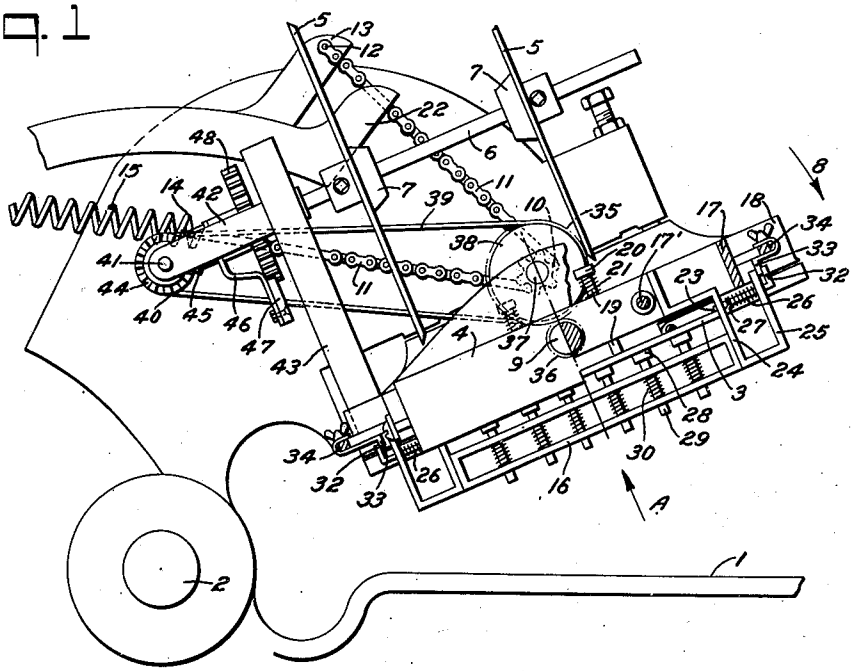
April 4, 1950 E. M. ERIKSEN 2,503,035

AUTOMATIC FEEDING APPARATUS FOR STRIP MATERIAL

Filed Aug. 8, 1946 2 Sheets-Sheet 1

Fig. 1



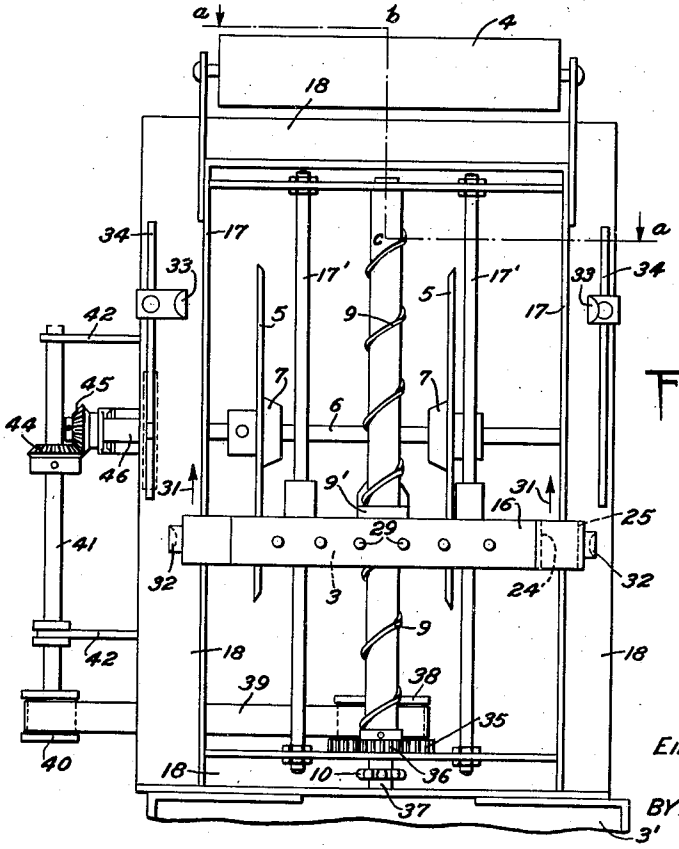


Fig. 2

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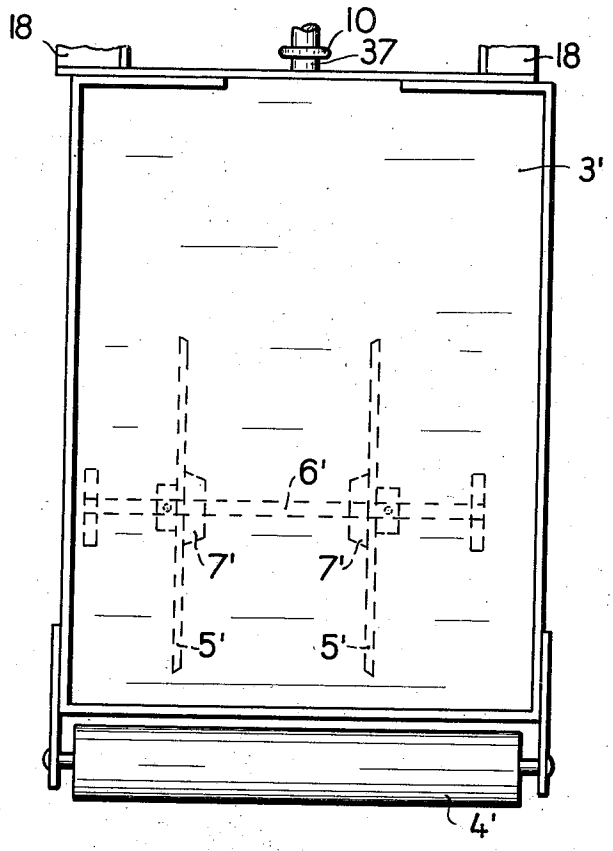
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ATTORNEYS

April 4, 1950 E. M. ERIKSEN 2,503,035

AUTOMATIC FEEDING APPARATUS FOR STRIP MATERIAL

Filed Aug. 8, 1946 2 Sheets-Sheet 2

Fig. 3



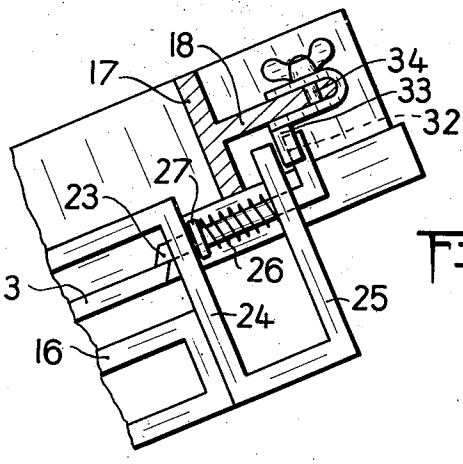


Fig. 4

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UNITED STATES PATENT OFFICE

2,503,035

AUTOMATIC FEEDING APPARATUS FOR STRIP MATERIAL

Einar Marinius Eriksen, Oslo, Norway, assignor to A/S Rull Trykk Industri, Oslo, Norway

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In Norway January 7, 1942

Section 1, Public Law 690, August 8, 1946
Patent expires January 7, 1962

11 Claims. (Cl. 101—288)

1

This invention relates to an automatic feeding apparatus for platen presses and other machines with an operating member for printing in one or more colours, stamping, perforation, embossing or other treatment of material, wherein the operating member is stationary, whereas a counter pressing or impression plate (termed in the following a "printing plate") for the same is arranged on a reciprocatory swinging frame. The carrying, guiding and winding-up parts for the material to be treated or printed upon and a feeding member are arranged on the said frame movably in a direction parallel to the turning axis of the frame in such a manner that the web of material is fed forward in this direction between the working operations. The feeding member proper may consist of a slide which is movable along guides longitudinally on the frame and has a clamping plate and two or more counter pressing members arranged in such a manner, that the web of material is clamped between said members and the clamping plate. According to the invention the frame has two sets of abutments, of which the first set acts upon the clamping plate in order to move it into and lock it in clamping position by means of a locking device at the moment the slide arrives at the initial position for feeding during the motion of the feeding member and the printing plate away from the counter printing plate (the type), whereas the other set of abutments acts upon a releasing mechanism for the clamping plate, when the slide during the opposite motion of the printing plate towards the type has effected its forward feeding of the web of material through a predetermined distance. The first set of abutments may consist of a stationary abutment on the machine frame and abutment pins or screws cooperating therewith, which are movable in the slide and attached to the clamping plate and are under the influence of springs tending to move the clamping plate back from clamping position. The second set of abutments may consist of two pairs of abutments, one abutment in each pair being attached adjustably on the carrying and guiding frame on the slide and the other one of each pair being attached to the locking member in question carried by the slide.

The second set of abutments may consist of two pairs of abutments one abutment in each pair being attached adjustably on the carrying and guiding frame of the slide and the other one of each pair being attached to the locking member in question carried by the slide.

When the abutments of each pair which is

2

carried by the slide during the feeding motion of the slide for pulling forward the web of material pass by the respective abutments attached to the frame, they are caused to move and to withdraw the locking members of the clamping plate so as to release said plate.

Besides, the invention comprises different features, which will appear from the following.

An embodiment of the invention destined especially for platen presses is shown in the drawing, wherein Figure 1 is an end view of the feeding apparatus the left half being seen from the line *a—b* and the right half being a cross section on the line *c—d* Figure 2. Figure 2 is a view of the feeding apparatus from below (direction A in Fig. 1).

Fig. 3 shows a similar underside view as a continuation of Fig. 2.

Fig. 4 shows a detail view of Fig. 1 drawn to a larger scale.

Numeral 1 refers to a platform, which carries the type matter or the printing blocks, which make impression upon a printing plate 3 shown in Fig. 3, both of them swinging to and fro about a shaft 2.

As mentioned above, the feeding apparatus is arranged before the printing plate, a storage roller for the endless material being arranged at one side to receive the impression from the type matter. From this storage roller the material (usually paper) is passed over a roller 4' (Fig. 3) and from the same is bent under the printing plate 3' on to the underside of the feeding apparatus proper (Fig. 2), viz, under a clamping plate 3 on same (see also Fig. 1), further over a roller 4 and finally up on the upper side of the feeding apparatus to a winding-up roller, which is fastened between two discs 5 on a shaft 6, the roller being pushed in between two tapered projections or hubs 7 in the center of these discs. The discs 5 may be adjustable along the shaft 6, according to the position of the web of material to be printed upon, and also according to the width of the web of the material. The said storage roller is arranged on the upper side of the printing plate similar to the winding-up roller, the numerals 5', 6', 7' in Fig. 3 corresponding to 5, 6, 7 in Fig. 2.

The problem is now to feed the web of the material forward into printing position under the printing plate 3 just before the printing plate swings downwards in the direction of the arrow 8 in Figure 1 against the platform 1 in order to receive the impression from the type. As mentioned, this swinging takes place about the

axis of the shaft 2. After the impression having been made, the printing plate 3' and also the feeding apparatus swing up again into upper position opposite the arrow direction 8.

The feeding forward of the web of the material takes place by means of a screw 9, best seen in Figure 2 to which, and a rotating motion back and forward is imparted by means of a chain wheel 10, which is arranged on a short shaft 37 of a gear wheel 35 meshing with a gear 36 on the end of the screw shaft and which cooperates with a chain 11, whose one end at 12 is fastened to a stationary projection 13 on the machine frame, from where it passes in a bight around and in engagement with a portion of the chain wheel 10, and then passes outwards and is connected to its other end 14 with one end of a helical spring 15, whose other end is attached to a stationary point in the frame (not shown).

As will be seen, the chain wheel 10 receives a motion in one direction (clockwise), when the feeding apparatus swings outwards opposite the arrow 8, whereas the wheel 10 receives its motion in opposite direction, when the apparatus swings back in arrow direction 8. This rotating motion back and forward imparted to the wheel 10 will also be transferred to the screw 9, and it is utilized by means of a nut 9', which surrounds and is in engagement with the screw threads and is connected with a slide 16, to move same rectilinearly to and fro, said slide serving to pull forward the paper. This slide with end portions 24, 25 is movable on two bars 17' along guides 17 in the rectangular frame 18 of the feeding apparatus and is seen in end view in Figure 1. In this slide the clamping plate 3 is journaled movably in a direction perpendicularly to the plane of the frame 18, consequently in the direction of the arrow A in Figure 1.

The clamping plate 3 is fixed to guiding pins 19, which are passed through the slide 16 and project up on its upper side in form of screw heads 20, as shown in Figure 1. Between these screw heads and the top side of the slide compression springs 21 are inserted, which surround the pins 19, constantly tend to move the clamping plate 3 in the direction of the arrow A—consequently rather upwards in Figure 1.

However, when the feeding apparatus and the printing plate swing out (opposite the arrow 8), the screw heads 20 will meet a stationary abutment 22 on the machine frame, and thereby will be held stationary, so that the screw heads 20 are pressed downwards relatively to the slide and thereby compress the springs 21 and press simultaneously the clamping plate 3 downwards, so that its edge passes by a locking device in form of shutting bars 23, as shown best in Figures 1 and 4. These bars 23 are movable in the plane of the frame 18 guided in the portions 24 and 25 of the slide 16, and are each under the influence of a spring 26, one end of which engages the portion 25 and the other end of which presses against a small disc 27 attached on the shutting bars 23, so that these bars by the springs 26 tend to be pressed inwards towards the centre of the slide 16. The said edges of the clamping plate 3 are inclined, and the inner end of the shutting bars 23 are also inclined, as is clearly seen from Figure 4.

Assuming that the clamping plate 3 is in its upper most position with its inclined edges above the bars 23 and is pressed down by means of the abutment 22 and the screw heads 20, it will be able, owing to the said inclinations, to move down past the shutting bars 23, and as soon as this has taken place, the bars will snap in over the upper side of the clamping plate and lock it fixedly in this position as shown in Figure 1.

Now the underside of the clamping plate 3 now cooperates with a row of resiliently yielding counter pressing members, each of which has the form of a head 28 on the upper end of a pin 29 movable up and down in holes in the slide 16. Each pin 29 is actuated by a spring 30 tending to press it upwards in the direction of the clamping plate 3.

In this manner one has a set of abutments, viz. the clamping plate 3 and the pin heads 28. Between the underside of the clamping plate on one side and the pin heads 28 on the other side the web of the material is passed forwards (direction 31, Fig. 2) by the feeding apparatus, when the slide 16 is moved in the arrow direction 31 in Figure 2. The paper or material is then clamped fast between 3 and 28 and is pulled along forwards during the motion of the slide driven by the screw 9 from the chain wheel 10 and chain 11.

As soon as the slide during its motion in the arrow direction 31 has pulled the material forward through a distance determined in each case (the size of which depends upon the type on the platform 1), the clamping plate 3 has to lose its grip on the paper, so that the slide may move further in the arrow direction 31 to the end of its travel in the frame 18 without taking the paper along with it. In the arrow direction 31 the clamping plate 3 must therefore be released from the clamping position—consequently from the shutting bars 23—so that by means of the springs 21 it may snap up into its upper position and thereby free the paper. This release or motion of the shutting bars 23 outwards from the slide centre takes place by a second set of abutments, consisting of two member pairs 32, 33. Each member 32 is an upwardly directed projection 32, on the exterior end of each bar 23, and each of the other members is a downwardly directed abutment 33 attached longitudinally adjustably on the exterior portion of the frame 18. The abutments 33 may be adjusted along the frame 18 and clamped fast in slots 34 by screws or the like in such a position that the clamping plate frees the paper, when it has been fed forwards in direction 31 through the length determined in each case.

The abutments 32 are now in such a position relatively to the stationary abutments 33, that they will meet the latter and slide past the same, when the slide 16 has reached forward to the definite position during its travel along the frame 18.

When this takes place, the abutments 33 will force the abutments 32 outwards, whereby the shutting bars 23 are pulled out from the slide centre so as to release the clamping plate 3, whereby the feeding forward of the paper ceases.

After the release of the pressure plate 3, the slide 16 as mentioned will move further to the end of its travel in the arrow direction 31, which takes place during the motion of the feeding apparatus outwards opposite the arrow direction 8. When then the apparatus moves back again, the slide 16 is also passed back opposite the arrow direction 31 to the initial position of its travel, and during this motion the abutments 32 will move past the abutments 33 without it having any influence upon the clamping devices 3, 28.

As mentioned above, a row of counter pressing members 28 in the slide is used. The purpose is

to be able to make use of two or more of these members depending upon the transverse position of the longitudinal portion and upon the width of the paper web which has to receive impression from the type. For this purpose each of the members 28 may be set out of operation by being depressed and held fast in depressed position by simple means not shown. Only the counter pressing members 28 are placed in operation which on either side of the centre line of the paper are located outside the impressed longitudinal portion of the paper, in order to avoid the risk of the members 3 and 28 erasing the impressions or making them unclear by contacting with it.

According as the paper is passed forward by the slide 16, it has to be wound up on the roll, which is journaled between the plates 5. Therefore the shaft 6 simultaneously with the motion of the plate 16 must receive a rotation in the correct direction. This takes place by a gearing from the shaft of the screw 9.

On the shaft 37 of the chain wheel 10 a pulley 38 is keyed, which over a belt 39 is connected with another pulley 40 on a longitudinal shaft 41 resting in bearings 42 on the side of the frame 18 parallel to the screw 9, but somewhat higher than same, as is seen in Figure 1.

The bearings 18 are attached to a plate or bracket 43, suitably made of wood with lateral mountings attached on the upper side of the frame 18, as indicated in Figure 1. The bracket 43 is not seen in Figure 2. It forms a bearing for one end of the shaft 6, which in the other end is preferably arranged freely. The shaft 41 is provided with a bevel wheel 44 in gear with another bevel wheel 45 moving idly on the end of the shaft 6. The wheel 45 is in suitable manner connected fixedly with an arm 46, which also is arranged idly on the shaft 6, and whose exterior end carries a pawl 47 in gear with a ratchet wheel 48, which is keyed to the shaft 6.

Thus it will be seen, that the rotation of the wheel 10 is transferred to the shaft 6 through the members 37, 38, 39, 40, 41, 44, 45, 46, 47 and 48, so that the shaft 6 will move simultaneously with the screw 9 in alternating directions. Thereby the winding roller on shaft 6 is rotated and will wind up the paper according as it is passed forward by means of the slide 16.

However, the winding roller has not to pull the paper further forward after having fed it forward through the determined distance by means of the slide 16. In order to obtain this, a slide coupling must be arranged at some place in the mechanical connection between the wheel 10 and the shaft 6. This may be obtained in the simplest manner by the belt 39 sliding on one of the discs 38 or 40 by its tension being so regulated, that the belt cannot overcome the resistance which is executed by the paper web against the pulling off from the storage roll on shaft 6'. As the transfer to the shaft 6 takes place by the pawl mechanism 47, 48, the shaft 6 is also driven only in this direction, because the pawl will slide over the teeth of the ratchet wheel 48 during the motion in the other direction.

The slip coupling, however, may also be arranged at other places, for instance in the ratchet wheel 48 itself.

The described mechanism with the necessary eventual alterations may of course be used also in other machines than platen presses, such as mentioned in the preamble of this description.

I claim:

1. In an apparatus for automatic stepwise feeding a web of material to be subjected to treatment in a machine provided with an operating member, the combination of such operating member and a counter pressing plate for same with a frame connected with said plate and movable to and fro perpendicularly to an axis, means on said frame for carrying the web so as to enable its feeding forwardly in steps to between the operating member and the counter pressing plate, a feeding member, arranged on said frame so as to be movable to and fro in feeding direction parallel with said axis, means for moving the feeding member, a clamping member arranged on the feeding member movably in a direction perpendicularly to the feeding member and to the feeding direction, counter pressing parts arranged movably on the feeding member so as to cooperate with the clamping member to clamp the web therebetween, two pairs of abutments one for moving the clamping member against its counter pressing parts into a position for clamping the web and another for releasing their clamping operation, the two abutments in the first pair being arranged stationarily on the machine and on the frame respectively so as to cooperate and move the clamping member into clamping position during the moving back of the frame with parts carried thereby in a direction from the operating member and the two abutments of the second pair being arranged on the feeding member and on the frame respectively for releasing the clamping member at the end of the feeding motion.

2. An apparatus as set forth in claim 1, wherein the first pair of abutments comprises a stationary abutment on the machine frame and posts cooperating therewith and movable in the feeding member so as to move the clamping member into clamping position.

3. An apparatus as set forth in claim 1, wherein the first pair of abutments comprises a stationary abutment on the machine frame and spring-pressed ports cooperating therewith and movable in the feeding member so as to move the clamping member against the spring action into clamping position, so that the springs tend to move the clamping member back from said position.

4. An apparatus as set forth in claim 1, wherein releasable locking members are arranged to retain the clamping member in clamping position and are so combined with the abutment on the feeding member as to be released from locking position by said abutment and thereby to release the clamping member at the end of the feeding motion.

5. An apparatus as set forth in claim 1, wherein releasable locking members in form of spring-pressed shutting bars are arranged to retain the clamping member in clamping position and are so combined with the abutment on the feeding member as to be released from locking position by said abutment and thereby to release the clamping member at the end of the feeding motion.

6. An apparatus as set forth in claim 1, wherein means is provided for adjustment of the abutment on the frame in the feeding direction for varying the length of the feeding motion.

7. An apparatus as set forth in claim 1, wherein the counter pressing parts are in the form of resiliently yielding pins in the feeding member, said pins being adapted to be brought into or out of operation so as to be caused to press against the web only on portions of same which are not operated upon by the operating member.

8. An apparatus as set forth in claim 1, where-

in an endless screw is carried rotatably by the frame with its axis parallel with the feeding direction, a nut surrounding the screw and connected with the feeding member and means for rotating the screw in one direction and in another direction according to the moving direction of the feeding member so as to move said member to and fro.

9. An apparatus as set forth in claim 1, wherein an endless screw is carried rotatably by the frame with its axis parallel with the feeding direction, a nut surrounding the screw and connected with the feeding member, a chain wheel connected to the screw, a chain engaging the chain wheel and attached in one end fixedly to the machine frame and in its other end attached yieldingly to the machine frame so as to rotate the screw during the motion to and fro of the movable carrying frame in one direction and in another direction according to the moving direction of the feeding member so as to move said member to and fro.

10. An apparatus as set forth in claim 1, wherein an endless screw is carried rotatably by the frame with its axis parallel with the feeding direction, a nut surrounding the screw and connected with the feeding member and means for rotating the screw in one direction and in another direction according to the moving direction of the feeding member so as to move said member to and fro, a winding-up roll for the web carried by the screw carrying frame, driving parts for rotating the roll in winding-up direction and arranged between the screw rotating means and the roll and including a slide coupling yielding as soon as the web during the motion of the frame towards the operating member has been fed forwards so much as corresponds to the forward feeding length of the web.

11. An apparatus as set forth in claim 1, wherein an endless screw is carried rotatably by the frame with its axis parallel with the feeding direction, a nut surrounding the screw and connected with the feeding member and means for rotating the screw in one direction and in another direction according to the moving direction of the feeding member so as to move said member to and fro, a winding-up roll for the web carried by the screw carrying frame, driving parts for rotating the roll in winding-up direction and arranged between the screw rotating means and the roll and including a slide coupling and a pawl-mechanism, a longitudinal shaft for driving the said mechanism, a pulley arranged in operative connection with the means for rotating the screw, a second pulley attached to the said shaft, a belt connecting both pulleys, and a bevel wheel gearing arranged between the shaft and the pawl-mechanism, said slide coupling being adapted to yield as soon as the web during the motion of the frame towards the operating member has been fed forwards so much as corresponds to the forward feeding length of the web.

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