S. M. LANGSTON.

PAPER SLITTER AND REWINDER.

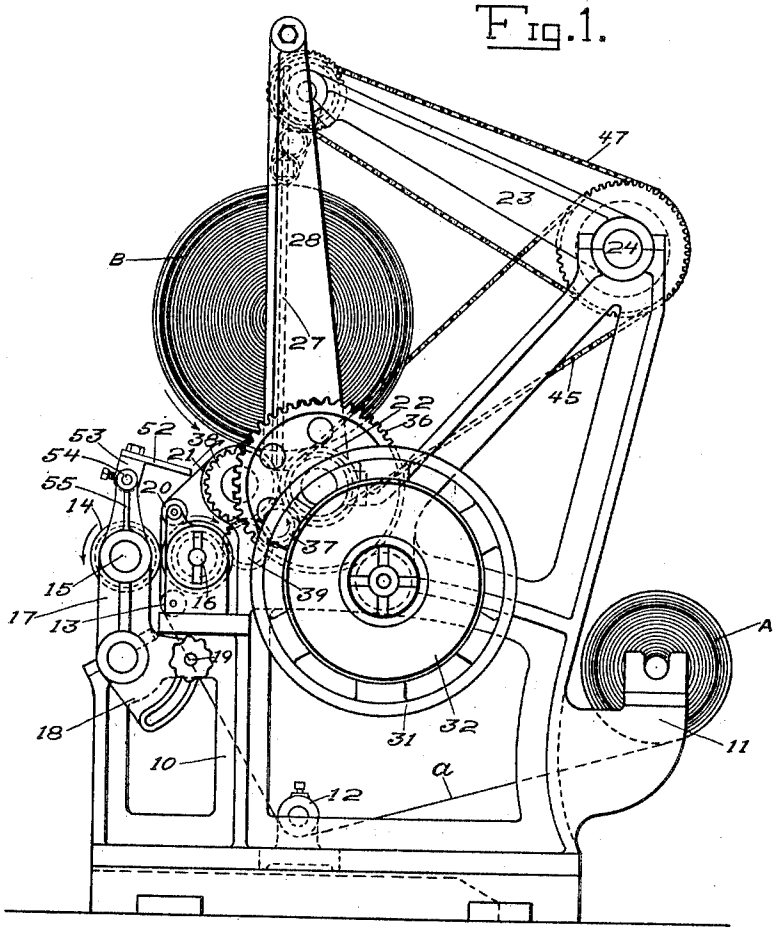
APPLICATION FILED MAR. 6, 1911.

1,009,756.

Patented Nov. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



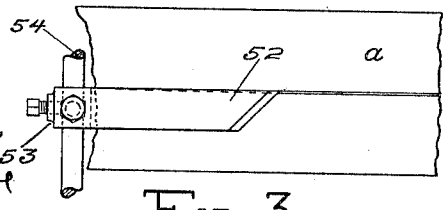


Fig. 3.

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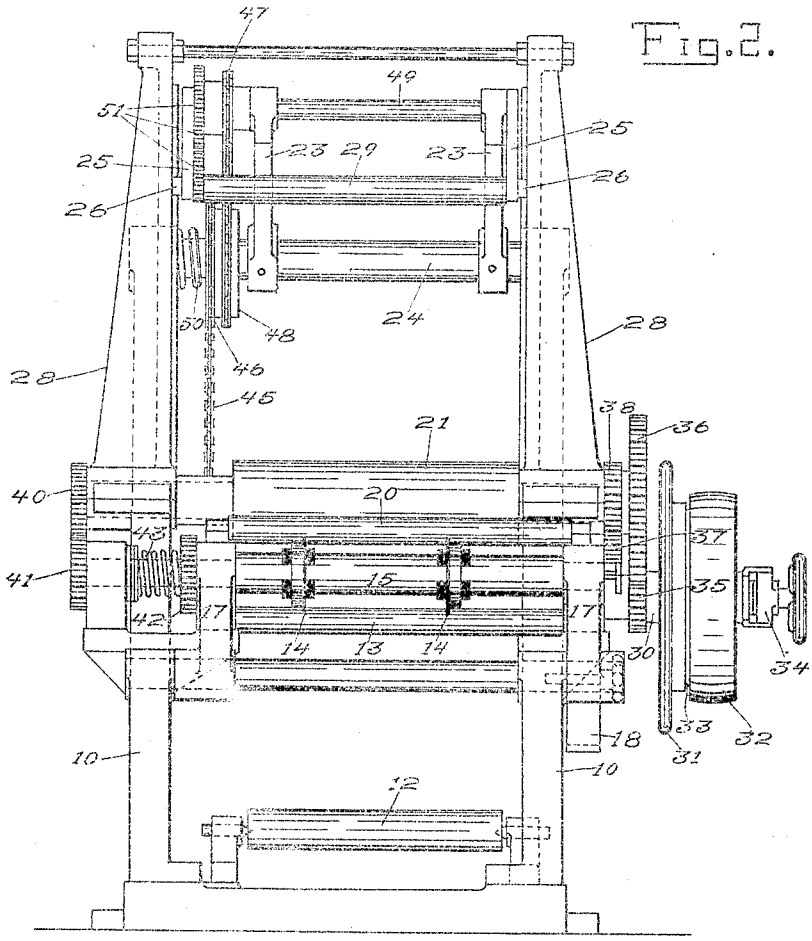
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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PAPER SLITTER AND REWINDER.

1,009,756. Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed March 6, 1911. Serial No. 612,566.

To all whom it may concern:

Be it known that I, SAMUEL M. LANGSTON, a citizen of the United States, and a resident of Camden, county of Camden, and State of New Jersey, have invented new and useful Improvements in Paper Slitters and Rewinders, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in paper-slitting and rewinding machinery of that type in which paper or other sheet material is unwound from one roll, subdivided longitudinally into a plurality of separate strips and rewound on a single reel.

The object of the present invention is to more firmly and effectively support the rewinding roll than is possible in the construction shown in my prior Patent No. 943,357, issued December 14, 1909, and at the same time to prevent the lateral displacement of the strips of paper prior to the rewinding and to prevent the minute fragments of paper liberated at the cutters from becoming rewound with the paper. The absence of this paper dust in the rewound material is highly important, particularly where the resulting product of the machine is to be used in cash registers, stock tickers or other machines using paper rolls and having delicate mechanism.

A further object of my invention is to facilitate the threading of the paper between the cutters of the machine and to facilitate the further adjusting of the cutters to get the desired width of paper strips.

To secure these objects, the rewinding reel is mounted directly above two rewinding rollers, so as to support the roll of paper upon these rollers and separate and distinct cutters independent of said rollers are mounted at one side thereof. Adjustable fingers engage with the paper at the lines of subdivision after the paper leaves the cutters and before it reaches the rollers and reel.

Other objects and advantages of my improved construction are more fully set forth and more particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, which form a part of this specification, and in which similar reference characters indicate corresponding parts in the different views.

Figure 1 is an end view of a machine constructed in accordance with my invention; Fig. 2 is a front view thereof; and Fig. 3 is a detail plan view showing a device for preventing sidewise movement of the paper, such device not being shown in Fig. 2.

The operating mechanism of my improved machine is supported upon any suitable framework. As shown, this includes two end frames 10 mounted on a suitable base and held rigid in respect to each other. The frame at one side carries supporting arms 11 for the roll of paper A which is to be unwound, subdivided into separate strips and rewound. The strip of paper *a*, as it unwinds from the roll A, may pass over suitable tension rollers 12 and 13 on its way to the cutters. These cutters are in the form of disks 14 rigidly secured to the parallel shafts 15 and 16, so adjusted in respect to each other, that the disks overlap and have a shearing action. These cutters are preferably constructed as shown in my prior Patent No. 692,155, issued January 28, 1902. The shaft 16 is preferably mounted in bearings carried by the main frame of the machine, while the shaft 15 is mounted in arms 17 pivoted on the frame so that the arms may be swung outwardly to separate the cutters for a considerable distance and permit their free adjustment along their respective shafts and the free movement of the paper between the cutters in threading the machine.

Any suitable means may be employed for locking the arms 17 in their adjusted positions. As shown, there is an extension 18 integral with one of the arms and having a curved slot through which extends a stud bolt 19 on the frame. By tightening the nut on this bolt, the arms may be locked in any desired position. These cutters are adjacent to one side of the machine and at a lower elevation than the rewinding reel, so that any lint which may be produced by the cutting action may drop without coming near the rewinding reel.

In addition to the tension roller 13, there is another tension roller 20, the two rollers being so disposed in respect to each other and in respect to the cutters, that the paper passes directly through and between the cutters in a straight line without binding against the cutters and without either of them acting in any way to advance the pa-

per. Preferably the cutters travel at a slightly higher rate of speed than the paper so as to more effectively cut the latter.

At a higher elevation than the cutters and at one side of the cutters are two rewinding rollers 21 and 22 rotatable about parallel axes and in the same direction. These rollers are mounted in suitable bearings in the frame of the machine, and serve to support the rewinding reel and to indirectly cause the rotation of the latter. The rewinding reel with the roll B of the separate strips of paper is disposed directly above the rewinding rollers 21 and 22, and is supported within the groove or recess between the same. The rotation of the rewinding rollers causes the rotation of the rewinding reel by frictional engagement, and the greater the weight of the roll of paper on the reel, the greater will be the friction between the lower surface of the reel and the rollers 21 and 22, and the more effectively will the roll be rotated to continue the winding of paper thereon. For holding the reel and its roll B of paper in place upon the rewinding rollers 21 and 22, I provide a pair of arms 23 pivoted to a shaft 24 on the frame. At the free end of these arms, I pivotally connect a pair of arms 25 normally extending downwardly from the ends of the arms 23 and having their lower ends carrying lugs or extensions 26 vertically movable within slots 27 in upward extensions 28 of the main frame. The lower ends of the arms 25 support a rewinding roll 29 bearing directly down upon the upper surface of the roll B and rotated at a slightly greater surface speed than the rate of travel of the paper. The arms 23 and 25 are of considerable weight, and this weight comes directly upon the paper roll to give the desired frictional engagement between the rewinding roller 24 and the pair.

For transmitting motion to the several parts, I provide a main drive shaft 30 having an end wheel 31 thereon and a driving pulley 32. The pulley may be loose from the shaft and connected thereto by a cone clutch 33 suitably regulated by a hand-operated device 34. This will permit the machine to start slowly upon the application of power thereto, as the clutch may be regulated to permit a slip when the strain exceeds a predetermined limit. This clutch involves no portion of my invention. From the main drive shaft 30, power is transmitted to the shaft of the rewinding roller 22 by means of intermeshing gears 35 and 36, and power is transmitted from the rewinding roller 22 to the rewinding roller 21 by a small pinion 37 and gears 38 of the same size, and connected to the two rollers. This insures the positive and continuous rotation of the two rollers in the same direction and at the same speed. The cutter shaft 16 is rotated from the rewinding roll 21 by an intermediate the rewinding roll 21 by an intermediate pinion 39 and gears 40 and 41 on the two shafts. The cutter shaft 15 carries a gear 42, which intermeshes with a corresponding gear on the cutter shaft 15 when the arms 17 are swung to bring the pairs of cutters in proper operative relationship. One of the two cutter shafts preferably has a coil spring 43 encircling it at one end and tending to move it longitudinally and hold each cutter on that shaft closely against the side of the corresponding cutter on the other shaft. The ratio of the gears is such that the cutters 14 travel at a slightly higher rate of speed than the paper and thus make a cleaner and better cut.

For driving the upper friction roller 29, I drive the shaft 24 by a chain 45 passing over a sprocket 46 loose on the shaft 24. A chain 47 passes over a sprocket 48 fixed on the shaft 24 and over a sprocket on a shaft 49 constituting the pivotal connections between the arms 23 and arms 25. Between the sprockets 46 and 48, there is a friction disk and a spring 50 which holds the two sprocket wheels in close engagement with this disk. Thus, as the sprocket wheel 46 is positively rotated, the sprocket 48 may lag behind, due to the slip at the friction disk. The arms 25 at their upper ends have downward extensions, and the friction roller 29 is mounted in the lower end of these extensions. The sprocket wheel on the shaft 49 is at the upper end of these extensions, so that the chain will not interfere with the roll of paper. Suitable intermeshing gears 51 transmit motion to the friction roller 29 from the shaft 49. The friction roller 29 thus normally tends to rotate at a speed somewhat in excess of the rate of travel of the paper, but it is permitted to rotate at the same speed by reason of the friction connections between the sprockets 46 and 48. This tendency of the roller 24 to travel faster than the paper insures the firm and solid winding of the paper.

It will be noted that the cutters are located below the friction-winding rollers 21 and 22 and at one side thereof, and that the paper passes upwardly between the cutters and thence diagonally to the friction roller 21. As the paper passes along this diagonal run, the fine lint or paper dust at the edges of the cut paper will fall away from the paper before the latter reaches the winding roller 21, and thus a minimum quantity of this dust will be rolled in with the paper. To further remove the lint and paper dust from the strips of paper while passing along this diagonal run, I may, if desired, provide the attachment shown in Figs. 1 and 3. The said attachment is not shown in Fig. 2, as it is thought it would tend to obscure certain other parts. This attachment includes

a plurality of fingers 52, each secured to a collar 53, and all of the collars are mounted on a transversely extending rod 54. The rod is mounted in suitable extensions 55 on the arms 17. The collars are adjustable longitudinally to the rod and angularly, so that they may be adjusted to engage with the paper along the slits in the latter. Each finger is preferably cut slightly diagonal at its end, as shown in Fig. 3, and the finger is adjusted to such a position that its point will press down slightly upon the paper at the slit. This tends to free the strips from all clinging particles of paper and to permit the paper to deliver free from dust to the winding rollers. Furthermore, the fingers prevent any strip from working sidewise so as to overlap an adjacent strip and become partially unwound therewith. The fingers may be used solely for this purpose if desired.

Various changes may be made in the details of the construction of my machine and within the terms of the appended claims without departing from the spirit of my invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A slitter and rewinder having in combination cutting mechanism for subdividing a strip of paper or the like longitudinally, rewinding mechanism including a reel for receiving the material, a transversely extending rod, a plurality of collars secured thereto and adjustable angularly and longitudinally thereof, a plurality of substantially flat fingers carried by said collars and lying in approximately the same plane and each having a pointed end bearing upon the surface of the paper at a line of subdivision for preventing lateral movement of the individual strips.

2. A slitter and rewinder having a series of rotary cutters for engagement with the paper upon one side thereof, a pivoted frame, a series of rotary cutters carried thereby for coöperation with the first-mentioned cutters, rewinding mechanism, a plurality of fingers for engagement with the paper to prevent lateral movement of the individual strips of paper and means secured to said pivoted frame for adjustably supporting said fingers.

3. A slitter and rewinder having a series of rotary cutters, a movable frame, a second series of rotary cutters carried by said frame for coöperation with the first-mentioned cutters to subdivide the paper or the like into individual strips, rewinding mechanism and means carried by said movable frame for engagement with the paper to prevent lateral movement of the individual strips.

4. A slitter and rewinder having a pair of friction winding rollers rotatable in the same direction and serving to support a roll of material being reeled up, a pressure roller adapted to bear on said roll of cut material, two series of rotary cutters for engagement with opposite sides of the paper below said first-mentioned rollers at one side thereof, a transversely extending rod disposed above one of said series of cutters, a plurality of collars secured thereto and adjustable angularly and longitudinally thereof, a plurality of substantially flat fingers carried by said collars and each having a pointed end bearing upon the upper surface of the paper at the line of subdivision for preventing lateral movement of the individual strips.

5. A slitter and rewinder having a pair of friction winding rollers rotatable in the same direction and serving to support a roll of material being reeled up, a pressure roller adapted to bear on said roll of cut material, two series of rotary cutters for engagement with opposite sides of the paper below said first-mentioned rollers at one side thereof, a transversely extending rod and a series of substantially flat fingers carried thereby and each having a pointed end engaging with the upper surface of the paper at the lines of subdivision for preventing lateral movement of the individual strips.

6. A slitter and rewinder having a pair of friction winding rollers rotatable in the same direction and serving to support a roll of material being reeled up, a pressure roller adapted to bear on said roll of cut material, two series of rotary cutters for engagement with opposite sides of the paper below said first-mentioned rollers at one side thereof, a bar over which the paper passes from said cutters to said first-mentioned rollers and a plurality of substantially flat fingers disposed above the paper intermediate said cutters and said winding rollers and in engagement with the upper surface of said paper adjacent to the lines of subdivision of the latter for preventing lateral movement of the individual strips of paper.

7. A slitter and rewinder having in combination cutting mechanism for subdividing a strip of paper or the like longitudinally, rewinding mechanism including a reel for receiving the material and a plurality of friction drums for engagement with the rewound material, one of said drums receiving the subdivided strips and delivering the same to the reel, said drums and reel being relatively movable, and a plurality of adjustable fingers for engagement with the surface of the paper adjacent to the lines of subdivision and intermediate said cutting mechanism and said rewinding mechanism for preventing the lateral movement of the individual strips of paper.

8. In combination a pair of friction-winding rollers revolving in the same direc-

guides for preventing lateral movement of said pressure roller, pivoted arms connected to said roller, means for transmitting power to the pivotal center of said arms, means for transmitting power along said arms to said pressure roller, and spring-pressed friction tion and adapted to support the roll of cut material being reeled up, a pressure roller adapted to bear on the roll of cut material, connections permitting a variation in the speed of rotation of said pressure roller.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL M. LANGSTON.

Witnesses:

ANNA W. KUENZEL,

ROBERT JENNETT.