Dec. 9, 1952 D. C. JEFFREY, JR 2,620,993

WEB WINDING DEVICE

Filed March 24, 1950 2 SHEETS—SHEET 1

Fig. 1.

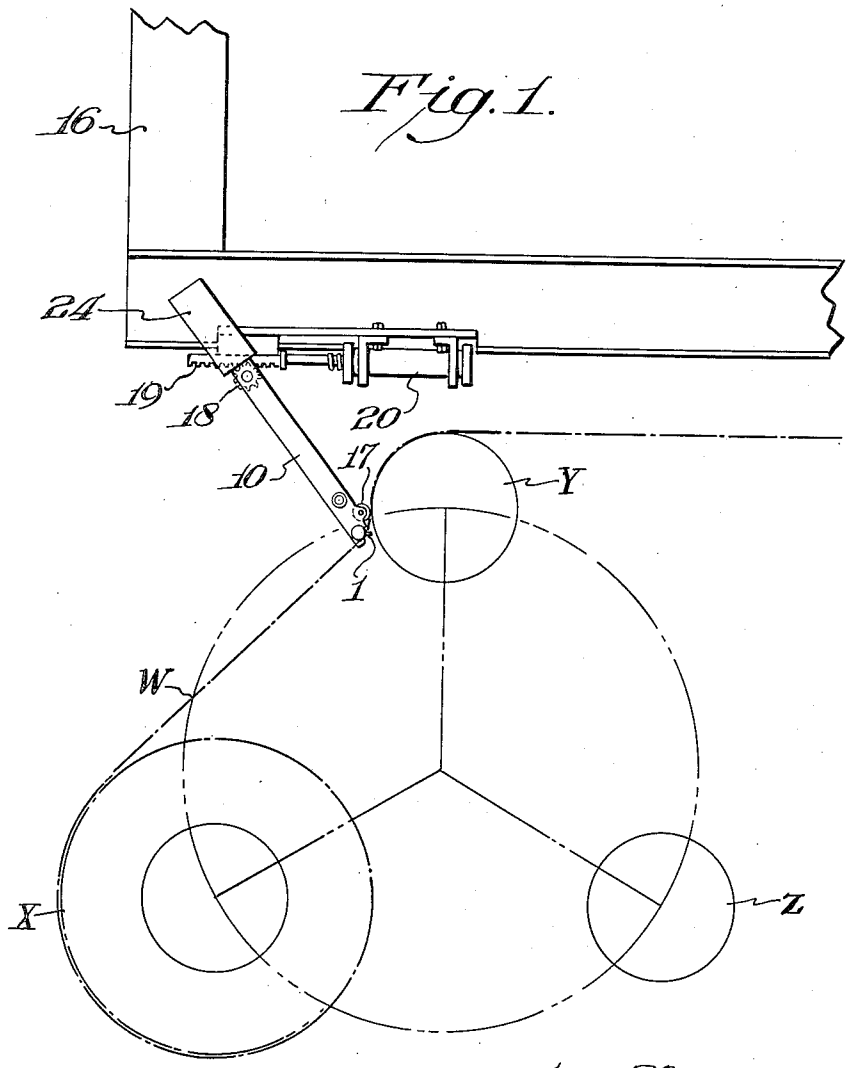
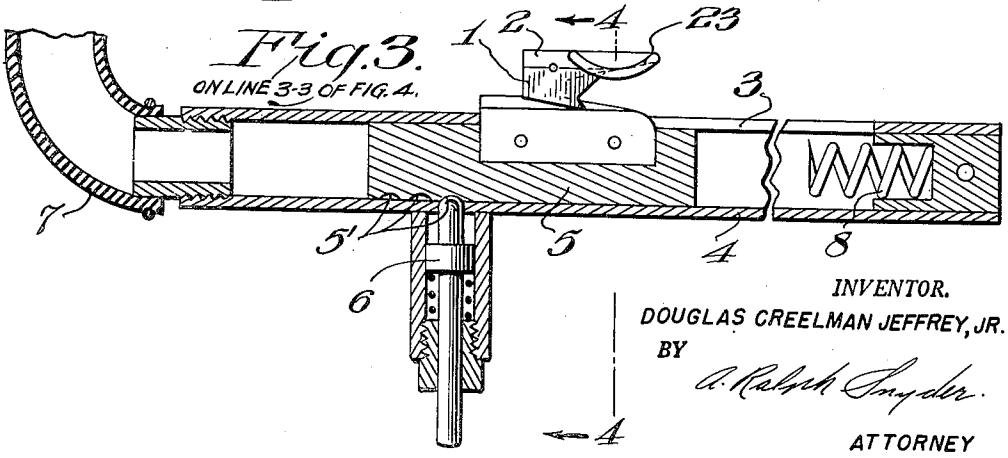


Fig. 3.

ON LINE 3-3 OF FIG. 4.



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Fig. 2.

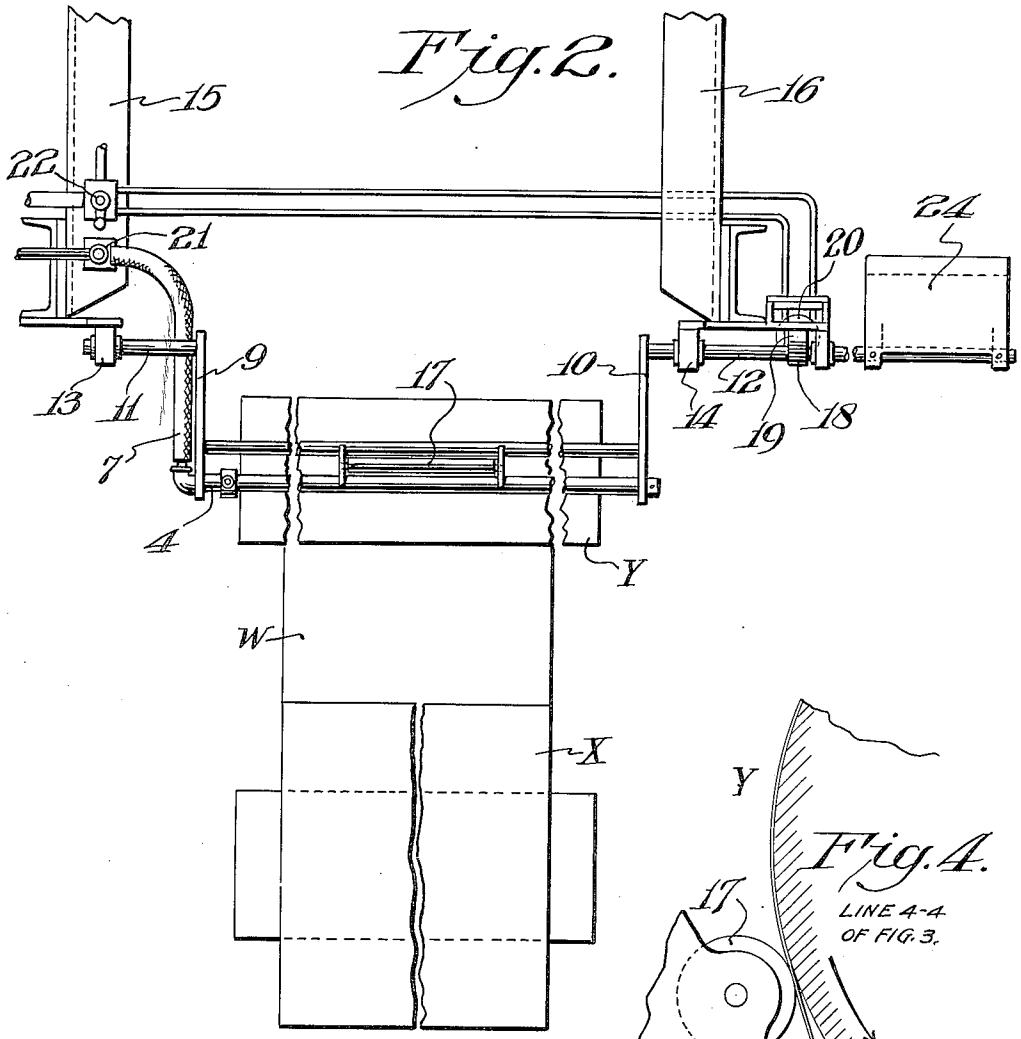


Fig. 4.

LINE 4-4 OF FIG. 3.

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Patented Dec. 9, 1952

2,620,993

UNITED STATES PATENT OFFICE

2,620,993

WEB WINDING DEVICE

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Application March 24, 1950, Serial No. 151,694

1 Claim. (Cl. 242—56)

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This invention relates to web winding and more particularly to a web-severing and transfer means applicable to web winding mechanisms for severing a travelling continuous web from a fully wound roll and starting the winding of the moving web on an empty core.

Large web rolls are customarily wound directly from the web as it issues from a paper- or other web-making or treating machine. To expedite this operation, it is necessary that when a roll is completely wound, the continuous web running to it be severed and the severed end started around an empty core to wind up another roll, and this should be accomplished without stopping or materially retarding the movement of the web.

Particularly, in connection with the winding of continuous film of regenerated cellulose and the like, various mechanical means, such as slashers, have been tried but they all gave a poor start on the new core, resulting in many feet of wrinkled, unusable, regenerated cellulose film, so that it has been considered more satisfactory to break or cut the film and start a new roll all by hand. The proper coordination required in manually pulling the film from the machine, breaking it by hand and starting it evenly around a new core has not been fully developed by all operators and even the most adept fail at times in breaking and starting the film on the empty core satisfactorily. However, in all cases a safety hazard exists in breaking the film manually at high speeds, since there is a possibility of injuring the hands or fingers when striking the film or core. Hand cutting with a knife would, of course, be even more dangerous. Moreover, an additional safety hazard exists if the film break is not clean. When the tail is drawn in by the winding film, it is possible for the operator's arm or hand to be caught in the film and to be pulled with it, especially since the operator helps the film around the core during this phase of the operation. Then too, if the operator fails to make a proper roll start, a large quantity of film either goes on the floor and is wasted or it is wound up as a long tail, wrinkling many layers of film which cannot be used for first quality production.

An object of this invention, therefore, is to provide a simple, safe and satisfactory mechanical means for severing a continuously travelling web from a completed roll and starting the winding of the travelling web on an empty roll core. This and other objects will more clearly appear hereinafter.

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This invention by which the objectives herein are realized will now be described with reference to the accompanying drawings wherein:

Fig. 1 is a side elevation showing the operative disposition of the device of this invention relative to the travel of the web and location of the fully wound roll and the empty core to be wound;

Fig. 2 is a front elevation of the device;

Fig. 3 is a horizontal cross-section of the piston-knife assembly on the line 3—3 of Fig. 4; and

Fig. 4 is a vertical cross-section on the line 4—4 of Fig. 3.

A conventional web winding mechanism comprises a spider frame adapted to support a plurality of roll cores, usually three, each one of which can be individually rotated, the spider frame being independently rotatable to bring an empty core into position for winding, and the finished roll into an unloading position. For purposes of illustration the device of this invention in its preferred embodiment will be specifically described as adapted to such a wind-up mechanism.

Referring to Figs. 1 and 2 of the drawings, the present film severing and starting means is shown in a position operative to sever the travelling web W from a completed, i. e. fully wound, roll X and starting the web on an empty core Y in winding position. A second empty core Z is positioned on the spider (not shown) to follow core Y into winding position. Referring particularly to Figs. 3 and 4, the web severing means comprises a knife assembly comprising a razor-edged blade and a blade-holder plate 2 fitted into and adapted to be guided by longitudinally extending slot 3 provided in a hollow cylinder 4, open at one end and closed at the other. Slot 3 and cylinder 4 are each of a length sufficient to permit the knife to travel the full width of any web being cut. Blade-holder plate 2 is attached to a piston 5 fitted in cylinder 4. In inoperative position the piston (and hence blade 1) is retained at the open end of the cylinder by spring-pressed ball-point detent 6 which engages one of the recesses 5' in piston 5 and is adapted to be driven in its cutting stroke to the opposite or closed end of the cylinder by means of compressed air fed through the open end of the cylinder 4 coupled to a flexible air-hose 7 connected in turn to a source of compressed air (not shown). A spring bumper 8 at the closed end of the cylinder serves to return the piston to its inoperative position. A wire knife-guard 23 at-

tached to plate 2 is provided as a protective measure. Cylinder 4 is supported at its ends with its longitudinal axis parallel to the axis of the core by brackets 9 and 10 which are fixed in turn to shafts 11 and 12, respectively, mounted for rotation on pillow blocks 13 and 14 the latter being supported by machine frame members 15 and 16, to permit swinging of the cylinder 4 to and away from the travelling web at the windup position. An idler roll 17 parallel to cylinder 4 is also supported between brackets 9 and 10 and is further disposed and fixedly spaced from the cylinder to insure that the knife will not strike the core but will press the web firmly against the core. A counterweight 24 at the end of shaft 12 facilitates swinging of the assembly. The assembly just described is swung into and out of operative position through the agency of pinion 18 keyed to shaft 12 which pinion engages rack 19 reciprocated by a two way air cylinder-and-piston 20. The flow of compressed air to cylinder 4 and 20 is preferably controlled by manual valves 21 and 22. It will be understood however that control of the air supply may be effected by any suitable means including fully automatic valve operating means.

The operation of the device of this invention is as follows: the full mill roll X is still rotating and the spider has been rotated so that the full roll is in the unloading position while the web W passes over the empty core Y, which is being rotated at a peripheral speed slightly greater than the web speed. The web-severing and starting assembly is then swung into position for cutting the film and starting it winding on the empty core Y. Idler roller 17 prevents the knife blade from striking the core and at the same time presses the film firmly against the surface of the core. Air pressure released by a manually operated (or automatic) valve forces the piston-knife assembly from one end of the slotted cylinder 4 to the other at such a rapid rate that the moving film is easily cut and the blast of air, which escapes through the slot behind the piston-knife assembly, presses the cut edge against the core where it is retained by the suction effect created by the rapidly rotating core so that the web wraps itself evenly around the empty core. The piston-knife assembly strikes the spring bumper 8 at the end of the slotted cylinder and rebounds to its original starting position, ready for the next roll start. The assembly is then swung back out of the way. It is essential that uniform tension be maintained on the full mill roll while the film is being cut.

The dimensions of the parts which go to make up the device of this invention are, in general, not critical. However, a desirable factor is that sufficient air-pressure be used to drive the piston-knife across the web at a rapid rate. If the knife does not travel fast enough an uneven tear in part will result rather than a clean cut across the width of the web, and a poor start may be obtained.

The present invention does away with all manual contact in the severing of the web from a full roll and the starting of a new roll with the attendant safety hazards. It eliminates the use of a slasher the full width of the web, which usually results in a poor roll start and many feet of wrinkled material. This invention also makes it possible to cut the web, and particularly film, while it is running at full speed, and gives a beautiful, smooth, wrinkle-free starting wind-up on an empty core.

As many changes and variations may be made without departing from the spirit and scope of my invention is in no wise restricted except as set forth in the appended claim.

I claim:

In apparatus for transferring a travelling continuous web running to a roll being wound to an empty rapidly rotating core upon which a new roll is to be started comprising means for shifting the roll being wound from a winding position to a position for unloading and for simultaneously shifting the rotating empty core to the winding position in contact with the travelling web, the improvement which comprises a hollow cylinder of a length greater than the width of the web and closed at one end and having an air inlet opening at the other, a slot in said cylinder extending substantially the length thereof, a piston fitted in said cylinder, a knife affixed to said piston for movement therewith and extending through said slot, controlled means for supplying compressed air to said cylinder whereby to drive said piston from the open to the closed end of said cylinder at a high rate of speed, and to provide a blast of air through said slot behind said piston, a compressible spring in said cylinder at the closed end operative to return said piston to the open end, a freely rotatable idler roll mounted parallel to and spaced from said cylinder, and shifting means for positioning said cylinder and said idler roll lengthwise across the path of travel of the web in winding position adjacent the empty rotating core in winding position, said idler roll being positioned to press the web against the empty core in winding position, said cylinder being positioned to bring the knife into contact with the web in its travel from the open end to the closed end of said cylinder whereby to sever the web and to direct the blast of air from the slot against the free end of the severed web whereby to press said free end of the severed web against said core, said shifting means being also operable to move said cylinder and said idler roll to an inoperative position.

DOUGLAS CREELMAN JEFFREY, JR.

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