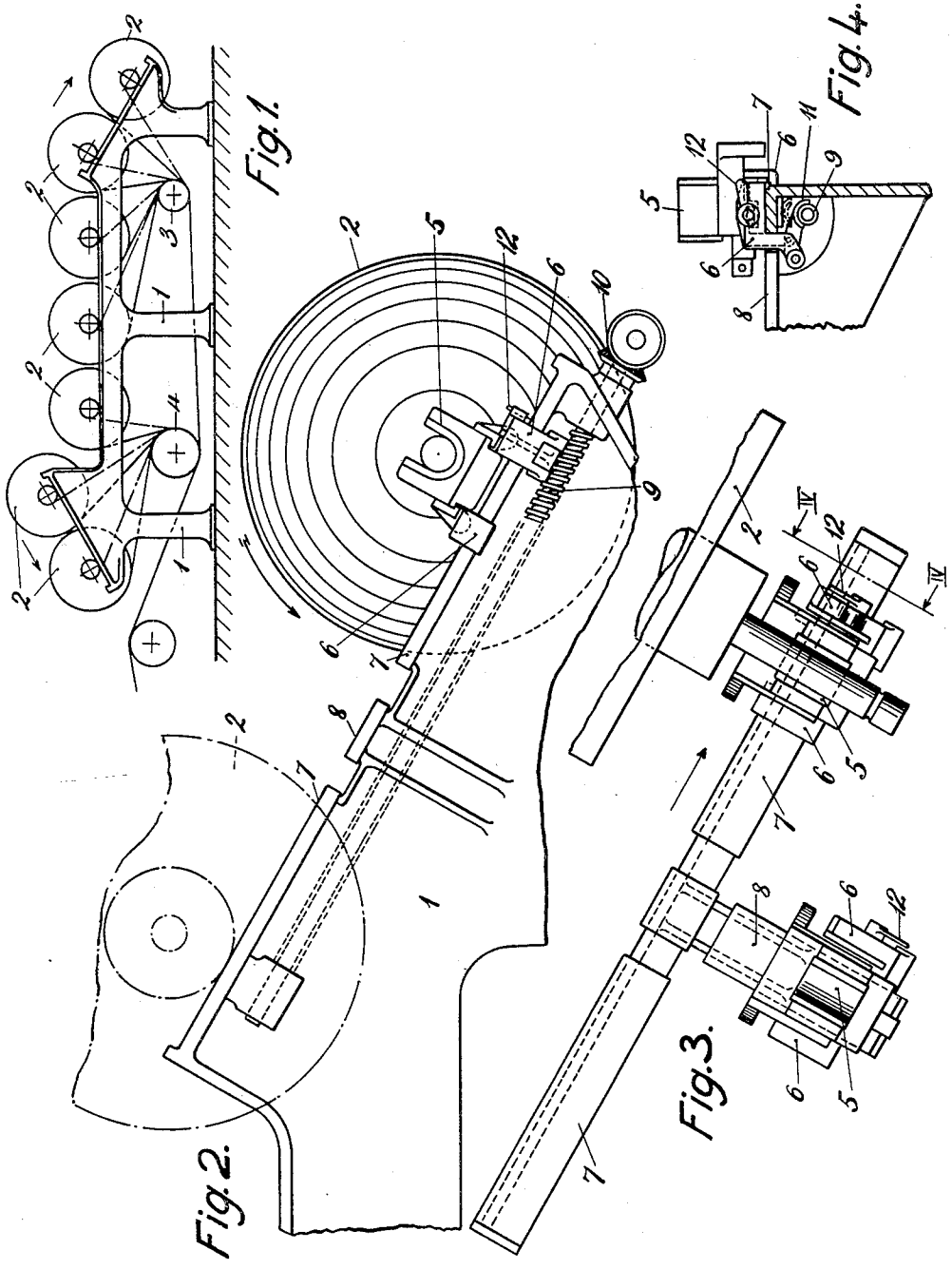
Oct. 10, 1933. F. W. VICKERY 1,930,405

PAPER REELING MACHINE

Filed Dec. 23, 1932 2 Sheets-Sheet 1



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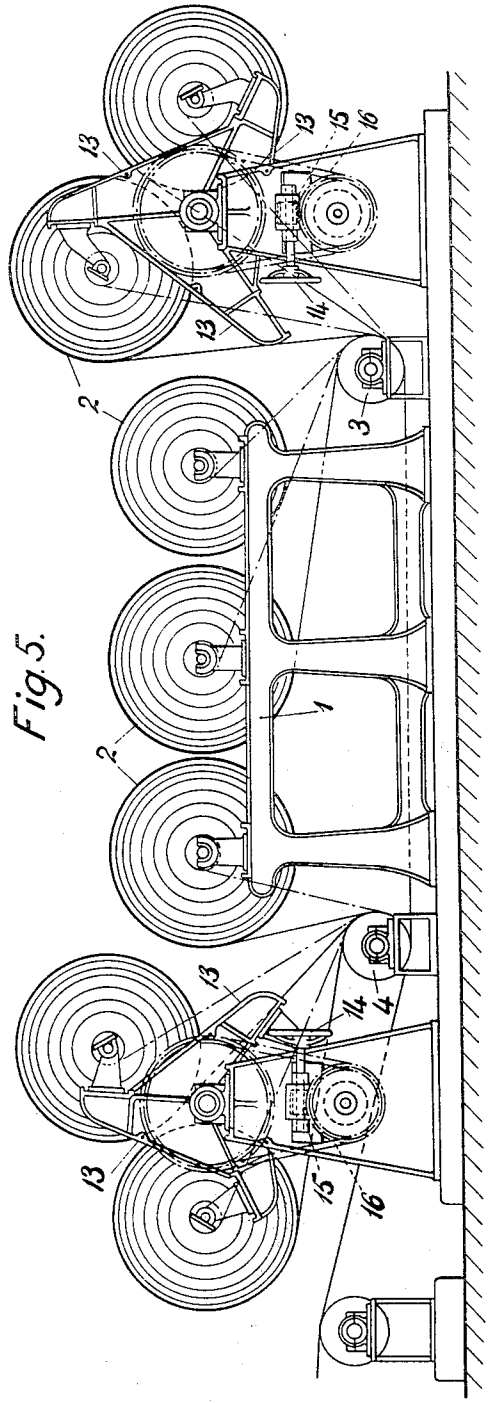


Fig. 5.

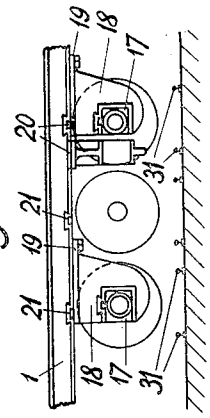


Fig. 7.

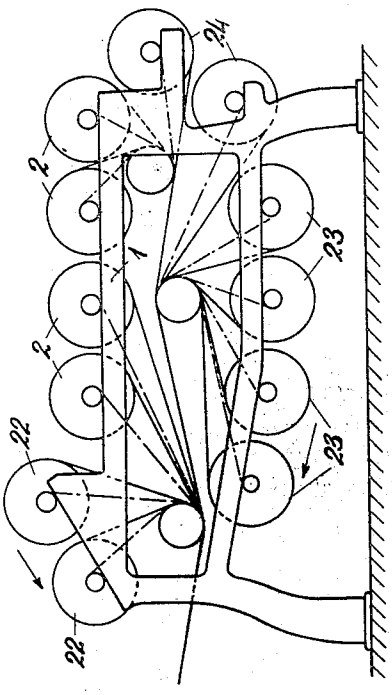


Fig. 6.

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PAPER REELING MACHINE

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10 Claims. (Cl. 242—58)

This invention relates to reel frames for assembling webs of paper from a number of reels to be forwarded together for instance to a cutting machine of which the reel frame may form part.

The principal purpose of the invention is to facilitate the replacement of an exhausted reel while the machine is running, so that the machine may run continuously notwithstanding that the reels do not become exhausted simultaneously. In particular the invention solves the problem of replacing an exhausted end reel, and obviates the risk of the cutter and layer being choked by the leading end of the new roll. The replacement of these reels being no longer a bugbear the invention affords the possibility of deliberately arranging the reels to be exhausted at different times, and of so minimizing the difficulties that arise from curl and equalizing the effects of static charge so far as they may vary between the outside and inside layers of the reels.

A further purpose of the invention is to ensure uniform feed of each web from its reel independently of any other, and so to eliminate creasing, a purpose to which the association of reels in different stages of exhaustion will further contribute.

In a reel frame having a single tier of reels the replacement of an intermediate reel presents no special difficulty so far as guiding the leading end of its web is concerned, as the end will be guided into its running path by the webs on each side of it. To permit of the replacement of an exhausted end reel the invention provides for an intermediate reel being brought to the end position while its web is still unwinding, and for a new reel to be placed in the position thus vacated.

Where the reel frame has two tiers of reels the invention provides for independent replacement of any one of the reels of the lower tier while the rest are running, by making their bearings movable, so that a new reel may be introduced from below.

The several webs to be assembled for the cutter are, according to the invention, carried from their reels to one or more turning rolls so located that the webs going to one turning roll do not touch each other whether the reels be empty or full until they arrive upon the turning roll.

The invention is illustrated in the accompanying drawings in which—

Figure 1 illustrates diagrammatically a single tier reeling machine;

Figure 2 is a fragmentary side view;

Figure 3 is a fragmentary plan view;

Figure 4 is a section taken on the line IV—IV of Figure 3, of mechanism for replacing an end reel;

Figure 5 illustrates an alternative scheme for replacing end reels;

Figure 6 shows diagrammatically a reel frame having two tiers of reels; and

Figure 7 illustrates a means for replacing reels of the lower tier of such a machine.

As shown in Figure 1 the frame 1 carries bearings for seven reels 2. The webs from four of these reels are taken over a turning roll 3. As may be seen from the tangent lines drawn to the turning roll from the reel peripheries and from the reel spindles, the roll is so located that no web touches another until it arrives upon the turning roll whatever the condition of exhaustion of the several reels. The webs from the remaining three reels together with the group assembled upon the roll 3 are united upon a second turning roll 4, again so placed that none of the single webs reaching it touches another or the assembled group until it arrives upon the roll. From the roll 4 the seven webs pass to measuring rolls and a cutter which may be of any well known form and therefore are not shown.

Any reel, except the end reels, when exhausted is readily replaced by lifting out its spindle and lowering a full reel in lieu of it. To enable end reels to be replaced as readily provision is made for shifting the reel next to the end reel into the end position and placing the bearings of the end reel in the position thus vacated. For this purpose the two sets of bearings are arranged upon a slanting part of the frame 1 so that the unexhausted reel next the end reel may be readily lowered into the end reel position. As the bearings are themselves heavy it is inconvenient to lift out the end bearings and replace them in the intermediate position, and provision is therefore made for sliding them out of the path of the intermediate bearings while the intermediate reel is being shifted to end position, and then sliding them into intermediate position. A mechanism for this purpose is shown in Figures 2, 3 and 4. It is to be understood that this arrangement is duplicated at the other side of the frame. Each bearing 5 has a saddle 6 sliding upon a track or guideway 7. The saddle is also capable of sliding at right angles upon a similar guideway 8, both guideways being sufficiently interrupted where they meet to allow of the passage of a saddle along the guideway 7 past the guideway 8, or from the guideway 7 on to the guideway 8.

Beneath the guideway 7 is secured a lead screw 9 rotatable through bevel gears 10 from a suitable handle. Each bearing carries a half nut 11 which can be engaged with or disengaged from the lead screw by rocking the handle 12.

The procedure upon the end reel becoming exhausted is as follows: Its empty spindle is lifted out. Its bearings are slid up to and along the side track 8. The bearings of the adjacent reel are in engagement with their lead screws 9 and these are then turned to lower the reel from which the web is still unwinding into the end position. There the half nuts 11 may be lifted from the lead screws. What were previously the end bearings are then slid back on to the tracks 7 and along them to the intermediate position where their half nuts 11 are engaged with the lead screws 9. A full reel is then lowered into the bearings.

Alternatively swinging arms may be employed for lifting over the reel next the end reel from its intermediate position to the end position. In Figure 5 such swinging arms are constituted by a three-armed spider 13 each arm carrying a bearing. The two spiders are separately pivoted to permit the passage of the paper web when a reel is carried from the intermediate to the end position. They are rotatable by the hand wheel 14 through a worm 15, a worm wheel, and two sets of chain gearing 16, one for each spider. These spiders are set at such a distance from the spindles of neighbouring intermediate reels that any arm when not carrying a reel can rotate past the spindle of the adjacent intermediate reel.

In this case when the end reel is exhausted its spindle is removed and the spiders 13 are rotated through 120° whereupon a new reel can be lowered into the previously empty bearings which have thus been brought to the intermediate position.

Where the number of reels is considerable they may be mounted in two tiers as shown in Figure 6. The reels 23 of the lower tier—which can neither be lifted vertically as can those of the upper tier nor removed laterally as can the reels 24—may be replaced while the machine is running by making their bearings movable so that they can be shifted out of the way of a new reel introduced endwise upon a trolley. A construction for this purpose is illustrated diagrammatically in Figure 7. The bearings 17 fit loosely in brackets 18 which are pivoted at 19 upon frames 1 and which may also have dovetailed projections 20 engaging in arc shaped recesses of corresponding section 21 in the frames 1 when the brackets are swung into reel-supporting position. When a reel is exhausted its bearings are withdrawn from the brackets, the brackets are swing out at right angles, as shown for the middle bracket in Figure 7, and a new reel is run into place upon a trolley. Guide rails 31 are provided in order that there may be no danger of a reel so brought in touching its neighbours. When the reel is in position the brackets 18 are turned back into line with the frame 1 and the bearings are replaced in them upon the ends of the reel spindle.

The end pair of reels 22 of the top tier are interchangeable in the manner explained with reference to Figures 2, 3 and 4, and the end reels 23 of the bottom tier may be similarly interchangeable.

I claim:—

1. In a machine for supporting reels of paper during unwinding the combination of a frame, a number of pairs of bearings for reel shafts carried by said frame, and a guide roll supported in said frame, said guide roll being located with respect to a group of pairs of bearings so that webs are led from reels carried in the bearings of said group directly to the guide roll and first meet upon the surface of said guide roll whether the reels be full or nearly empty.

2. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a frame, a plurality of pairs of bearings for supporting shafts of reels of paper, means for guiding the webs of paper unwound from each reel to bring the webs together to form a multi-layer web, and means for shifting the bearings of the reel supplying the web layer next to the surface layer of the multi-layer web to the position of the reel supplying the surface layer when the supplying of paper from the latter has ceased.

3. A method of feeding webs of paper from a plurality of unwinding reels of paper to form a multi-layer web, comprising bringing the webs from the reels together, shifting the reel supplying the layer next to the surface layer of the multi-layer web to the position of the reel supplying the surface layer when the unwinding of the latter has been stopped, positioning a full reel in place of the shifted reel and unwinding the paper web contained thereon as an intermediate layer of the multi-layer web.

4. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a frame, a plurality of parallel paper-carrying reels supported by said frame, means for guiding the paper webs unwound from each reel to bring them together to form a multi-layer web, means providing for the removal of the reels supplying the surface layers to the multi-layer web, and means for shifting the reels supplying the layers next to the surface layer of the multi-layer web to the position of the surface layer supplying reels.

5. A machine for supporting reels of paper during unwinding comprising a frame having end portions formed as guides, pairs of bearings for reel shafts carried by the middle portion of said frame, an end pair and a penultimate pair of bearings for reel shafts at each end of said frame slidable upon the respective guide portions of said frame, means for holding said end and penultimate pairs of bearings in position on said guide portions and for releasing them to permit them to be moved along said guide portions, and guide tracks associated with the guides formed on the end portions of the frame to permit shifting of the end pairs of bearings off of the guides while the penultimate pairs of bearings are shifted to the end position.

6. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a frame, a plurality of pairs of bearings for reel shafts carried by said frame, means for guiding webs of paper unwinding from said reels to form a multi-layer web, and means operable during unwinding of the reels for shifting an intermediate pair of bearings and the reel of paper carried thereby to an end position upon removal of a reel in end position, so that a full reel may be inserted in an intermediate position and the web thereof threaded between the webs forming the surface layers of the multi-layer web.

7. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web

comprising a frame, a plurality of pairs of bearings for reel shafts carried by said frame, means for guiding webs of paper unwinding from said reels to form a multi-layer web, said frame having end portions formed as guides upon which an end pair and a penultimate pair of said bearings for reel shafts are slidably mounted and means for holding said end and penultimate pair of bearings in position on said guide portions and for releasing them to permit them to be shifted, so that upon removal of an end pair of bearings and the reel carried thereby for supplying the surface layer web to the multi-layer web, the penultimate pair of bearings and the reel carried thereby can be moved to end position and a full reel inserted in the penultimate position, thereby permitting threading of the web of the new reel between outer layers of the multi-layer web.

8. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a frame, a plurality of pairs of bearings for reel shafts carried by said frame, means for guiding webs of paper unwinding from said reels to form a multi-layer web, a rotatable shaft mounted at each end of said frame, means on each of said shafts for supporting two pairs of reel shaft bearings, means for rotating and retaining said shafts in adjusted positions, so that upon termination of the web supplied from a reel in end position to provide a surface layer of the multi-layer web, the shaft may be rotated to bring the other reel into end position, to permit threading of a web from a reel in place of the former end reel, between the surface layers of the multi-layer web.

9. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a stationary frame, a plurality of pairs of bearings for reel shafts carried by said frame, means for guiding webs of paper unwinding from said reels to form a multi-layer web, a rotatable end frame associated with said stationary frame and carrying pairs of bearings for reel shafts positioned so that the two pairs thereof are at one end of the stationary frame, and means for turning the rotatable frame while the reels are unwinding for shifting an intermediate pair of bearings and the reel carried thereby to end position upon termination of the web supplied from the end reel to permit the positioning of a new reel in an intermediate position and the threading of the web thereof between the surface layers of the multi-layer web.

10. A machine for supporting reels of paper to be unwound and discharged as a multi-layer web comprising a frame, a plurality of pairs of bearings for reel shafts carried by said frame, means for guiding webs of paper unwinding from said reels to form a multi-layer web, said pairs of bearings being supported in a plurality of tiers on said frame, means operable during unwinding of the reels for shifting a penultimate pair of bearings and the reel of paper carried thereby to an end position upon removal of a reel in end position, so that a full reel may be inserted in a penultimate position and the web thereof threaded between the webs forming the surface layers of the multi-layer web, and means for shifting the intermediate pairs of bearings of the lower tier to disengage them from a reel shaft and permit endwise removal of said shaft.

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