Sept. 11, 1923. 1,467,841

H. A. CUMFER

AUTOMATIC SHEET WINDING AND MEASURING MACHINE

Filed Oct. 17, 1921 5 Sheets-Sheet 1

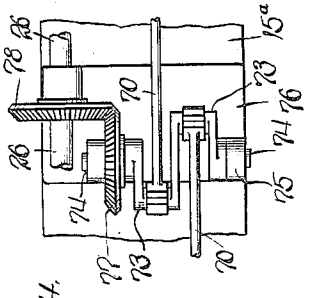


Fig. 4.

Fig. 1.

Inventor:
Harry H. Cumfer
By Toné Bain & Hinkle
Attys.

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H. A. CUMFER

AUTOMATIC SHEET WINDING AND MEASURING MACHINE

Filed Oct. 17, 1921 5 Sheets-Sheet 2

Fig. 14.

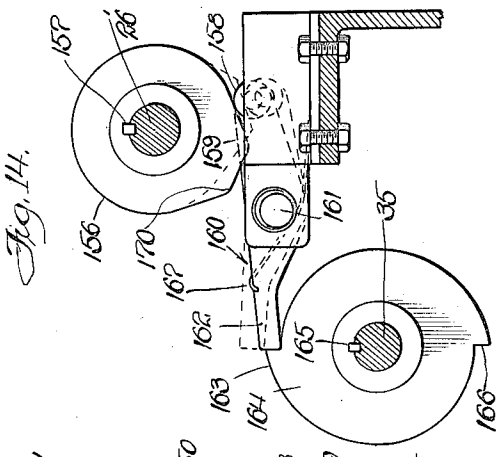
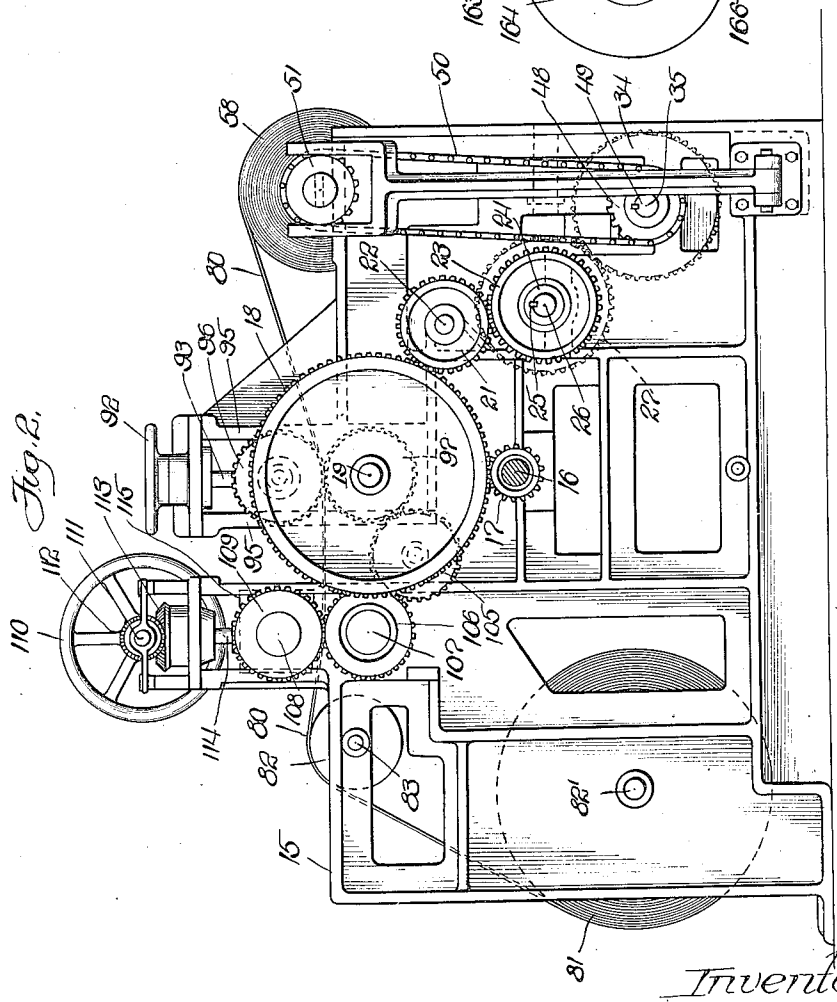


Fig. 2.



Inventor:
Harry A. Cumfer:
By Foree Bain & Minkle
Attys.

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H. A. CUMFER

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Filed Oct. 17, 1921 5 Sheets-Sheet 3

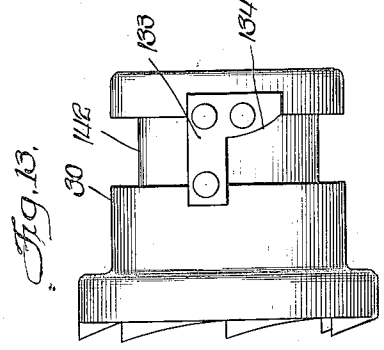


Fig. 13.

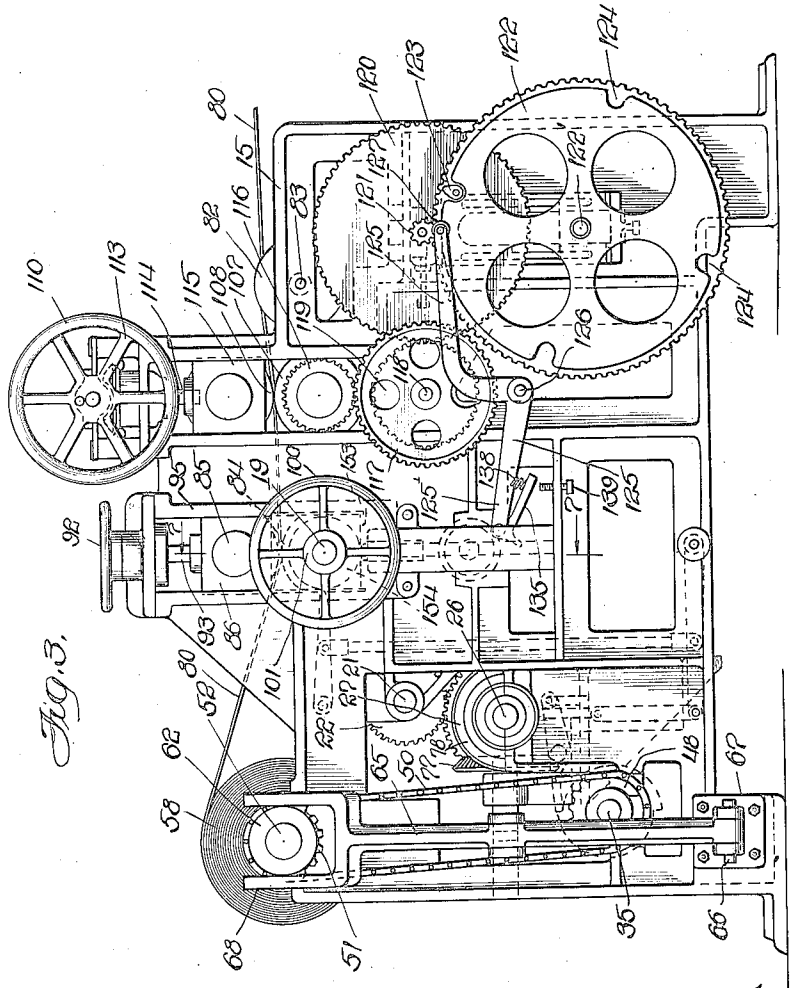


Fig. 3.

Inventor:
Harry A. Cumfer.
By Foree Rain Hinkle
Attys

Sept. 11, 1923. 1,467,841

H. A. CUMFER

AUTOMATIC SHEET WINDING AND MEASURING MACHINE

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Fig. 5.

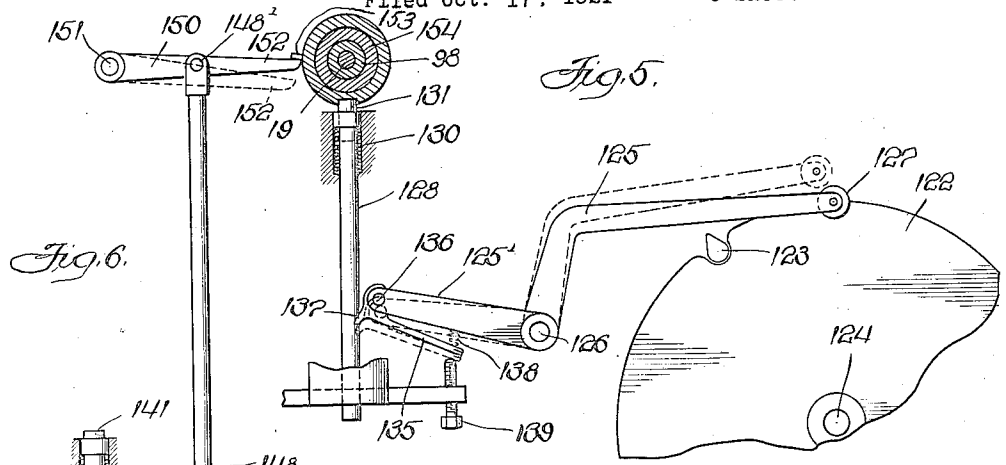


Fig. 6.

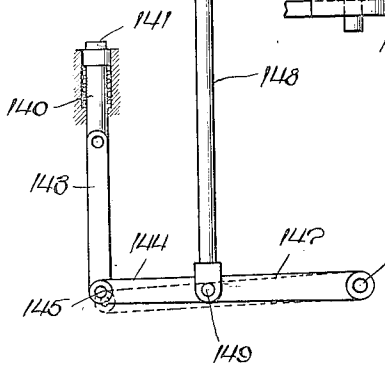


Fig. 7.

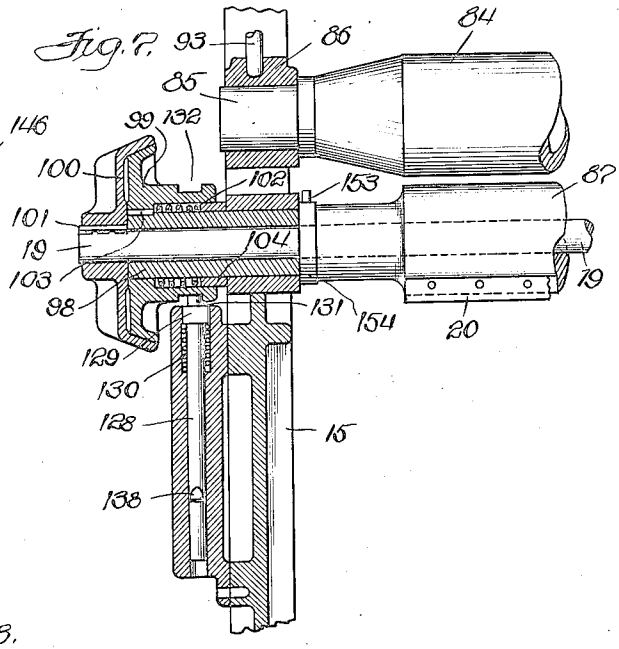
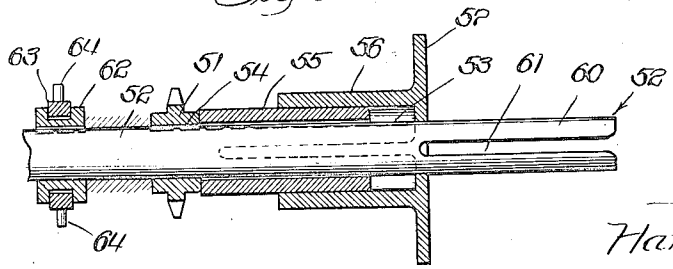


Fig. 8.



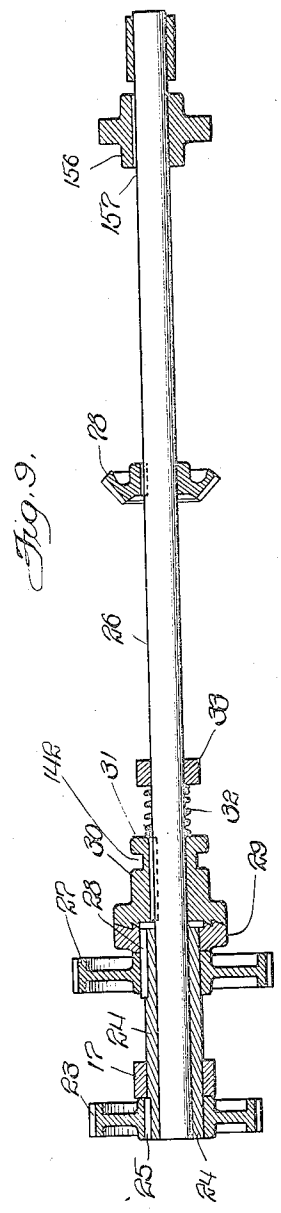
Inventor:
Harry A. Cumfer
By Jonée Bain Hinkle
Attys.

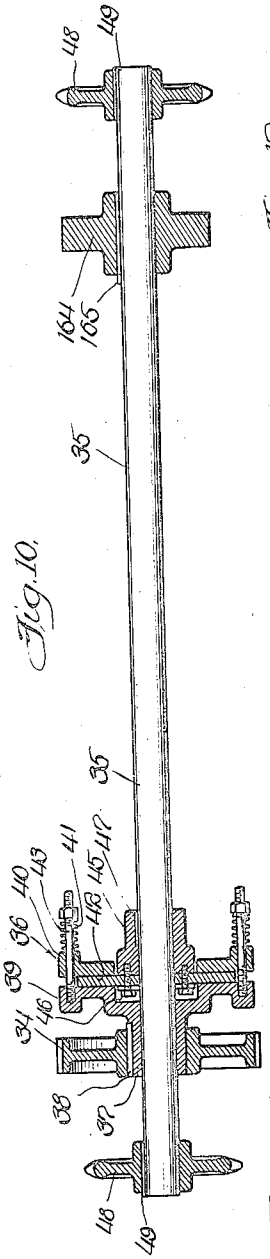
Sept. 11, 1923. 1,467,841

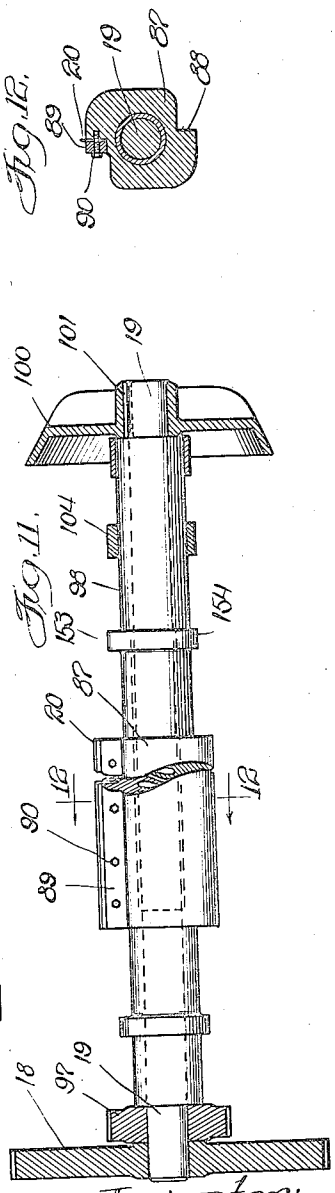
H. A. CUMFER

AUTOMATIC SHEET WINDING AND MEASURING MACHINE

Filed Oct. 17, 1921 5 Sheets-Sheet 5







Inventor:
Harry A. Cumfer
By Forrest Bain Winkle
Attys

Patented Sept. 11, 1923. 1,467,841

UNITED STATES PATENT OFFICE.

HARRY A. CUMFER, OF CHICAGO, ILLINOIS, ASSIGNOR TO GUYTON & CUMFER MFG. CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AUTOMATIC SHEET WINDING AND MEASURING MACHINE.

Application filed October 17, 1921. Serial No. 508,229.

To all whom it may concern:

Be it known that I, HARRY A. CUMFER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Sheet Winding and Measuring Machines, of which the following is a specification.

The invention relates to improvements in automatic sheet winding and measuring machines.

One of the objects of the invention is the provision of a machine which will wind a constantly moving, elongated sheet into rolls; sever the sheet; discharge the wound rolls and wind other rolls successively in the same manner, thus continuing to wind the continuously moving sheet into separated rolls until the sheet is exhausted.

Another object of the invention is the provision of a machine which will measure the sheet, as it passes into the roll being wound, and actuating mechanism, initiated by the measuring mechanism, to cut the sheet into definite predetermined uniform lengths, and position the mandrel members to receive the succeeding end of the sheet to continue the winding operation.

Another object is to generally improve machines of this character.

Other, further and more specific objects and advantages of the invention will become readily apparent, to persons skilled in the art, from a consideration of the following description when taken in conjunction with the accompanying drawings, wherein:—

Fig. 1 is a front elevation of a machine embodying my invention.

Fig. 2 is an end elevation of the machine, showing the left hand end when facing the machine as shown in Fig. 1.

Fig. 3 is an elevation of the right hand end.

Fig. 4 is a plan view of a detail when looking down from line 4—4 of Fig. 1, showing the means for withdrawing the mandrel members from the finished roll.

Fig. 5 is an enlarged arrangement of levers and clutch tripping mechanism initiated in operation by the sheet measuring means for releasing the rotary knife to sever the sheet about the time the roll has been completely wound.

Fig. 6 is a clutch tripping mechanism operable to connect clutch members whereby to operate the device to withdraw the axially movable two part mandrel members from the wound rolls when finished.

Fig. 7 is an enlarged sectional view taken on line 7—7 of Fig. 3 showing the clutch actuated by the apparatus shown in Fig. 5.

Fig. 8 is an elevation of one of the axially movable slotted mandrel members upon which the rolls are wound.

Fig. 9 is a longitudinal elevation of a shaft and part of the mechanism for axially shifting the mandrel members.

Fig. 10 is a shaft thru which power is transmitted to intermittently rotate the axially movable winding mandrel members.

Fig. 11 is a broken away elevation of the shaft carrying one of the sheet cutting knives and which also carries a clutch member.

Fig. 12 is a transverse section taken on line 12—12 of Fig. 11.

Fig. 13 is an enlarged elevation of an axially shiftable clutch member shown in section in Fig. 9.

Fig. 14 is an elevation of a stop mechanism to accurately and briefly stop the rotation of the intermittently moving shaft that rotates the sheet winding mandrels.

In all the views the same reference characters are employed to indicate similar parts.

In the art of making prepared roofing an elongated continuous sheet, usually a sheet of felt, is saturated with hot asphalt, and in the course of converting the sheet into a waterproof finished commercial roofing product it must undergo, successively, a number of operations.

The exigencies in manufacture, arising from the peculiar character of the materials forming concomitant parts of the finished product, demand that the sheet shall be continuously moved during the entire period when it is being acted upon. When the sheet of roofing has been completed and sufficiently cooled, it is then wound into rolls of definite length, convenient for sale, storage and for shipment.

Much inconvenience has heretofore been occasioned by the necessity for winding the continuous sheet into rolls without stopping its movement and considerable loss to the

manufacturer has been engendered by over lengths in his honest efforts to give the purchaser all that he pays for.

My improved machine accurately measures the sheet as it is being wound into rolls; severs the sheet and discharges the completed roll and begins winding a new roll by the time the severed end of the continuously moving sheet reaches the mandrel members upon which the rolls are consecutively wound, without stopping the movement of the sheet; all said operations being automatically performed.

In the particular embodiment chosen for disclosing my invention there are two shaft-supporting frame members 15, one on each side, properly held together by suitable tie beams 15ª and 15ᵇ. A main driving shaft 16 is longitudinally supported in the frame members 15 and is provided on one end with a pinion 17.

The gear pinion 17, carried by the driving power shaft 16, is in mesh with a larger gear 18 which is secured to the shaft 19, and this larger gear is in mesh with the pulley 21 which is rotatably supported on a stub shaft 22. The gear wheel 21 is in mesh with a gear wheel 23 that is supported upon a sleeve 24 by a key 25 (see Fig. 9). Sleeve 24 is rotatable upon shaft 26, when not clutched thereto. Another gear wheel 27 is secured to the sleeve 24 by the key 28 and secured to the sleeve 24 by the same key is a clutch member 29 for cooperation with the clutch member 30 which is axially movable along the shaft 26 and which is rotatably secured thereto by a spline and feather 31. The two clutch members, 29 and 30, are normally held in engagement by a spring 32 that is coiled about shaft 26 and held in place by a collar 33. The use and operation of these clutch members will be hereinafter more fully explained.

The gear wheel 27, which is carried on the sleeve 24 of the shaft 26, is in mesh with another gear wheel 34 which drives the shaft 35 through a frictional connecting impositive driving means 36. The friction connector 36 consists of a hub 37 to which the gear wheel 34 is rotatably secured by the key 38. Two clamping members 39 and 40, of the connector, are yieldingly held in contact with the disc 42, by a series of circumferentially spaced apart springs 41 that surround stud bolts 43 which project from the member 39 loosely through the member 40 to permit the latter to slide on the bolts. The disc 42 is secured to a hub 45 by bolts 46, and the hub is secured to the shaft 35 by a key 47. The reason for impositively driving the shaft 35 will be hereinafter more fully explained.

The shaft 35 carries on each of its ends a sprocket wheel 48, secured thereto by a key 49. Sprocket wheels 48 are each connected by a chain 50 with sprocket wheels 51, respectively. Sprocket wheels 51 are rotatably secured to the axially movable mandrel members 52. There is a spline 53 in each of the mandrel members 52 and a feather 54 in each of the sprocket wheels 51, so that when the mandrel members 52 are axially moved, into the dotted line positions shown in Fig. 1, the sprocket wheels 51 need not necessarily be moved with the reciprocating mandrel members. Each of the mandrel members 52 has bearing in a fixed sleeve 55, and axially and adjustably movable over the bearing sleeve 55 is another sleeve 56 having a flange head 57. These heads 57 serve as guides for the sheet that is to be wound into rolls, 58, and the heads 57 may be axially adjusted along the mandrel members 52 to positions appropriate for the width of the sheet and the length of the roll to be wound thereon.

Each of the mandrel members at its inner end 60 is provided with a transversely and axially extending slot 61 to receive the end of the sheet when the latter is about to be wound into a roll upon said mandrel members.

Fixed to the outer ends of the mandrel members 52 is a grooved collar 62 which carries a loose ring 63 in the groove, the ring having laterally projecting trunnions or pins 64. A lever 65 for axially reciprocating the mandrel members, one for each, is pivoted at its lower end, as at 66, to a standard 67, and its upper end 68 is forked and each prong of the fork contains a slot 69 to receive the pins 64. To give the levers 65 their lateral movement, as shown in dotted lines in Fig. 1, and for the purpose of moving the mandrel members 52 from the interior of the roll, composed of the sheet wound upon the composite mandrel, each lever 65 is pivotally connected to a link 70, as at 71.

The mandrel members are reciprocated by the levers 65 and these levers are moved by the following described means:

The inner ends of the links 70 are pivotally connected to cranks 73 which are on opposite sides of the shaft 74 and normally in positions shown in Fig. 4. The shaft 74 has rotatable bearing in standards 75 that rise upwardly from a plate 76, secured to the beam 15ª. The shaft 74 carries a miter gear 77 which is in driving mesh with a gear 78 secured to the main driving shaft 26. When the shaft 74 is rotated one complete revolution, the links 70 are moved outwardly by the rotating cranks 73 and being pivotally connected to the arms 65 the latter are moved out into the dotted line positions shown clearly in Fig. 1, thereby withdrawing the mandrel members 52 from the interior of the roll that has previously been coiled thereabout. This movement

takes place periodically and at a time predetermined by the length of the sheet composing the roll, and is initiated by the means that measures the length of the sheet as it is being wound upon the mandrel members.

The sheet 80 to be wound into the rolls 58 is shown to come from an original roll 81 which is mounted upon a mandrel 82′ supported from the frame 15. The sheet, however, may proceed from any suitable source, the roll 81 is shown only for illustrative purpose. In practice the sheet is wound directly into rolls 58 coincidently with its manufacture. The sheet passes over idler roller 82 supported on the shaft 83 and then passes between the feed rolls; then between the roller 84 and the rotating knife 20. The roller 84 is supported upon journals 85 in vertically movable journal boxes 86, so that knife 20 may be separated adjustably from the roller 84 in order that it may evenly contact the confronting surface of the roller 84 at the time when it is severing the sheet. The rotatable member 87 carrying the knife 20 is provided with shoulders 88 against which the knife 20 is secured in fixed position by a bar 89 held in place by cap screws 90. When the member 87 is rotated about the time when the roll is finished, the knife 20 makes even contact with the peripheral surface of the roll 84, and thereby the sheet is severed. The boxes 86, at each end of the roll 84 and which support the journals 85 of the roll 84, are vertically movable at each end of the roll by hand wheels 92 and the threaded rod 93. The boxes 86 are movable in the guide 95 and the respective ends of the roll 84 may be independently adjusted so that its surface may be brought into alignment with the cutting edge of the knife 20. On one end of the roll 84 is a gear wheel 96 which meshes with a gear wheel 97 on the shaft 19. The knife-bearing member 87, (Fig. 7) is extended into a bearing sleeve 98, at one end, to which is secured a clutch member 99 for cooperation with a clutch member 100 that is secured to the shaft 19 by key 101. A coil spring 102 yieldingly holds the clutch members normally in contact and a key 103 rotatably connects the clutch member 99 to the sleeve 98, so that when the shaft 19 is being rotated and the clutch members are in contact, as shown in Fig. 7, then by operation of the shaft 19 the knife 20 is rotated to sever the sheet 80. The spring 102 abuts against a collar 104 which is loose on the sleeve 98.

The gear 97 which is on the shaft 19 is in mesh with the gear 105 (Fig. 2), and this gear is in mesh with another gear 106 on the lower sheet feeding roll 107. The upper feed roll 108 carries a gear 109 which is driven by the gear 106 so that the sheet 80 passing thru and between the rolls 107 and 108 is thereby fed thru the machine. The upper roll 108 is raised and lowered, with respect to the lower roll 107, by means of a hand wheel 110 which is connected to a shaft 111 and which rotates miter gears 112 that are in mesh with other miter gears 113 that rotate nuts, not shown, around the threaded, vertically disposed stem 114, the latter being secured in the box 115 that supports the journals of the upper roll 108.

Now, from the foregoing description, it will be seen that the sheet 80 may be fed thru the machine and wound into rolls 58 and that the sheet may be severed when the roll 58 has been completed.

The sheet measuring means, in cooperation with the feed rolls, initiates the sheet cutting operation as follows:—

The lower feed roll 107 (Fig. 3) carries a gear wheel 116 which is in mesh with another gear wheel 117 carried on the shaft 118, on which is secured a smaller gear wheel 119 in mesh with a relatively large gear wheel 120 and this latter gear wheel carries a pinion 121 in mesh with a measuring gear 122. Gear 122 is secured on a shaft 122′. The measuring gear 122 may be replaced by another gear of smaller diameter when sheets of other lengths are to be wound into rolls 58.

The gear 122 carries a detent 123 and there are four locations, 124, at which, selectively or inclusively, these detents may be placed. If a detent be placed at 124, diametrically opposite the detent 123, then the sheet wound into a roll would be half as long as when one detent only is attached to the wheel 122. A smaller wheel in substitution for wheel 122 may be placed on vertically adjustable shaft 122′ by raising the bearing until the smaller wheel is in mesh with the pinion 121.

A lever 125 is pivoted, at 126, and on its extended end bears a roller 127 which normally rides on the periphery of the measuring gear 122. This structure is shown more clearly in Fig. 5. The clutch members 99 and 100 are connected by displacement of a vertically movable rod 128. Rod 128 carries a collar 129 on its upper end and a spring 130 abuts against the collar to yieldingly hold the upper end 131 of the rod normally in the groove of the clutch member 99. Bridging the groove 132 of the clutch member 99 is a cam plate 133, shown more clearly in Fig. 13, as associated with the clutch member 30, as indicated in Fig. 5. The same sort of cam plate is provided for the clutch member 99, and when the tapered portion 134 is brought into contact with the upper end 131 of the rod 128 the clutch member 99 is moved axially of the sleeve 98, out of contact with the clutch member

100, thus holding the shaft 19 and knife bearing roller 87 out of driving connection with the rotating sleeve 98.

To displace the end 131 of the rod 128 there is shown, in Fig. 5, a dog 135 pivoted at 136 to the arm 125′ of the lever 125. The dog is provided with a nose 137 which normally rests in the notch 138 made in the rod 128. The dog 135 has an elongated end which is held yieldingly away from the lever member 125′ by a spring 128 so that the nose 137 will yieldingly engage notch 138 of the rod 128. An adjusting screw 139 contacts the outer end of the dog 135. Now when the roller 127 on the outer end of the lever 125 is raised by the detent 123 the member 125′ will be depressed and the dog 135 with its nose 137 engaging the slot 138 will cause the rod 128 to be depressed against the resilient effect of the spring 130, thereby withdrawing the end 131. of the rod 128, out of the groove 132 on the clutch member, permitting the clutch members to become drivingly connected by operation of the spring that surrounds the respective shaft. In Fig. 7 the clutch member 99 is thus brought into driving engagement with the clutch member 100 and therefore the shaft 19 will rotate the knife 20 on the knife carrier 87 one revolution, and the knife, coming in contact with the surface of the roll 84, will sever the sheet that is at that time between the knife carrier and the roll. The clutch member 30 on the shaft 26 is affected by withdrawing the rod 140 for the same purpose as that clearly shown in Fig. 5. In this part of the structure (Fig. 6, a vertically movable rod 140 has its upper end 141 normally in the groove 142 in the clutch member 30. The clutch member 30 is provided with a cam plate 134, as heretofore described, and therefore the upper end 141 of the rod 140 normally holds clutch members 29 and 30 separated, in which event sleeve 24 (Fig. 9) will not rotate the shaft 26, but when the clutch member 30 is released, in the manner heretofore made clear, spring 32 will move it along the shaft 26 until it makes driving connection with the member 28 and then the shaft 26 is rotated by the sleeve 24. The lower end of the rod 140 (Fig. 6) is pivotally connected to a link 143 which in turn is connected to a vibrating arm 144 as at 145 and this arm is secured to a shaft 146. Secured to the same shaft is another similar but shorter arm 147 to which is pivoted a vertically extending rod 148, at 149. An arm 150 is pivoted to a stationary portion of the machine frame at 151 and has its free end, 152, normally in the path of a pin 153 which projects from a collar 154 extending from the knife-carrying member 87. This pin 153 may be located on the collar 154 at a position where it will operate the lever 152 at a predetermined time after the knife has been operated, so that the outward movement of the mandrel members 52 will occur subsequent to the time when the sheet has been severed, so that the tail end of the sheet may be wound upon the mandrel before the mandrel members are withdrawn from the finished roll 58 and before the latter is dropped from the machine. It is only when the knife carrier 87 is rotated that the clutch member 30 on the shaft 26 is permitted to contact the clutch member 28 and rotate the shaft.

The gear wheel 23 on the shaft 26 positively rotates the sleeve 24 and the gear 27. The gear 27 positively rotates the gear wheel 34 which is secured to the hub 37, but the shaft 35 is impositively driven by the gear wheel 34 thru a frictional drive 36 so that if the shaft 35 be positively stopped the gear 34 will be permitted to rotate by the friction between the members 39—40 and the member 42.

In order that the beginning end of the moving sheet shall make winding engagement with the mandrel members 52 it is convenient to have the mandrel members 52 briefly stopped in their rotation, at proper periods, so that the end of the sheet will invariably enter the slots 61 made in the confronting ends of the mandrel member 52.

The device shown in Fig. 14 is a means by which the shaft 35 is positively stopped periodically so that the mandrel members will occupy the positions shown in Fig. 1 with the slots in horizontal planes in condition for the sheet to enter the slots. Mounted on the intermittently rotatable shaft 26 is a cam 156 secured thereto by a key 157 and arranged to depress a roller 158 on the end 159 of a lever 160. The lever 160 is pivoted at 161 and has a forwardly extending end 162 which engages a shoulder 163 made in a cam 164, which is secured to the shaft 35 by a key 165. The cam 164 has another notch diametrically opposite the notch 163. This notch is indicated by 166 and in turn will make contact with the end 162 of the lever 160. It is only necessary to rotate the mandrel members one-half revolution to bring the slots 61 into horizontal planes and shaft 35 rotates coextensively with the mandrel members.

A spring 167 tends to yieldingly hold the end 162 of the lever 160 normally in contact with the peripheral surface of the cam 164. In operation the shaft 26 is rotated only one revolution at uniform periods of time and its movement is initiated by the operation of the measuring device heretofore described. The normal position of the lever 160 is shown in dotted lines in Fig. 14 wherein the end 162 of the lever 160 is raised above the shoulders of the cam 164. This is accomplished when the flat portion 170 of the cam 156 is immediately above the roller 168 as

shown in dotted lines, and this is the normal position of the parts.

While the shaft 26 is being rotated and the flat portion 170 leaves contact with the roller 158 then the spring 167 will depress the end 162 until it will rest behind one of the shoulders 163, or 166 of the cam 164, and hold the shaft 35 stationary in exact position. The object of this is to hold the mandrel members stationary in the position shown in Fig. 1 during their momentary dwell, so that the slots in the mandrel members are properly presented for the entrance of the oncoming sheet. As soon as the shaft 26 has made its complete revolution then the end 162 of the lever is raised into dotted line position and the shaft 35, which controls the rotation of the mandrel members is released. During the time when the shaft 35 is stopped, in the manner described, there is slipping engagement between the members of the transmission device 36, between the member 42 which is secured to the shaft 35 and the members 39 and 40 which are secured to the hub 37.

It is now manifest that the diameter of the wheel 122 which carries the detent 123 determines the length of the sheet 80 to be wound into the rolls 58, and that it is positively driven by gearing rotated by the same source of power which moves the sheet. If detents 123 be placed in all of the notches 124, then the length of the sheet that will be wound into rolls 58 will be one-fourth the length that it would be if only one detent were used and if it is desirable a smaller wheel corresponding to the wheel 122 with a single detent may replace the wheel 122 by raising the bearing which carries the wheel, so that the smaller wheel will readily mesh with the pinion 121. If it is desirable to wind rolls with lengths one-half of the exhibit shown then the second detent may be placed diametrically opposite the location of the detent 123 on the wheel 122 so that the length of the sheet to be wound is readily determined by the measuring device.

Briefly, a recapitulation of the operation may be stated as follows:—

A constantly moving sheet to be wound into rolls is passed thru the machine. It passes between feed rolls that keep the sheet continually moving and which operate a train of gearing which moves an ultimate member thereof a predetermined distance. The ultimate member initiates a cutting off knife which severs the sheet into predetermined lengths; each length is contained in a wound roll. The sheet is wound upon two coaxially arranged, slotted mandrel members which just subsequent to the severing of the sheet are moved axially away from each other to withdraw them from the roll and the finished roll is thus allowed to drop away from the machine. The mandrel members are then returned to roll-winding positions and are stopped from rotating with the slots in a horizontal plane in which the sheet is then moving and for a sufficiently long period to permit the end of the sheet to enter the slots, after which the mandrel members are again rotated to wind another roll and the operations are repeated.

While I have herein described a single embodiment of my invention for the purpose of clear disclosure, it will be manifest, to persons skilled in the art, that many changes may be made in the general arrangement and configuration of the parts, within the scope of the appended claims.

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

1. A machine of the character described having in combination a rotatable mandrel about which a sheet is to be coiled into rolls of determined length; means for feeding the sheet to the mandrel; positive means independent of the sheet for measuring the length of the sheet as it is fed to the mandrel; sheet cutting means, to sever the finished roll from the sheet, while the sheet is moving and directly initiated in its operation by said measuring means and automatically operable means arranged to withdraw the mandrel from the roll to release the roll from the mandrel.

2. A machine of the character described having in combination a rotatable mandrel, axially divided into two members, said members axially movable with respect to each other; means to reciprocate said members alternately from and toward each other to withdraw them from a roll that may be wound thereon and to replace them to receive another roll; a constantly moving feeding means for a sheet to be wound on the composite mandrel and means brought into effect by a positively operable means to initiate the operation of the reciprocating means whereby to withdraw said mandrel members from the roll.

3. A machine of the character described having in combination a rotatable mandrel, axially divided into two members, said members axially movable with respect to each other; means to reciprocate said members alternately from and towards each other to withdraw them from a roll that may be wound thereon and to replace them to receive another roll; feeding means for continuously moving a sheet to be wound on the composite mandrel; means to sever the sheet after the roll is wound and while the sheet is moving and means to initiate the operation of the serving means and subsequently the reciprocating means to withdraw said mandrel members from the finished roll.

4. A machine of the character described having in combination means for winding a

constantly moving sheet into a finished roll; means to sever the sheet while moving into uniform lengths; means to discharge the finished roll; positively operable sheet-measuring means to determine the length of the sheet in each said roll and connecting means, initiated in operation by the measuring means to set into operation the sheet severing means and subsequently the roll discharging means.

5. A machine of the character described having in combination a sheet feeding means for continuously moving a sheet; means for winding parts of the sheet of uniform lengths into a finished roll; means to sever the sheet while the sheet is moving; means to discharge the finished roll; positively driven sheet-measuring means to determine the length of the sheet in each said roll and connecting means initiated in operation by the measuring means to set into operation the sheet severing means and the roll discharging means without stopping the movement of the sheet.

6. A machine of the character described having a two-part slotted mandrel upon which to wind a constantly moving sheet into rolls; means to rotate the mandrel members; means to sever each sheet into its measured length to be wound on the composite mandrel and before it is released therefrom; means to move the mandrel members axially to withdraw them from the roll to be wound thereon and to return them to their roll-winding positions after the roll has been severed from the sheet, and means to stop the mandrels with their slots in planes to receive the approaching end of the moving sheet.

7. A roll winding machine having two co-axially positioned, winding mandrels, slotted to receive a sheet to be wound into a roll and automatic means to move the mandrel members from the interior of the roll when finished and after the roll has been completely severed from the sheet.

8. A roll winding machine having two axially positioned roll-winding members arranged to receive an end of a sheet to wind it into rolls; a knife, moving with the sheet to completely sever the sheet; means for moving the knife intermittently and the sheet continuously and means to withdraw the roll-winding members from the roll after the sheet has been completely severed.

9. A roll winding machine having two axially positioned roll-winding members arranged to receive an end of a sheet to wind it into rolls; a knife, moving with the sheet to completely sever the sheet; means for moving the knife intermittently and the sheet continuously; means to withdraw the roll-winding members from the roll after the roll has been completely cut from the sheet and means to initiate operation of the knife at uniform predetermined intervals.

10. A roll-winding machine having means to receive the end of a sheet and wind it into a roll; means for continuously moving the sheet; a knife arranged to move with the sheet, driven intermittently to sever the sheet completely to separate the roll; a timing mechanism driven independently of the sheet arranged to initiate operation of the knife at regular intervals.

11. A roll winding machine having means to receive the end of a sheet and wind it into rolls; means for continuously moving the sheet; a rotatable knife arranged to move with the sheet and driven intermittently to sever the sheet completely to separate the roll; a timing mechanism arranged to initiate rotation of the knife to sever the sheet at regular intervals, and means to stop rotation of the knife after it has made one revolution.

12. A roll winding machine having means to receive the end of a sheet and wind it into rolls; a pair of feed rolls for continuously moving the sheet; a rotatable knife for severing the sheet, located after the feed rolls and between the feed rolls and the winding mechanism, means stopping rotation of the winding mechanism without stopping the movement of the sheet and means for operating the knife at regular intervals.

In testimony whereof I hereunto subscribed by name.

HARRY A. CUMFER.