles 99, 100, 101 and 102. The take-up spindles are of divided construction and are removably installed so that the wound foil drums are readily removable. From the outside, easily adjustable multiple disc brakes 107 continuously exert a slight braking movement on the foil transfer rollers 66, 67, 68 and 69 so that the rotary field motors, during the displacement phase in which the travel rollers are uncoupled by the free wheeling drive 77, exert no tension on the foil lengths. In a similar manner, the free wheeling device is prevented from overriding during the travel phase. At the intentional interruption of the travel of the foil by swinging away rubber rollers 70, 71, 72 and 73, the current to the rotary field magnets is simultaneously suspended.

If the foil that had been employed is no longer to be used, which is the case when it has become almost completely depleted, the rewinding thereof is dispensed with. In FIG. 4 there is shown how the depleted foils are advanced out of the machine.

Starting with foil transfer roller 66 which lies closest to the collection basket 108, a reduction gear 110, 111 is driven through a roller chain 109. The ratio of the transmission is selected so that the wheel 111 rotates somewhat faster than the foil transfer roller 66. Winch or reel 112 is firmly connected for rotation with the

wheel 111 and is provided on the periphery thereof with sandpaper or similar material for increasing the frictional surface thereof. This winch or reel 112 can also be formed of rods arranged in the form of a star, and covered with sandpaper. If one were to assign or apportion to the foil transfer roller 66 the greatest travel path called for with the respective operation, the rotary speed of the winch or reel 112 is always greater than that of any of the foils. The take-up spindles 99, 100, 101 and 102 serve only as guide rods for the independent foils which are supplied to the reel or winch 112. Due to the very great speed of the reel or winch 112, the foil lengths are held tightly and are advanced into the collection basket 108.

Installation of the machine is advantageously effected in the position of the type bed shown in FIG. 1. The lateral portion 84 of the machine frame is of such construction that relatively good accessibility is afforded to the type bed 1 in the illustrated position. The dot-dash line 113 shown in FIGS. 1 and 2 defines the shape or outline of the lateral wall 84 of the machine frame. In order to permit the lateral portion 84 of the frame to have this shape, all drive mechanisms are advantageously provided at the lateral wall 83 of the machine frame.

I claim:

1. In a cylinder printing press having a stationary machine frame, track means on said stationary machine frame, a press bed mounted on said track means and reciprocably displaceable thereon, a device for hot embossing with colored roll foil including means mounting a plurality of stamping dies on said reciprocable press bed, a spindle for carrying a colored foil roll located on one end of said reciprocable press bed, foil transfer rollers and means for eliminating a depleted colored foil roll mounted on said stationary machine frame at a location thereof remote from said one end of said press bed, a plurality of guide means disposed between said spindles for guiding a colored foil from a roll thereof located at said one end of said reciprocable press bed to the other end of said press bed and from there to the foil transfer rollers and the depleted foil roll eliminating means mounted on said stationary machine frame, an oscillating slide transmission forming a connecting bridge between said reciprocable press bed and the foil transfer rollers mounted on said stationary machine frame and com-

prising coupling arm means and rocker arm means pivotally connected at one end, respectively, thereof to one another and at the other respective ends thereof to said other end of said reciprocable press bed to said stationary machine frame adjacent said foil transfer rollers, respectively, said plurality of guide means including deflecting rollers respectively mounted at the pivot connections of said coupling arm means and said rocker arm means, and means for drawing lengths of the colored foil stepwise from the roll thereof over and slightly spaced from said stamping dies and along said coupling arm means and rocker arm means to said foil transfer rollers.

2. In a printing press according to claim 1 wherein said means for eliminating a depleted colored foil roll comprise foil take-up spindles, and rotary field magnets for driving said take-up spindles.

3. In a printing press according to claim 1 wherein said means for eliminating a depleted colored foil roll comprise a winch rotatably mounted on said stationary machine frame, means operable by one of said foil transfer rollers for driving said winch, and a collection basket disposed in vicinity of said winch for collecting the depleted coiled foil therein.

4. In a printing press according to claim 1 wherein said stationary machine frame has a pair of mutually spaced opposite lateral walls and said means for eliminating the depleted colored foil roll includes at least one drive mechanism, said means for drawing the lengths of colored foil from the roll, and said drive mechanism of said depleted foil roll eliminating means being located in their entirety on one of said lateral walls, the opposite lateral wall being left free of encumbrance by said drawing means and said drive mechanism for affording unhindered access to the stamping dies of said reciprocable press bed.

5. In a printing press according to claim 1 wherein said spindle located on said one end of said reciprocable press bed is adapted to carry a plurality of colored foil rolls, and including separate foil transfer rollers and separate depleted foil roll eliminating means for each of said plurality of colored foil rolls.

6. In a printing press according to claim 5 including separate means for drawing lengths of colored foil stepwise from each of said plurality of colored foil rolls, respectively.

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