Oct. 16, 1928. 1,687,607

A. E. COLLINS

SLITTING MACHINE

Filed Dec. 14, 1926 6 Sheets-Sheet 1

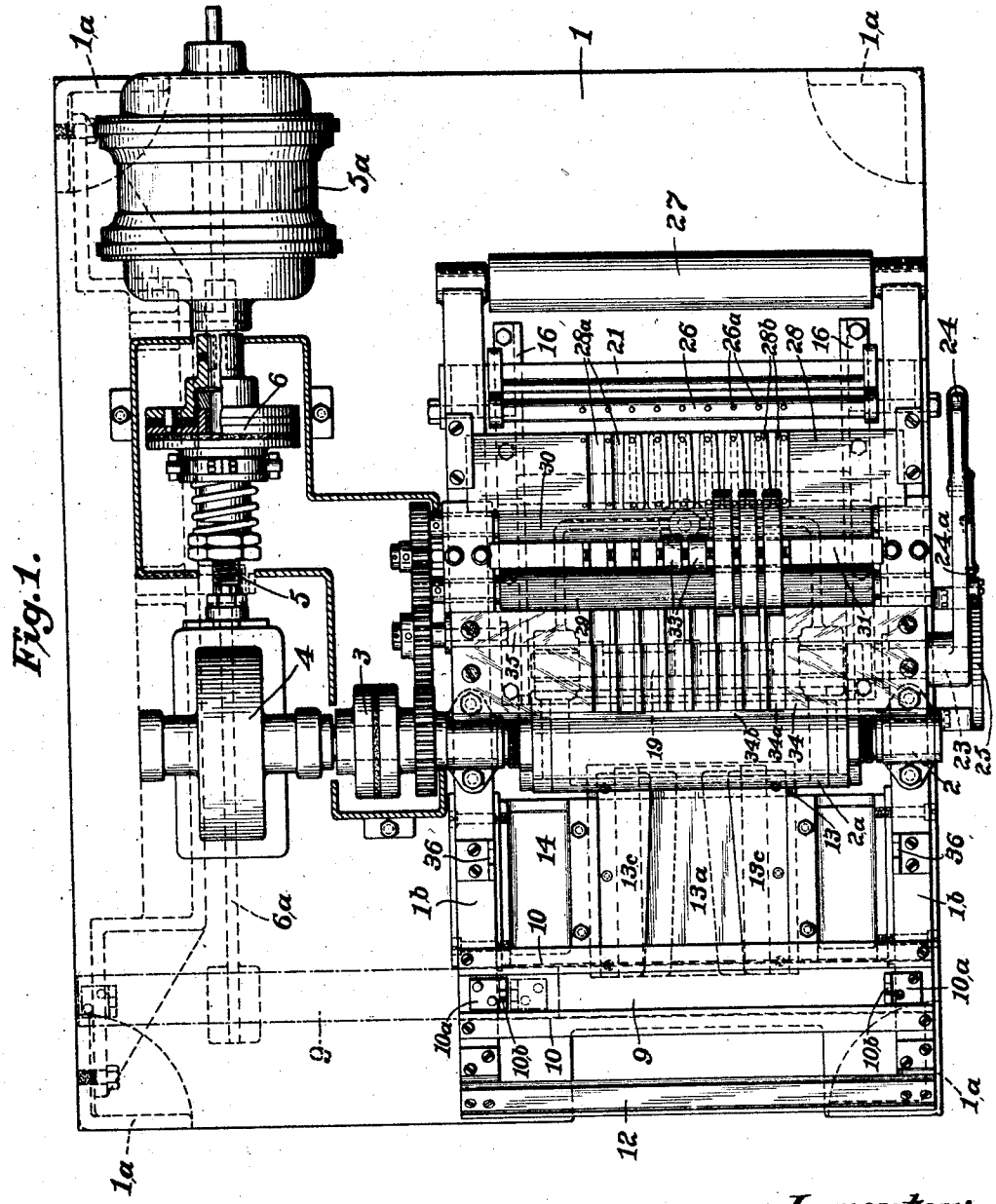



Fig. 1.

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SLITTING MACHINE

Filed Dec. 14, 1926 6 Sheets-Sheet 2

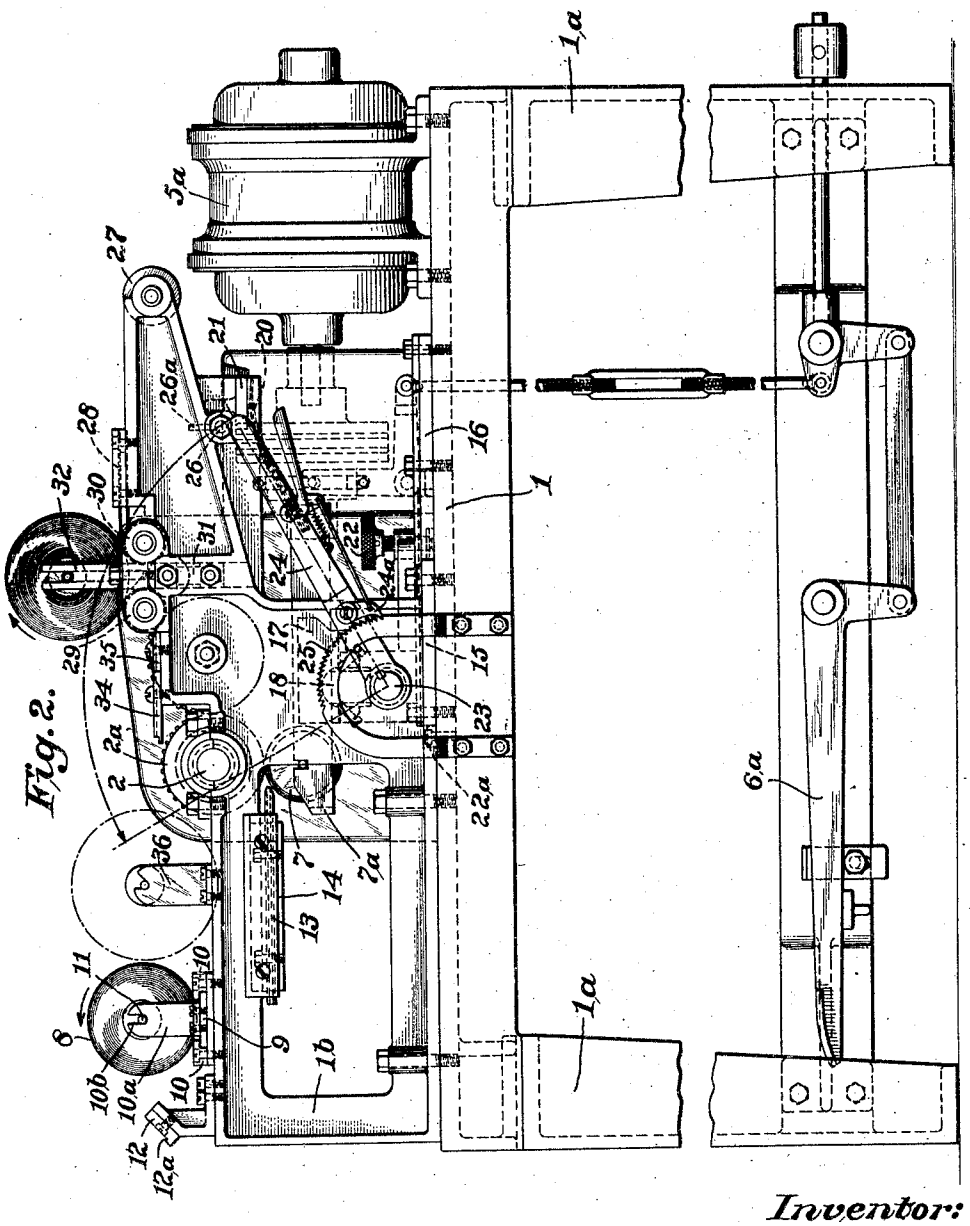



Fig. 2.

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SLITTING MACHINE

Filed Dec. 14, 1926 6 Sheets-Sheet 3

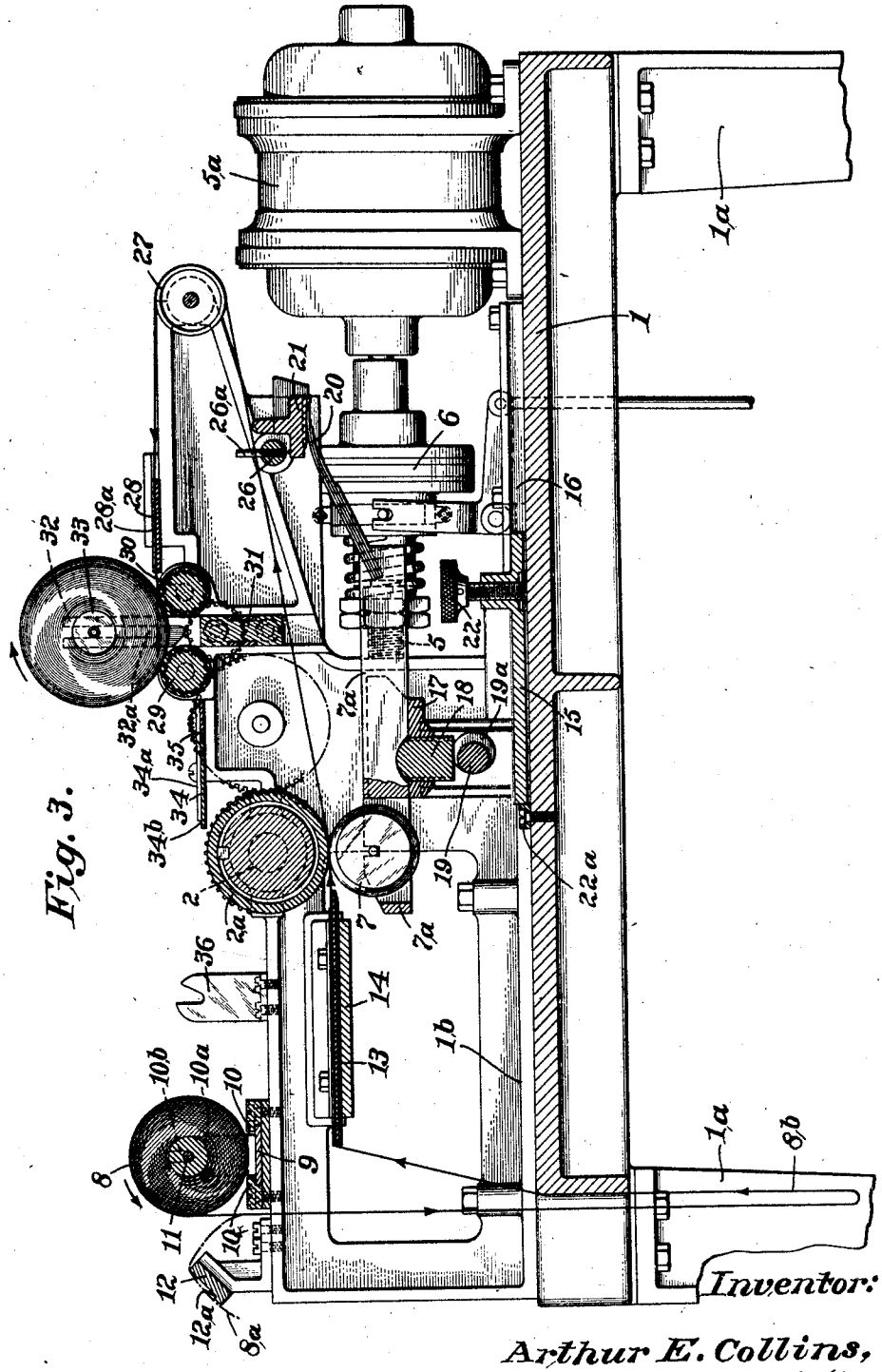



Fig. 3.

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SLITTING MACHINE

Filed Dec. 14, 1926 6 Sheets-Sheet 4

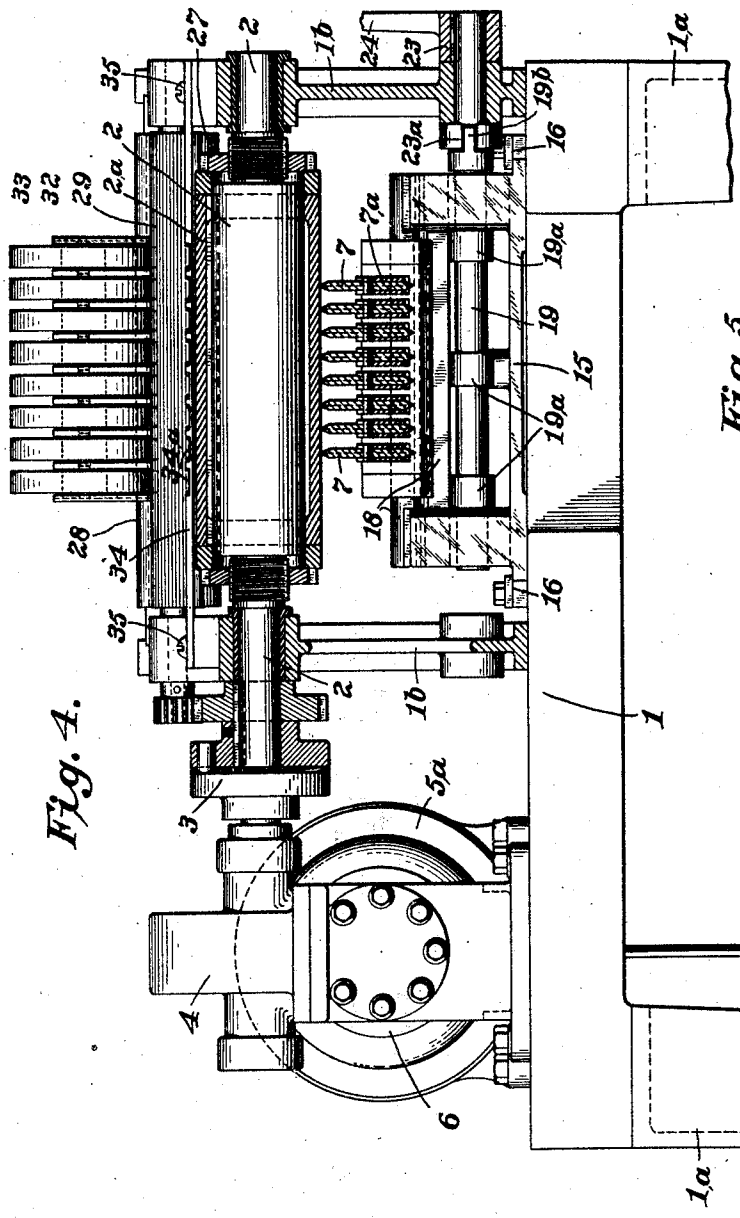


Fig. 4.

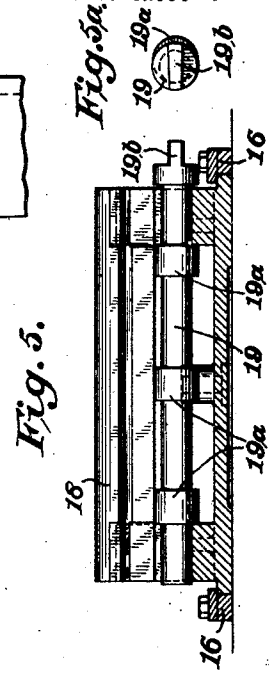


Fig. 5.



Fig. 5a.

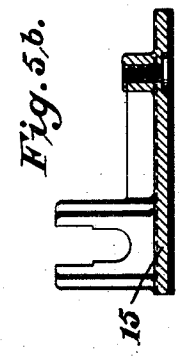


Fig. 5b.

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SLITTING MACHINE

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Fig. 6.

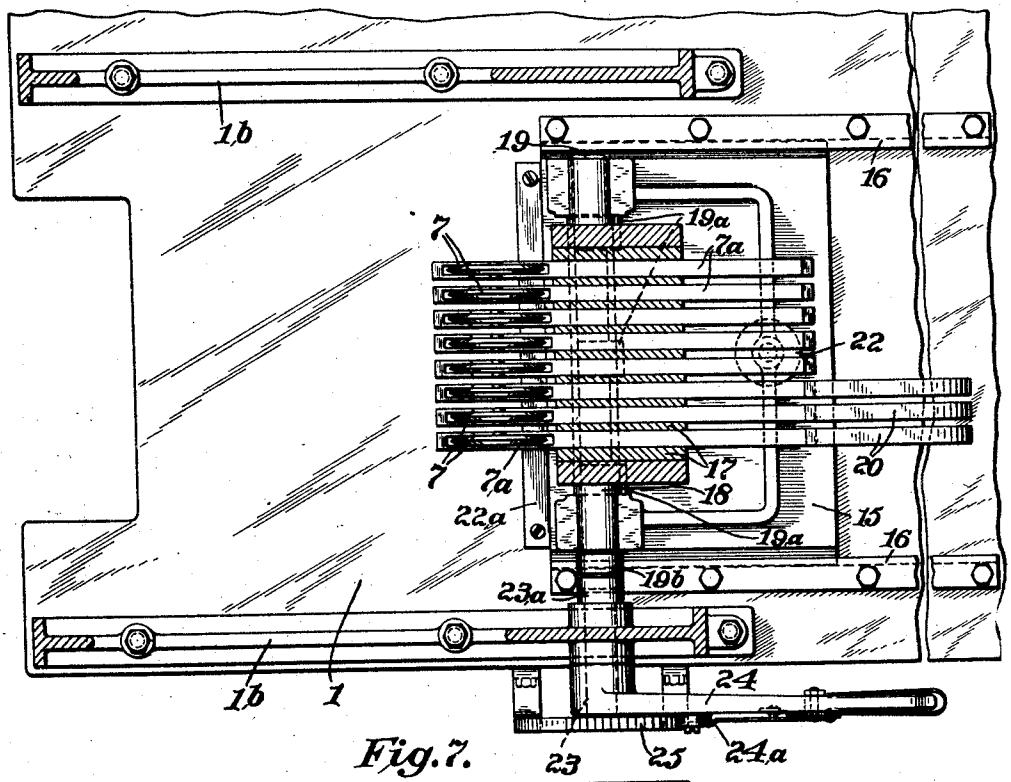



Fig. 7.

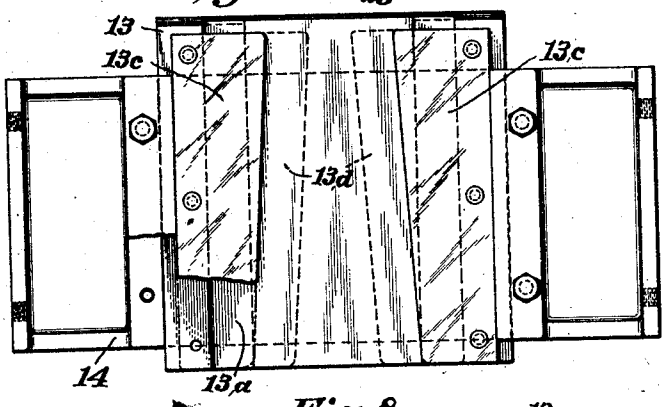



Fig. 8.




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Fig.9.

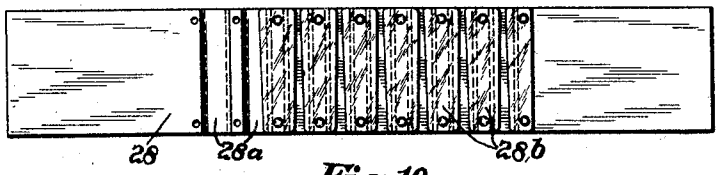



Fig.10.




Fig.13.




Fig.11.

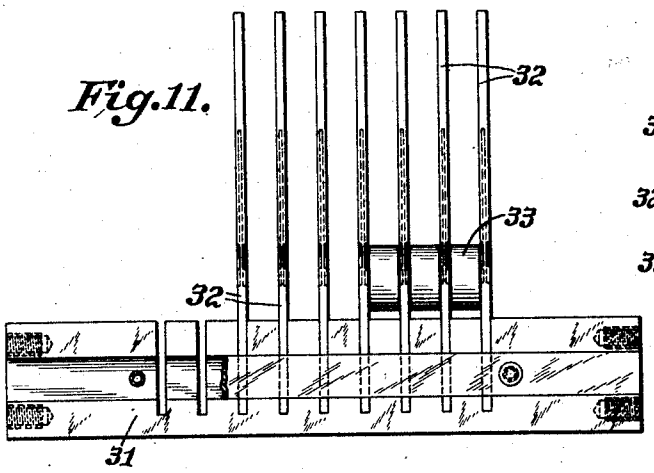



Fig.12.

Fig.14.




Fig.15.

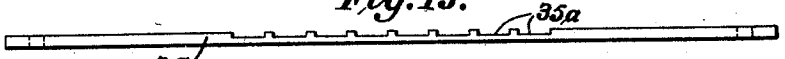



Fig.16.

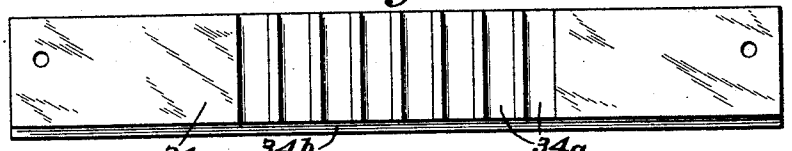



Fig.17.




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Patented Oct. 16, 1928. 1,687,607

# UNITED STATES PATENT OFFICE.

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## SLITTING MACHINE.

Application filed December 14, 1926. Serial No. 154,748.

My present invention relates to improvements in slitting or winding machines of the type in which a plurality of spaced cutters, operating against a rotating platen roll, serve to divide a traveling web into a plurality of relatively narrow bands or strips which are thereupon wound up into individual rolls.

My improved machine is designed especially for operating upon sheets of unvulcanized rubber, though not limited to such use, which is extremely sticky or tacky. Frequently it is desired to slit and re-wind webs of unvulcanized rubber calendered to between .007 and .010 inch in thickness divided into strips or ribbons of one-half or three-fourths inch in width.

Such webs are dusted on one or both sides with a powdered material which will enable it to be wound in roll form without the overlying convolutions adhering, but great difficulty has been experienced in slitting and re-winding any webs of unvulcanized rubber or rubberized fabric and particularly of the character referred to.

One is that with slitting and re-winding machines heretofore produced, so far as I am aware, while the cutters may penetrate through the stock to the platen roll, the cut edges immediately re-unite due to the tacky nature of the rubber which makes it necessary to pull them apart along the scored lines which interferes with the proper functioning of the machine.

Another objection is that in prior machines the strips when separated tend to interweave before reaching the re-winding rollers and again must be pulled apart and such separation is an extremely difficult matter.

My said invention aims to avoid these difficulties and to provide a machine by which a traveling web of unvulcanized rubber or rubberized fabric may be slit into a plurality of narrow ribbons, and these separated and rewound on spools without injury to the ribbons and without danger of interweaving or overlapping.

One of the principal objects of this invention is to collect and rewind the material in such a way as to avoid stretching the material unduly which would result in a change in width, and to re-roll it in such form that it will remain smooth and free from wrinkles.

The invention further aims to provide means whereby the successive webs of supply stock may be readily joined so that the stock to be slit may be fed to the machine without interruption and in a continuous length.

The invention further aims to provide means to enable the ribbon spools to be readily and collectively removed from the machine when sufficient quantities of the ribbons have been wound thereon.

Another object is to provide simple and effective means for severing the re-wound portions of the ribbons from the unwound portions and to effect the ready attachment of such unwound portions to fresh spools and their convenient placement in re-winding position.

Still another object is to provide a machine which will be readily convertible for cutting ribbons of different width. With these and other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described, what I regard as my invention being ascertained and defined by the claims appended hereto.

What I at present consider the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of the machine with parts in section.

Fig. 2 is a side elevation, partly broken away.

Fig. 3 is a longitudinal vertical section.

Fig. 4 is a transverse vertical section taken along the line of the platen roll.

Figs. 5, $5^a$ and $5^b$ are detail views.

Fig. 6 is a horizontal sectional detail showing the cutters in plan.

Figs. 7 and 8 are detail views of the web guide, in plan and transverse section respectively.

Figs. 9 and 10 are respectively a plan and edge view of the strip guide 28.

Fig. 11 is a detailed elevation, partly in section, of the spool guide.

Fig. 12 is an end view of bar 31, and Fig. 13 is a transverse vertical section.

Figs. 14 to 17 inclusive are detail views in plan and edge view respectively of plates or bars 34 and 35.

Referring by reference characters to these drawings, 1 indicates a bed plate supported by standards $1^a$ and carrying frame members

1[b] in which is journaled a shaft 2 which carries the platen roll 2[a] hereinafter described. This shaft is driven through a flexible coupling 3 and worm reduction unit 4 from the prime mover shaft 5, which may conveniently be the shaft of an electric motor shown conventionally at 5[a], said shaft 5 being provided with a clutch 6 of any approved type, controlled through suitable connections from treadle lever 6[a] (Fig. 2).

Cooperating with the platen roll 2[a] is a series of cutters 7 of the blunt edge disc type which cooperate with the platen roll to sever the web by a rolling contact, the cutting discs being forced into contact with the platen roll by spring means hereinafter described and being driven by their rolling contact therewith.

At this point it may be in order to state that where it is desired to slit the material into three-fourths inch ribbons I find it desirable to use a web of six inches in width, whereas if one-half inch ribbons are desired, a four inch web is used, and the machine is constructed so as to be readily convertible for operation on either width, as will hereinafter appear.

The web is placed in the machine in roll form, as indicated at 8, in four or six inch widths and in order that it may be fed to the cutters in continuous lengths, I preferably provide a movable carrier for a plurality of stock rolls and means for joining the end of the wed drawn from an exhausted roll to the initial end of the web of a fresh roll. This comprises a slide member 9 mounted to move transversely in guide ways 10 carried by the frame members 1[b], which slide member has upstanding brackets 10[a] provided with slotted upper ends forming seats 10[b] for a rod or skewer 11 passed through the aligned eyes of a plurality of rolls 8. After the end of the web on one roll has been reached, it is detached from the spool and thrown over upon a cutter platen bar 12 (as indicated at 8[a], Fig. 3) which bar has a guiding groove 12[a] for a hand cutter. The stock rolls 8 may comprise paper shells on which the four or six inch widths have been previously wound.

Slide 9 is now shifted to carry the exhausted spool out of feeding position and replace it with a fresh spool, the free end of the web of which is laid upon the web end 8[a]. By passing a seaming cutter along the groove 12[a], the two webs are seamed together and the surplus ends severed or removed in the manner well understood by those skilled in the art. The web of the fresh roll is therefore supplied to the machine as a continuation of the preceding roll, and this operation is continued indefinitely, it being understood that when all the rolls have been exhausted the skewer or rod 11 is lifted out and replaced by a skewer loaded with fresh rolls.

The roll being drawn upon for slitting is of course positioned in substantial alignment with the slitting means and is rotated (by hand or otherwise) to produce a slack loop indicated at 8[b]. Thence the web is led over a stock guide 13. This comprises a (preferably steel) plate member (Fig. 8) having a channel 13[a] six inches wide in one face. and one 13[b] four inches wide in the other face, both provided with smooth polished faces, which plate is removably and reversibly secured to a support 14 carried by the frame members. Thus by merely reversing the plate, it is adapted to accurately guide either width of stock to the slitting mechanism.

Retaining plates 13[c] and 13[d] overhang the guide channels and maintain the edges of the web in place, the adjacent edges of these plates being preferably arranged to converge towards each other, as shown in Fig. 7.

The guide plate 13 and bed plate 1 both terminate short of the breast of the stock roll so as to allow for the accumulation of a material amount of slack, as indicated at 8[b]. The presence of the slack loop insures an even feed of the web to the slitting mechanism.

This, as hereinbefore stated, comprises the platen roll 2[a] and cutting discs 7.

These latter must be capable of being changed to cut either the wide or narrow ribbons as required, and to accomplish this I arrange and mount them as follows:

A carrying slide 15 is slidably mounted in guides 16 so as to be movable into and out of the machine. The cutters 7 are carried by individual cutter bars 7[a] supported by a spacing block 17 and designed to be raised and lowered by a vertically movable fulcrum bar 18 operated by cams 19[a] on cam bar 19. Each bar carries on its end remote from the cutter a leaf spring 20 and all these springs, when the cutter carrying slide 15 is in place, terminate beneath a fixed cross bar 21. Raising the cutter holders presses the spring ends against the under side of bar 21 and hence forces the cutting discs into contact with the platen roll with a yielding pressure individual to each cutter.

To provide for cutting the two widths of ribbons, I furnish two cutter slides 15, one with the cutters spaced one-half inch apart and the other with the three-fourths inch spacing, and it is therefore only necessary to remove one slide and substitute the other to make the change. A locking screw 22 having a suitable milled head is provided for locking the slide in proper position, which is determined by the stop bar 22[a].

For operating the cam shaft 19, I provide its end with a cross lug $19^b$ (Figs. 5 and $5^a$) which is adapted to slide into and out of engagement (in the movement of the cutter slide 15) with a corresponding key way or recess in a socket member $23^a$ (Fig. 4) carried by shaft 23 journaled in one of the frame members. This shaft carries a hand lever 24 which has a hand controlled pawl $24^a$ cooperating with a toothed quadrant 25 for locking the cams when the knives are in elevated position.

After a web of rubber has been passed through the cutting device, the ribbons formed thereby will be inclined to stick together, as hereinbefore indicated. To effect their separation, I provide a ribbon separator which comprises a bar 26 having upstanding smooth round pins or fingers $26^a$ between which the ribbons pass, whereby said fingers act like the teeth of a comb. This bar is made removable and replaceable, so that by providing two bars with correspondingly spaced pins, either width of ribbons may be separated.

After leaving the separating fingers $26^a$, the ribbons pass around an idle roll 27 and are thence led to guides which accurately align them with the re-winding rolls. These guides are formed by a steel plate 28 having two sets of smooth polished slots $28^a$ milled in its opposite faces, one set being one-half inch in width, and the other three-fourths inch and correspondingly placed, and being similar, except as to width, to plate $13^a$.

The plate is removable and reversibly held so that it may be readily inverted to effect the change of width of guide. Small guide plates $28^b$ are secured to the fences between the slots so as to provide nearly closed guides for the ribbons.

This guide plate is located in close proximity to the re-winding mechanism, which will now be described.

This comprises a pair of rolls 29 and 30 which are driven at a slightly greater surface speed than the platen roll $2^a$, conveniently by a train of gearing from the platen roll shaft. The rolls 29 and 30 are provided with knurled or roughened surfaces to exert a pulling or turning effect on the ribbon rolls which are floatingly supported by the rolls 29 and 30. In order to properly position the ribbon rolls, I provide a ribbon roll bar or block 31 removably carried by the frame members which in turn carries a plurality of upstanding ribbon roll spacing plates or bars 32.

Each of these spacers is provided with narrow substantially L-shaped grooves $32^a$, and the upper part of each spacer is slotted entirely through in alignment with the groove or grooves. The ribbon rolls 33 are of a width to pass between the spacers and are provided with small axial projections at each end to engage the L-shaped slots in the spacers.

When the ribbon rolls are empty, and resting upon the pulling or winding rolls 29 and 30, these projections will be in line with the lateral extensions of the L-shaped slots, so that they may be readily rolled into place. When the empty rolls have been put in position and the ends of the ribbons affixed or secured thereto, rotation of the rolls 29 and 30 causes the ribbons to be wound on the spools in a manner that will be obvious. As soon as any amount of ribbon has been wound on each spool, it will be raised until its axial projection is out of line with the branch slot and will consequently be held against accidental removal. As the winding continues, the spools or rolls will rise till their central eyes align with the through slots in the spacers (Fig. 2) at which time (the spools being full) a skewer may be passed through the spool eyes and all lifted out together.

In order to enable the ribbons on the filled spools to be readily separated from the stock in the machine, and such stock readily attached to fresh spools, I provide the following means.

Adjacent the roll 29 I provide two adjacent plates 34 and 35 (Figs. 1 and 3). Plate 34 has slots $34^a$ across its face corresponding in width to the width of ribbons.

It is also rebated along its edge, as indicated at $34^b$ to provide a guide for a cutting knife. Assuming that the spools have had the requisite amount of ribbons wound thereon and been lifted out by the skewer, they are then placed on plate 34 and rolled along the same to lay the ribbons in the slots $34^a$, after which the skewer is supported in the forked or slotted upper ends of brackets 36. The operator may now readily sever all the ribbons by passing a suitable cutting knife along the rebated edge or guide $34^b$. The rolls of ribbons on the skewer may now be removed and it will be found that the ends of the ribbon lying on plate 34 will be of the proper length to pass around a new set of ribbon rolls in re-winding.

For this purpose I provide the plate 35 above referred to, which is of identical construction to plate 34, except that the slots $35^a$ are of the proper width to receive the spools or rolls 33 (usually of steel). One of these rolls being dropped into each slot with the spool contacting with roll 29, the free end of each ribbon will be of such length that it may be lifted up from plate 34 and carried over the top of the corresponding spool and tucked into starting position, and each spool may be rolled up over roll 29 and dropped into the space between the spacer plates in winding position.

Plates 34 and 35 are made removable and

replaceable for different widths of ribbon.

Having thus described my invention, what I claim is:

1. In a slitting machine, the combination with slitting means, of a carrier for a plurality of stock rolls, and means whereby said carrier may be adjusted transversely of the machine to bring successive rolls into operative position, and means associated therewith for effecting the junction of the end of the web of a fresh stock roll to the end of the web of the preceding roll.

2. In a slitting machine, the combination with slitting means, of a carrier for a plurality of stock rolls, means whereby said carrier may be moved to bring the rolls successively into and out of operating position, and a cutter bar adjacent the operating position of the stock roll upon which the free ends of preceding and succeeding webs may be superposed.

3. In a slitting machine, the combination with slitting means, of a carrier for a plurality of stock rolls, means whereby said carrier may be moved to bring the rolls successively into and out of operating position, and a cutter bar adjacent the operating position of the stock roll upon which the free ends of preceding and succeeding webs may be superposed, said cutter bar having a knife guide.

4. In a slitting machine, a platen roll, and cutter means cooperating therewith comprising a carrier, a plurality of cutters carried thereby with means for pressing them yieldingly against the platen roll, said carrier and cutter mechanism being removable and replaceable as a unit.

5. In a slitting machine, a main frame, a platen roll journaled therein, a cutter carrier movable into and out of the machine frame, cutter means supported from said carrier, means also carried by said carrier whereby said cutters may be pressed into contact with the roll, including a shaft journaled in said carrier, an operating member carried by the machine frame, and means whereby the insertion of the carrier in the machine automatically engages said shaft with said operating means.

6. In a slitting machine, a main frame, a platen roll journaled therein, a cutter carrier insertible in and removable from said frame, cutter bars fulcrumed on said carrier and having cutters adjacent one end to cooperate with said platen roll and springs on the other end for detachably engaging a fixed bar on said frame, and means for raising and lowering the fulcrum of said cutter bars.

7. In a slitting machine, a main frame having a bed plate, a platen roll journaled in said frame above the bed plate with means for rotaing it, guides on said bed plate, a carrier plate slidable into and out of said guides, a plurality of cutter bars supported by said carrier plate to have vertical movement relative thereto, and means for raising and lowering said cutter bars when the cutters are in operative position relative to the cutting roll.

8. In a sheet stock slitting machine, a main frame, a driven platen roll journaled therein, a plurality of rotatable cutting discs cooperating therewith, means for supporting a stock roll, and a guide for the sheet stock comprising an elongated plate having a channel therein of a width corresponding to the width of the fabric, said channel being aligned with the bight of the platen and cutting discs.

9. In a sheet stock slitting machine, a main frame, a driven platen roll journaled therein, a plurality of rotatable cutting discs cooperating therewith, means for supporting a stock roll, and a guide for the sheet stock comprising an elongated plate having a channel therein of a width correspanding to the width of the fabric, said channel being aligned with the bight of the platen and cutting discs, said plate having ledges overhanging the side edges of the channel and partially closing the same.

In testimony whereof I affix my signature.

ARTHUR E. COLLINS.