

May 29, 1945.

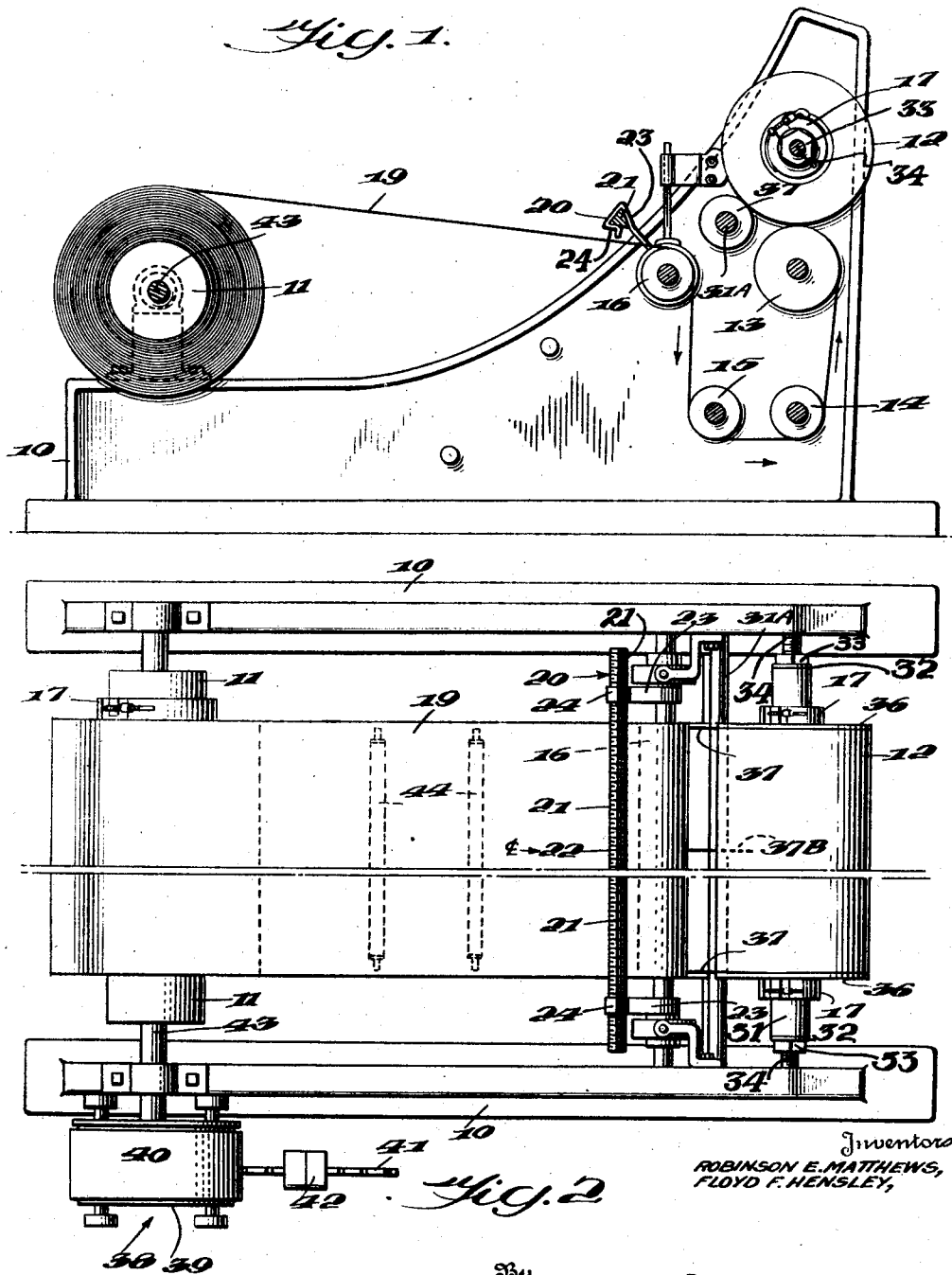
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2,376,879

REWINDING MACHINE

Filed Feb. 17, 1942

2 Sheets-Sheet 1



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Fig. 3.

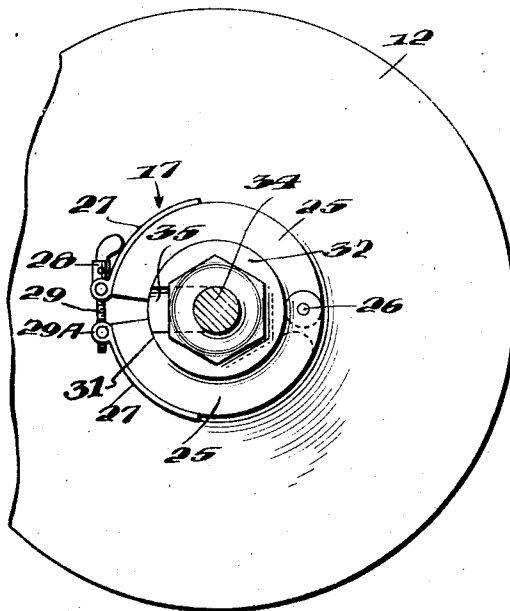


Fig. 4.

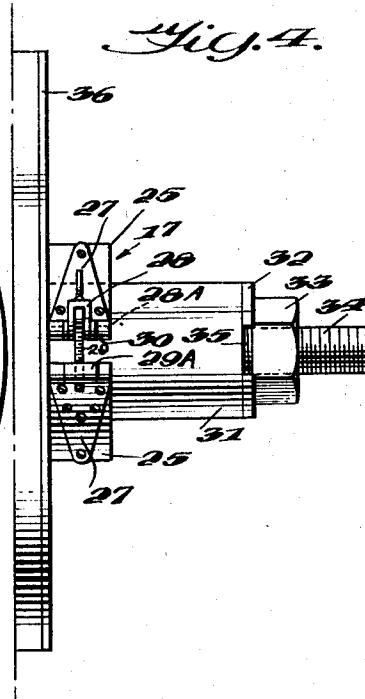


Fig. 5.

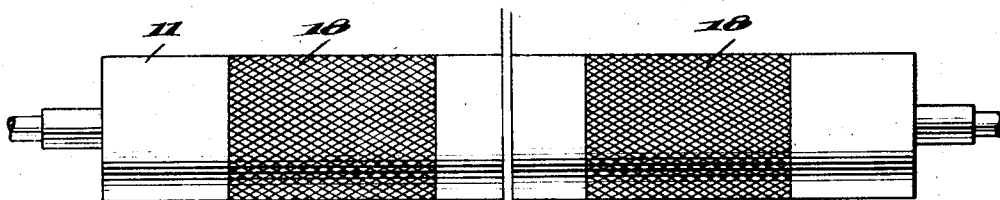
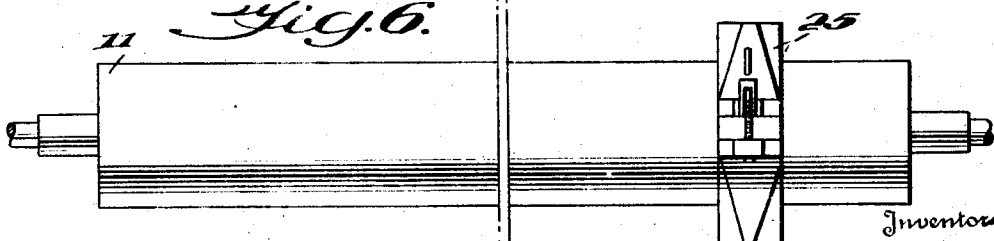


Fig. 6.



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REWINDING MACHINE

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Application February 17, 1942, Serial No. 431,282

5 Claims. (Cl. 242—55)

Our invention relates to machines for winding or rewinding web material and more particularly to improvements in machines especially adapted for rewinding high quality paper like cigarette paper, in continuous web form. The invention is described hereafter with particular reference to cigarette paper but only for illustrative purposes since the equipment may be employed or adapted for the winding or rewinding of any desired web material. Likewise the machine may or may not employ slitting operations, including the use of knives, for slitting the paper into two or more parts and for cutting off a narrow strip along the edges of the rewound paper to obtain a smooth edge.

The machine of our invention is useful for rewinding paper in such a manner that it can be inspected for defects during the rewinding operation. This comprises unwinding of the original roll of paper and rewinding the paper at a distance so that the continuous moving web of paper may be viewed between the unwinding and rewinding rolls. In this type of operation several practical problems arise; namely, endwise slipping of the paper on the unwinding or supply roll; tendency of the narrow trim, cut from the edges of the paper, to fall down on the rewinding mandrel; and difficulty of designating for future reference the exact locations of the defects as they show up in the rapidly moving continuous paper web.

In accordance with our invention we have perfected improvements in the rewinding machine to overcome all these problems and to improve otherwise the efficiency of operation of these machines.

With regard to the problem of the paper slipping on the supply roll, we have devised two means, either or both of which may be used to prevent this trouble. These means comprise core clamps, which are adapted to clamp around the mandrel of the supply roll adjacent to the roll, and the use of knurled surfaces on the mandrel of the supply roll.

The problem of the narrow cut trim tending to fall away from the rewinding roll has required heretofore the cutting of an appreciably wider strip at the edge of the paper than would normally be desired, so that the rewind bobbin of this cut strip is self-supporting and will not slip away from the main rewind roll. This procedure however is expensive from the standpoint of waste material produced. In accordance with our invention we have avoided this disadvantage by

using a clamp around the rewind mandrel and in close abutting position with the bobbin of the rewound strip. This clamp makes it possible to maintain a very narrow cut strip, which for example may be no more than about one half inch in width.

In connection with the difficulty of locating and marking for future use the defects in the paper, we have provided a measuring rule or scale graduated into specified units and bearing easily visible numerals that indicate various distances from each edge of the paper to the center of the scale. We position this graduated scale above and crosswise the moving web of paper, so that, as the paper passes under this measuring device, the location of any holes, tears, wrinkles, spots, or other common defects occurring in the paper can easily be determined by the inspector, who is constantly watching the moving web of paper. For example, the inspector notes the distance (as indicated by the scale) of a hole in the paper from the nearest edge of the paper. He then records this measurement on a small tab of paper, commonly referred to as a flag, and places this tab in between the two adjacent layers or plies of paper on the rewind roll. It is held therebetween and projects from the roll a sufficient distance to be noted when the roll is later handled for further inspection or processing.

Some of the novel features of our invention are set forth with particularity in the appended claims; the details of construction of the equipment and mode of operation will be now more clearly understood from the following specific but non-limiting description taken in conjunction with the accompanying drawings in which like reference characters indicate similar parts and in which:

Fig. 1 is a side view of the rewinding machine; Fig. 2 is a plan view of the machine;

Fig. 3 is an end view of the rewinding mandrel and roll showing a clamp for supporting the narrow trim bobbin;

Fig. 4 is a side view of the bobbin and clamp shown in Fig. 3 and the associated mandrel;

Fig. 5 is an elevational view of a mandrel for the supply roll, having knurled sections for preventing paper slippage, and;

Fig. 6 is an elevational view of a smooth surface mandrel for the supply roll, having a clamp provided to prevent paper slippage.

Referring now more specifically to the parts of the rewinding machine as illustrated in the drawings, the machine comprises in general a

supporting base 10, a supply roll 11, a rewind roll 12 resting upon a driving roll 13, guide rolls 14, 15 and 16. A clamp for supporting the trim portion of the rewinding roll 12 is shown at 17. This type of clamp may be used on the mandrel of the rewind roll as illustrated in Figs. 1, 3 and 4 for supporting the trim bobbin and it may also be used on the smooth supply roll 11 as illustrated in Fig. 6 for preventing endwise movement of the paper reel thereon. In lieu of the clamp 17 on the supply roll 11 the latter may be provided with knurled surfaces as indicated at 18 in Fig. 5. Either or both of the means 17 and 18 may be used as desired for preventing slipping of the paper reel on the supply roll. In most instances it is not necessary to use both of these means since either one of them will function to prevent lateral movement of the paper. The clamp 17 may be used at each end of the supply roll if desired although in the usual case only one clamp is necessary since the paper roll tends to slip in only one direction.

The measuring device for locating defects in the paper web 19 is shown at 20. This device has a scale 21 for indicating distances from each edge of the paper 19 to the center line shown at 22. This measuring device is mounted just above the moving paper web 19 and is supported by a bracket 23 which has a clamplike extension 24 for encircling the measuring device 20. The clamplike extensions 24 of the supporting brackets 23, as shown more clearly in Fig. 1, are rebent in triangular form to correspond to the cross-sectional form of the scale bar 20. They obviously have certain inherent resiliency and are preformed so as to be sprung open slightly to receive said bar 20 and react to clamp it sufficiently to hold it in place, yet permitting longitudinal adjustment of the bar therein so as to bring the center line of the scale 21 in vertical coincidence with the middle of the paper web 19 traveling thereunder after the supply roll 11 and rewind 12 have been adjusted and aligned for the proper travel of the paper web as hereinbefore described. This measuring device may be made of wood, metal or any other suitable material on which a plainly visible scale can be printed or cut, and is preferably triangularly shaped so as to present a flat surface on each side for the scale 21. By means of this construction the measuring device may be viewed from either end of the machine.

Referring now to the details of the clamp 17 as shown more particularly in Figs. 3 and 4, this clamp comprises two semi-circular collar portions 25 hinged together at the point 26; and at the other respective ends are connector supporting plates such as the strap hinge sections 27. The two collars 25 are connected by means of a toggle clamp. This clamp enables connecting, tightening and locking the two adjacent ends of the two semi-circular collars. The clamp comprises a bolt 29 which is pivotally connected at 29A to one of the strap hinge sections 27 and carries at the other end a stirrup 28 and laterally extending pins 28A which are engaged by the reversely curved or clawshaped member 30 for locking the stirrup to the adjacent end of the other collar.

In the illustrations of Figs. 3 and 4 the clamp 17 is positioned around a fiber core 31 on which the paper reel 12 is wound. One of these cores is provided at each end of the paper reel 12 and extends therethrough to about halfway the

length of the reel where the two cores abut each other. To hold these cores in firm abutting position we provide at the end of each core a washer 32 held by a nut 33 which is threaded on the shaft 34. The washer 32 is preferably made with a slot 35 so that it may be inserted on the shaft 34 without removing completely the lock nut 33.

The trim, above referred to, which may be formed at each edge of the rewind roll 12 is shown at 36 in Figs. 2 and 4. When the supporting clamp 17 is used in accordance with our invention, as indicated in Figs. 2 and 4, this trim section 36 may be reduced to about $\frac{1}{2}$ " in width or possibly less. The trim is cut by means of a disk knife 37 mounted on rotating shaft 31A. This knife functions to slit the paper web as it is wound onto roll 12. Additional similar knives 37B may also be provided for slitting the main paper roll into two or more smaller rolls, when desired.

To control the feed of the paper web from the supply roll 11, we have provided a drum brake shown generally at 38. This brake comprises a brake drum 39 around which is encircled a brake band 40. Pivotally connected to this band is an arm 41 and an adjustable weight 42. By longitudinal movement of the weight 42 the braking action on the shaft 43, which is connected to the drum 39, may be varied and thereby change the tension on the paper between supply roll 11 and windup roll 12.

The alternate means for preventing slipping of the paper reel as indicated in Fig. 5, namely the knurled sections 18, comprises generally roughened portions on the otherwise smooth roll 11. The size and extent of these sections may be varied to suit varying conditions. Only one section may be used instead of two or more sections and it is usually desirable to leave smooth the end portions of the roll so that if they are handled by the operator of the machine they will not injure his hands.

During operation of the machine, the paper is unwound from the supply roll 11 and is advanced by means of the driving roll 13 which receives power from a motor, not shown. Since the wind-up roll 12 rests on the driving roll 13 it is rotated thereby and causes the paper web to wind on this roll. The web, in moving from the supply roll 11 to the wind-up roll 12, is guided by means of stationary rolls 14 and 16 and is also guided and moved by rotating roll 15. The paper advances, in the direction indicated by the arrows, around the several rolls. For purposes of inspection it is desirable to provide lights, such as fluorescent tubes indicated at 44, for illuminating the paper and thereby show up defects in the sheet. As indicated by dotted lines in Fig. 2, said fluorescent tubes 44 are located beneath the paper web 19 which is light-penetrable. Thus, with the light coming through the paper from below, defects in the paper are easily discernible. These defects when noted by the inspector are fixed in location on the sheet by noting the corresponding location on the scale 21 and then marking this distance on identifying paper tabs as already described above.

While our invention has been described with particular reference to a rewinding machine it is to be understood that the improvements herein will apply equally as well to similar types of machines which operate on continuous web material. For example, the invention may be applied to a slitting machine used for slitting the supply roll

of web material into a number of bobbins of narrow width. Various other modifications and changes are contemplated within the scope of this invention as suggested by the appended claims.

We claim:

1. In a rewinding machine for continuous web material comprising a supply roll and rewind roll, the combination therewith of a measuring scale positioned above the moving web material and relatively close thereto, said scale having similar graduations extending from a center point to each end of the scale and having two substantially flat surfaces angularly positioned with said graduations thereon.

2. Apparatus for rewinding continuous web material and inspection of the material in the process, comprising in combination, a supply roll of the material and a take-up roll therefor, the supply roll held from movement longitudinally of its axis and the take-up roll having a core on which the web material is wound, a supporting shaft on which said core is adjusted and held from movement longitudinally of its axis, an adjustable device on said core for determining the end location of the take-up roll and holding said roll cooperatively aligned in web receiving relation to the supply roll, said device abutting and supporting a considerable end area of the body of material wound on the core of the take-up roll, and a transverse measuring scale positioned above and in relatively close proximity to the moving web material between said supply and take-up rolls for determining the location of defects in the material with respect to the distance thereof from the edge or edges of the web.

3. An apparatus as set forth in claim 2 and in which the measuring scale is adjustable for vary-

ing its lengthwise working position relative to the web material traveling thereunder and the take-up roll aligning and holding device on the core is a toggle type clamp.

4. Apparatus for rewinding continuous web material and inspection of the material in the process, comprising in combination, a supply roll of the material and a take-up roll therefor, the supply roll held from movement longitudinally of its axis and the take-up roll having a core on which the web material is wound, a supporting shaft on which said core is adjusted and held from movement longitudinally of its axis, an adjustable device on said core for determining the end location of the take-up roll and holding said roll cooperatively aligned in web receiving relation to the supply roll, said device abutting and supporting a considerable end area of the body of material wound on the core of the take-up roll.

5. In a machine having a web supply and take up roll for the inspection of a continuous moving web which may have occasional defects therein, the combination of a scale rule of a length at least as great as the width of said web and being positioned substantially parallel to and crosswise of the web and in relatively close proximity thereto, said rule having two substantially flat surfaces angularly positioned to each other and bearing a scale with similar graduations and positioned so as to be discernible to an inspector of the moving web and to indicate to him the distance from the edge of the web of any visual defect occurring in the moving web and coinciding with one of said graduations as it passes thereby.

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