

Aug. 26, 1958

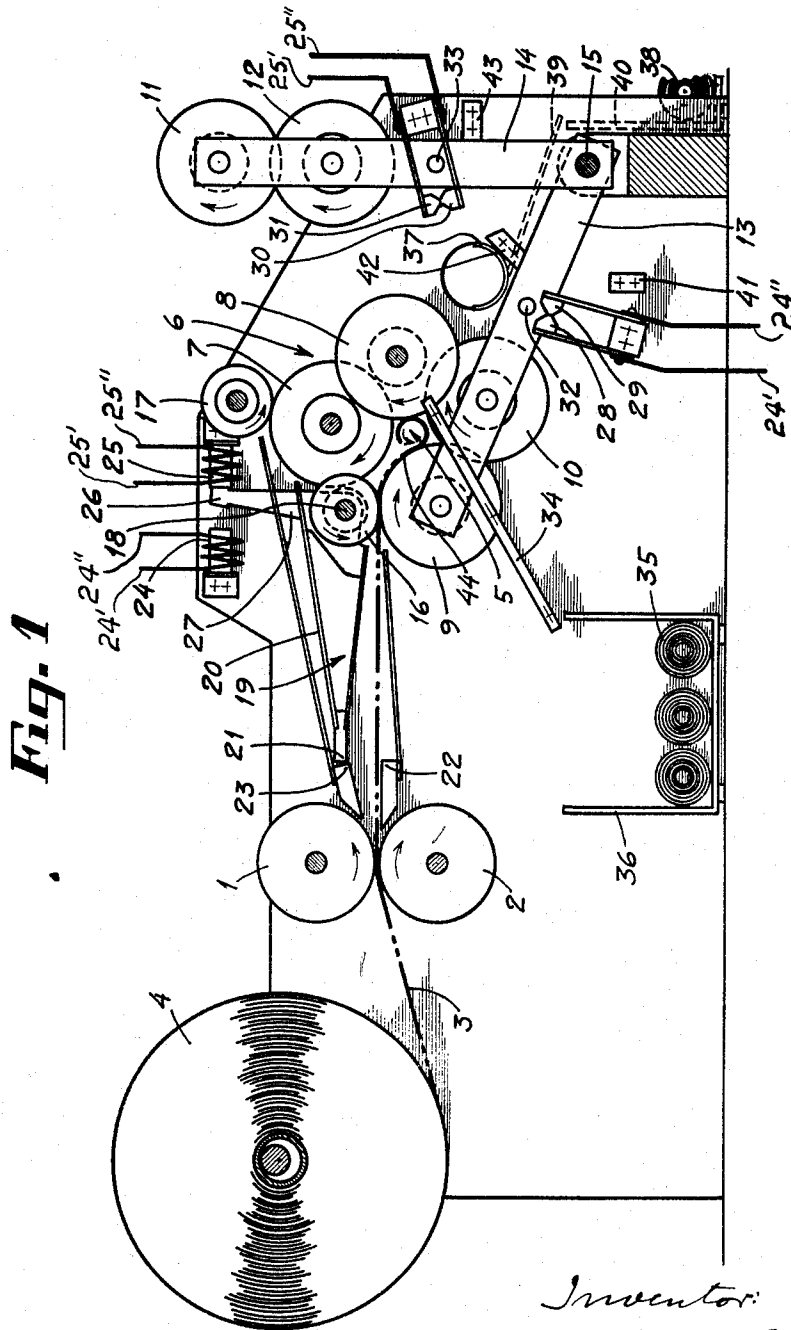
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2,849,191

MACHINE FOR WINDING PAPER MATERIAL IN ROLLS

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5 Sheets-Sheet 1



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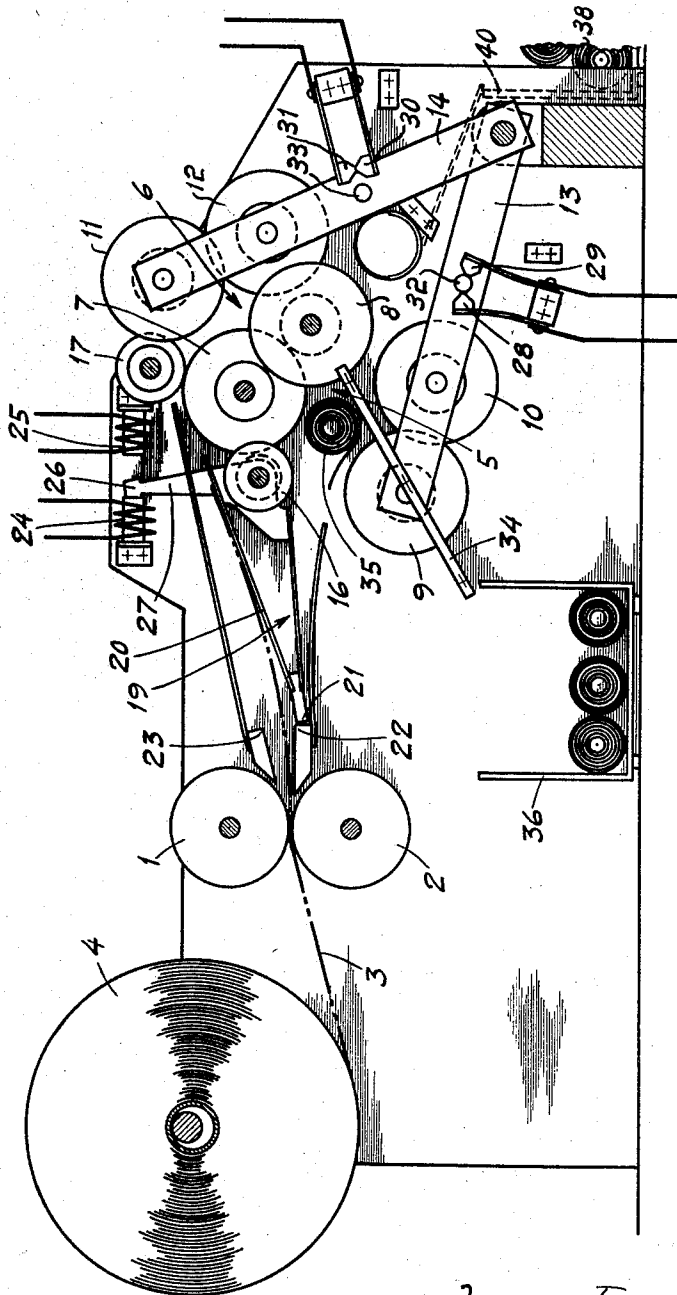
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Fig. 2



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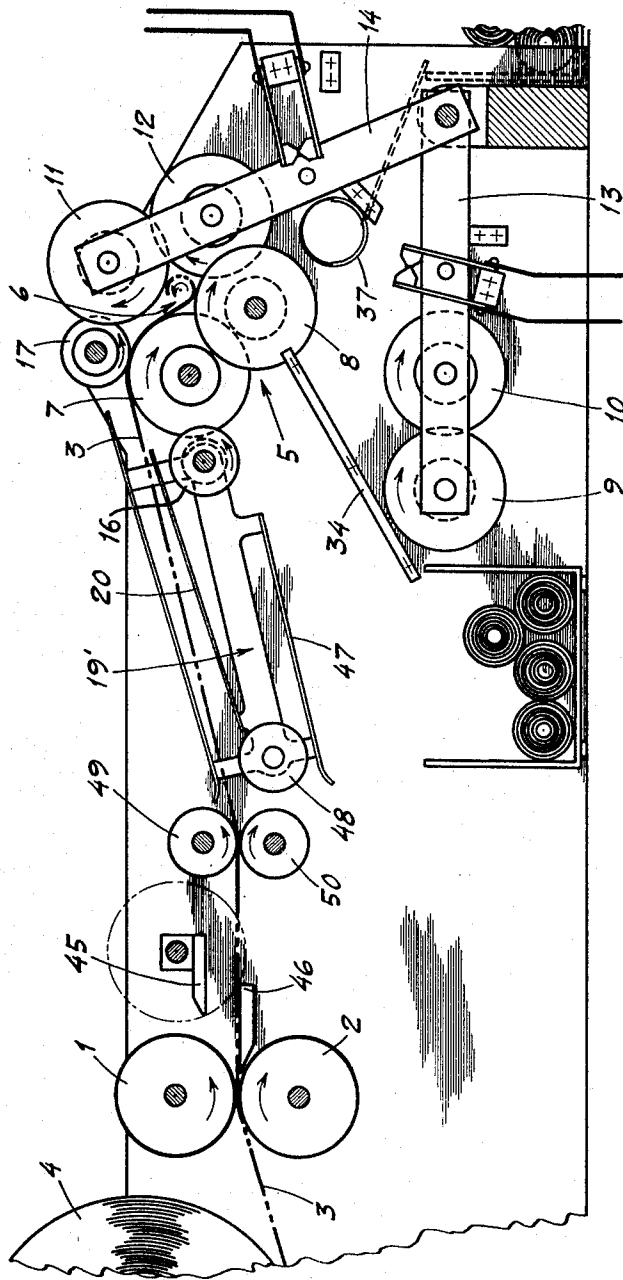
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Fig. 3



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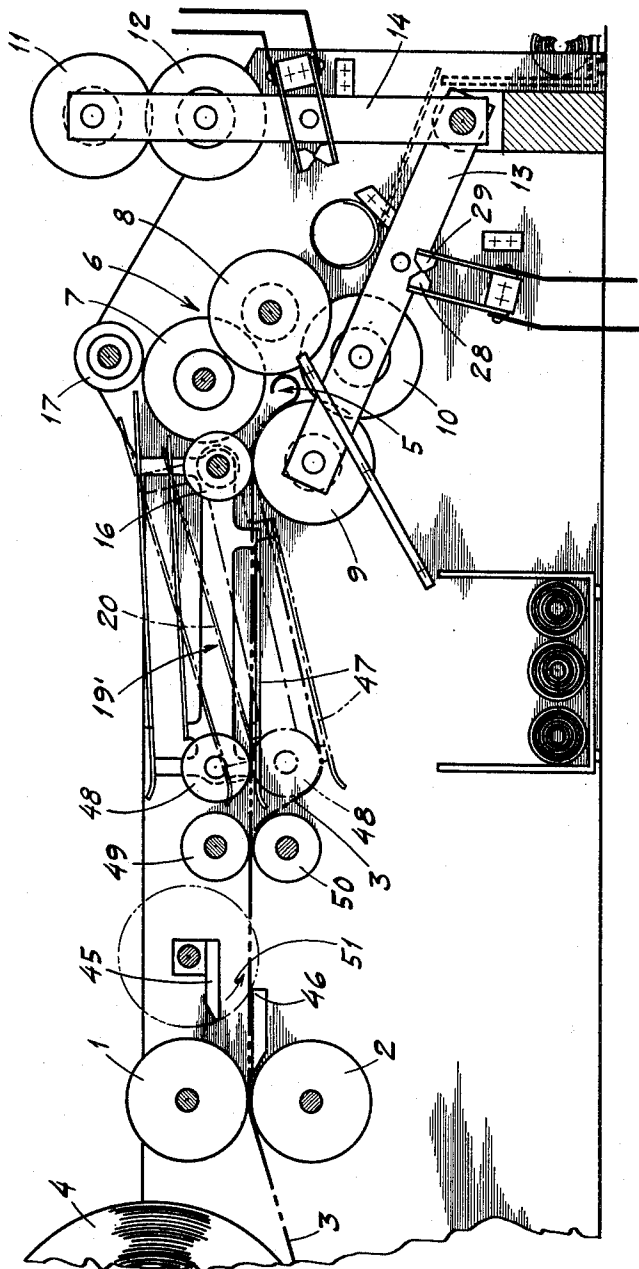
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Fig. 4



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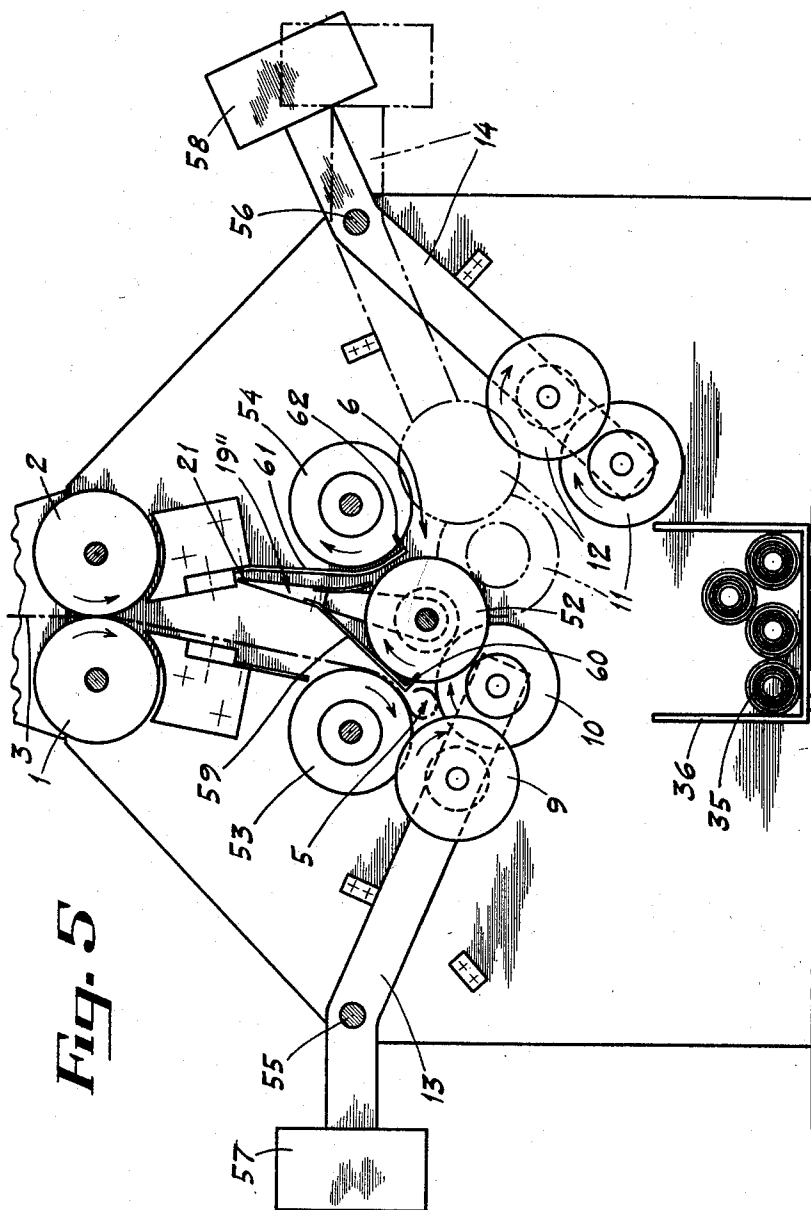


Fig. 5

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MACHINE FOR WINDING PAPER MATERIAL IN ROLLS

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Claims priority, application Sweden February 12, 1954

13 Claims. (Cl. 242—56)

This invention relates to a simplified type of paper winding machine with two winding stations in which the winding operation may be continuously carried out. The winding stations may be arranged stationary. The object of the invention is to provide a winding machine in which a switching tongue is arranged to guide the free end of the web into one of two winding stations alternately.

A further object of this invention is to provide the winding stations with a number of rollers driven in the same direction of rotation, said rollers being swingably mounted and coacting with another set of rollers being stationary mounted and likewise driven in the same direction of rotation, said stationary rollers being suitable for both winding stations.

A further object of this invention is to provide said switching tongue with a cutter at its free end, said cutter coacting with anvils or abutments for cutting the web when the switching tongue is swung to its ends positions.

Other features of the invention are made clear in the following description with reference to the attached diagrammatic drawings on which:

Figure 1 is an elevational view of a winding machine.

Figure 2 is another elevational view of the invention.

Figure 3 is an elevational view of said invention showing a modification of same.

Figure 4 is another elevational view of the invention shown in Figure 3; while

Figure 5 is an elevational view of a further modification of said invention.

The two rolls 1, 2 feed the web 3 from a supply roller 4. The machine has two winding stations 5, 6. Each winding station comprises four rollers (see Figs. 1-4) of which two rollers 7, 8 are stationary and driven in the same direction of rotation. Each winding station comprises in addition two rollers 9, 10 and 11, 12, respectively, driven in the same direction of rotation and each pair being journaled at the outer end of a pair of arms 13 and 14, respectively, said arms being pivoted on a common shaft 15. The rollers 7-12 are provided with ring grooves and arranged for engaging one another. For each winding station 5, 6 is moreover provided a feed roll 16 and 17, respectively, for feeding the web 3 into the winding stations. The arrangements for driving the rollers and for swinging the arms 13, 14 are not shown on the drawings, as the construction hereof does not present any difficulty for those skilled in the art.

According to the embodiment shown in Figs. 1 and 2, a switching tongue 19 is at one end pivotally mounted to the shaft 18 for the feed roll 16, said switching tongue being at its upper edge provided with a sliding plane 20 for the web 3. The switching tongue 19 is at the edge of its free end shaped as a cutter 21 which coacts with two similarly shaped anvils 22, 23 at each end position of the switching tongue.

According to the example shown, the swinging movements of the switching tongue 19 might be performed with the aid of two electro-magnets 24, having conductors

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24' and 24'', and 25 having conductors 25' and 25'', which electro-magnets are alternately made to attract the armature 26 which is shaped out of or arranged on the free end of a lever 27 connected to the switching tongue 19. The electric circuits, to which the magnets 24, 25 are connected, are closed via double contacts 28, 29 and 30, 31 and relays, not shown on the drawing. The electric circuit through the contacts 28, 29 and 30, 31 is broken by pins 32 and 33 on the arms 13 and 14, respectively. The conductors to the contacts 28 and 29 are numbered 24' and 24'' and those to the members 30 and 31 are numbered 25' and 25''.

The rollers 9, 10 may be somewhat shorter than the width of the web 3, and outside the arms 13 are arranged railshaped roller ways 34 inclining downwards to permit the wound paper rolls 35 to be fed from the winding station 5 down to a container 36, with the ends of the paper rolls rolling on the roller ways. Below the winding station 6 a groove 37 is arranged to permit the wound rolls 38 from said winding station to slide endwise onto an inclining plane 39 from which the paper rolls 38 fall into a container 40. Stops for limiting the swinging movement of the arms 13, 14 are indicated by 41, 42 and 43.

The machine operates in the following way. When the switching tongue 19 moves to the position indicated in Fig. 1, the web 3 is fed by the rolls 1, 2 to the roll 16 and between this one and the roller 9 into the winding station 5 where the free end of the web is forced to wind in the direction of the arrow 44 through coaction between the rollers 9, 10, 8 and 7. As the diameter of the paper roll increases in the winding station 5, said paper roll presses against the rollers 9, 10, whereby the arms 13 are swung counterclockwise according to the drawing. When the pin 32 thereby forces the contacts 28, 29 apart, the electromagnet 24 attracts the armature 26, whereby the switching tongue 19 is swung counterclockwise. The cutter 21 then cuts the web 3 against the anvil 22, and at the same time, the free end of the web is forced along the sliding plane 20 up to the feed roll 17 which in coaction with the roller 7 leads the end of the web into the winding station 6, where a new roll is prepared in the same way as described for the winding station 5. After the web is cut for the roll 35 in the winding station 5, the rotation of the rollers 9 and 10 continued, so that also the last part of the cut web was wound onto the roll 35. At the same time and by arrangements not shown on the drawing, the arms 13 are swung counterclockwise and so far (see Fig. 3), that the periphery of the roller 9 becomes situated beneath the roller way 34 to permit the paper roll 35 to roll down into the container 36. Thereafter, the arm 13 returns automatically to its original position (Fig. 1). When the paper roll in the winding station 6 has grown to a predetermined diameter, the pin 33 presses the contacts 30, 31 apart due to the outward swinging of the arms 14. This closes the circuit through the electromagnet, which attracts the armature 26, whereby the switching tongue 19 swings clockwise and the cutter 21 cuts the web 3 against the anvil 23. In this position of the switching tongue 19 the sliding plane 20 is out of the way for the web 3 which may once again be fed straight forward to the winding station 5. At the outswinging of the arm 14, the wound paper roll falls from the winding station 6 down to the groove 37 and then into the container 40.

The arrangement for swinging the switching tongue 19 has not been shown in Figs. 3 and 4 but may be of the same type as the device shown in Figs. 1 and 2. According to Fig. 3, the switching tongue 19, besides the sliding plane 20, is also at the bottom provided with a sliding plane 47. At its free end, the switching tongue 19 is

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moreover provided with a rotatably mounted guide roller 48.

When the switching tongue 19' moves to the upward swung position, indicated in Fig. 4 in full lines, the web 3 is fed from the supply roller 4 between the feed rolls 1 and 2 past the cutter 45, which is held in the inoperative position shown on the drawing, further between two additional feed rolls 49, 50, and slides on the plane 47 to the feed roll 16, which through coaction with the roller 9 feed the end of the web into the winding station 5. As soon as the winding of the web has begun, the switching tongue 19' swings counterclockwise to the position indicated in chain-dotted lines in Fig. 4 (or the position shown in full lines in Fig. 3). In this position, the web is fed in a roundabout way over the guide roller 48, and the sliding plane 20 with its lower end reaches beneath an imaginary line between the points of action with the web of the roller pairs 49, 50 and 9, 16. Therefore, when the paper roll in the winding station 5 has grown to the desired size, or the wound web has the desired length and the separation of the contacts 28, 29 effects the swinging of the knife 45 in the direction of the arrow 51 in Fig. 4 so that the web is cut, the free end of the web will be fed by the rolls 49, 50 to the sliding plane 20 which, as is shown in Fig. 3, guides the web up to the winding station 6. During the winding of the web in this station, the switching tongue is once again swinging to the position shown in full lines in Fig. 4, when the guide roller 48 once more leads the web in a roundabout way over the guide roller, and the sliding plane is brought upwards so that it no longer cuts the above mentioned imaginary line between the points of action with the web of the rollers 49, 50 and 9, 16. Thus, when the web is once more cut by the cutter 45, after the roll in the winding station has been wound, the free end of the web may again be fed by the rolls 49, 50 straight forward to the winding station 5.

In the embodiment shown in Fig. 5, the feed rolls 1, 2 are so arranged that the web 3 is fed mainly vertically to the two winding stations 5, 6. By this arrangement it is possible to obtain a winding machine in which the various rollers are arranged substantially symmetrically. The stationary rollers belonging to the winding stations of the machine, are three in this embodiment, namely a roller 52 situated straight below the feed rolls 1, 2 and two rollers 53, 54, situated at each side of the roller 52 but not in connection with it. The rollers 9, 10 and 11, 12 are, in the same way as according to the two previously described embodiments, rotatably journaled in pairs on two arms 13 and 14, respectively, said arms being swingably mounted on shafts 55 and 56, respectively, said shafts being parallel to the shafts of the various rollers and situated at each side of the winding stations 5, 6. Counterweights 57 and 58 are arranged at the ends of the arms 13, 14 being situated opposite the rollers 9, 10 and 11, 12, respectively, said counterweights being so dimensioned that the rollers 9, 10 and 11, 12, respectively, may be swung away when the roll in the winding station 5 is growing larger without the roll 35 being exposed to a too high pressure. When the arms 13, 14 are swung away (the position of the right arm 14, indicated in full lines) after the paper roll has been wound and the web 3 has been cut by the cutter 21 at the front end of the switching tongue 19, the roll falls straight down into the container 36.

One additional feature is that due to the journaled of the arms 13, 14 in the manner shown in Fig. 5, the rolls in the winding stations 5, 6 maintain substantially the same position in the station during the whole winding operation, and the pressure on the rollers becomes mainly constant. All this contributes to a smooth winding operation.

According to the embodiment indicated in Fig. 5, the switching tongue 19'' is provided with a number of resilient metal strips 59, suitably made from steel and

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serving as guiding means for the web 3, said strips with one angularly bent end engaging with the peripheral grooves in the roller 52. Similar strips 61 engage with its one bent end 62 with the peripheral grooves in the roller 54. These bent ends 60, 62 of the strips 59, 61 lead the free end of the web 3 in a circular track inside the winding stations 5 and 6, respectively, and prevent the end to pass through the space between the roller 52 and the roller 53 or the roller 54.

The embodiments shown and described should be considered as examples only, and the different parts of the winding machine could be altered in several ways within the scope of the invention. This concerns in the first place the shape of the cutters 21 and 45. Also the switching tongue 19'' may be given some other shape than the one indicated on the drawings. In the examples of embodiment, the various devices have been contemplated as operated electrically, but instead could be used e. g. pressure boxes with a compressed air loaded diaphragm and other means for swinging the switching tongue 19'', the arms 13, 14 and the cutter 45 pneumatically. The swinging of the switching tongue 19'' and also the arms 13, 14 may be effected mechanically by the use of a screw with endless threading, said screw operating as a counter of meters or feet of the length of the web. The arms 14 may, in the embodiment shown in Figs. 1-4, with its upper end be pivotally mounted to a separate shaft, and the rollers 11, 12 may be journaled at the lower ends of the arms. The arms 14 are then swung away counterclockwise by the roll 38 increasing in the winding station and the arms 13 could then serve as a roller way for the rolls 38 in order to feed said rolls into the container 40.

The machine has been here described with reference to paper winding, but may, of course, be used for winding other sheet materials as well.

What I claim is:

1. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers, and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size.

2. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, and means for leading the free end of said web, so that when the web is cut, the free end of said web gets a clear passage to the empty winding station, while the winding of the preceding roll is simultaneously finished in the first winding station, said leading means comprising a guide roller mounted at the free end of said guiding means.

3. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said wind-

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ing stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, said cutting device being arranged at the free end of the guiding means.

4. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, and further each winding station comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, said cutting device comprising a cutter at the free end of said guiding means for cutting said web when said guiding means is turned to one of its positions.

5. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, pivotally mounted arms having said movable rollers journaled at one end thereof, the bearing shafts of said arms being situated at each side of said winding stations and being parallel to the axis of these rollers.

6. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, and means for feeding said web substantially vertically down to said guiding means and further to said winding stations.

7. A machine for winding paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations and a device for cutting the web of paper material when the rolls have grown to a predetermined diameter, means for guiding the free end of said web alternately into one of said winding stations, said winding stations comprising a number of rollers driven in the same direction but being non-displaceable, each winding station further comprising a set of rollers also driven in the same direction as the first mentioned rollers and each of the last mentioned sets being arranged to move away from said non-displaceable rollers as the paper rolls increase in size, pivotally mounted arms having said movable rollers journaled at one end thereof, the bearing shafts of said arms being situated at each side of said winding stations and being parallel to the axis of these rollers, means for feeding

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said web substantially vertically down to said guiding means and further to said winding stations, said guiding means comprising a number of resilient metal strips having one angularly bent end, said rollers being provided with a peripheral groove and said angularly bent end of said guiding strips engaging with said grooves in one of said non-displaceable rollers in each of said winding stations.

8. A machine for winding up a continuously fed web of a sheet material into rolls without the use of a core or reel, comprising two winding stations, a cutter for cutting off a predetermined amount of web for each roll, a shifting device adapted to guide the cut free end of the web alternately into the winding stations, and a control device for said cutter and said shifting device, each one of said winding stations comprising a plurality of rollers which are located in a circuit and driven in the same direction for rolling the web between them, one group of said rollers in each winding station being mounted stationary and the other group of rollers being mounted displaceably and arranged to be moved away from said stationary group for the discharge of the roll.

9. A machine for winding up a continuously fed web of a sheet material into rolls without the use of a core or reel, comprising two winding stations, a cutter for cutting off a predetermined amount of the web for each roll, a shifting device adapted to guide the cut free end of the web alternately into the winding stations, and a control device for said cutter and said shifting device, each one of said winding stations comprising a plurality of rollers which are located in a circuit and driven in the same direction for rolling the web between them, one group of said rollers being common to the two winding stations and the remaining rollers forming a group divided between the two stations, one of said group of rollers being mounted stationary and the other group of rollers being mounted displaceably and arranged to be moved away from said stationary group for the discharge of the roll.

10. A machine for winding up a continuously fed web of a sheet material into rolls without the use of a core or reel, comprising two winding stations, a cutter for cutting off a predetermined amount of the web for each roll, a shifting device adapted to guide the cut free end of the web alternately into the winding stations, and a control device for said cutter and said shifting device, each one of said winding stations comprising a plurality of rollers which are located in a circuit and driven in the same direction for rolling the web between them, one group of said rollers being common to the two winding stations and mounted stationary and the remaining rollers forming a group divided between the two stations and mounted displaceably and arranged to be moved away from said stationary group for the discharge of the roll.

11. A machine for winding up a web of paper material in smaller rolls without the use of a cylindrical core or a reel, comprising two stationary winding stations, a cutter for cutting off a predetermined amount of the web for each roll, a pivotally mounted switching tongue adapted to guide the cut free end of the web alternately into the winding stations and carrying at its free end said cutter, and a control device for said cutter and said shifting device, said winding stations comprising a number of non-displaceable rollers driven in the same direction, each winding station further comprising a set of rollers driven in the same direction as the first mentioned rollers and arranged each to move away from the said non-displaceable rollers at a moment after the roll has been severed by the cutter.

12. A machine for winding up a continuously fed web of a sheet material into rods without the use of a core or reel, comprising two winding stations, means for feeding said web continuously and substantially vertically down to said winding stations, a cutter for cutting off a

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predetermined amount of the web for each roll, a shifting device adapted to guide the cut free end of the web alternately into the winding stations, and a control device for said cutter and said shifting device, each one of said winding stations comprising a plurality of rollers which are located in a circuit and driven in the same direction for rolling the web between them, one group of said rollers in each winding station being mounted stationary and the other group of rollers being mounted displaceably and arranged to be moved away from said stationary group for the discharge of the roll, said displaceable rollers being pivotally mounted on pairs of swinging arms.

13. A machine for winding up a continuously fed web of a sheet material into rolls without the use of a core or reel, comprising two winding stations, a predetermined amount of web for each roll, a shifting device adapted

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to guide the free end of the web alternately into the winding stations, and a control device for said shifting device, each one of said winding stations comprising a plurality of rollers which are located in a circuit and driven in the same direction for rolling the web between them, one group of said rollers in each winding station being mounted stationary and the other group of rollers being mounted displaceably and arranged to be moved away from said stationary group for the discharge of the roll.

References Cited in the file of this patent

UNITED STATES PATENTS

1,681,046	Marresford	Aug. 14, 1928
2,200,656	Scheff	May 14, 1940