No. 847,838. PATENTED MAR. 19, 1907.

W. D. SKIDMORE.

MACHINE FOR CUTTING WEB MATERIALS.

APPLICATION FILED APR. 19, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

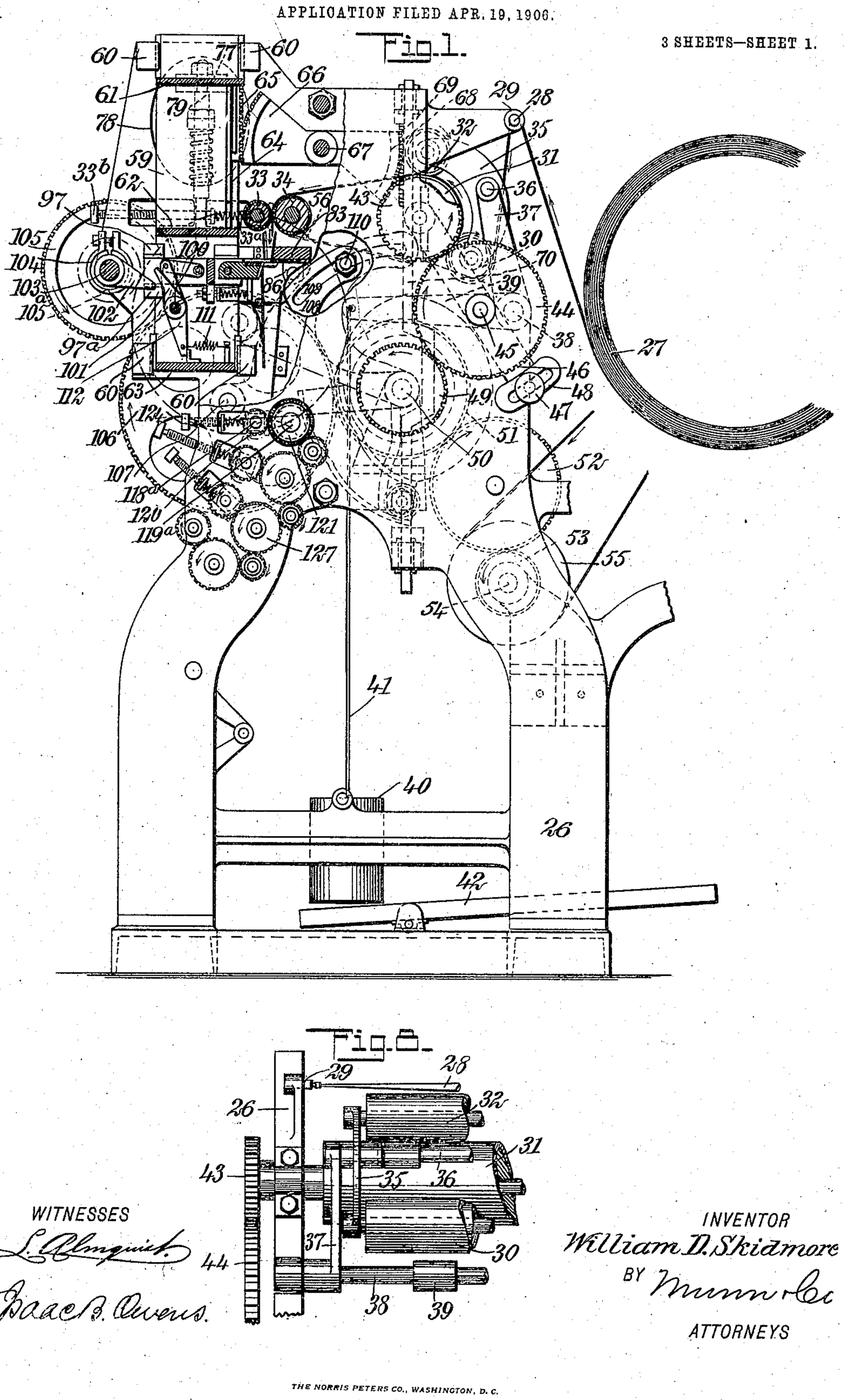

Fig. 2.

WITNESSES

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Isaac B. Owens.

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ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 2.

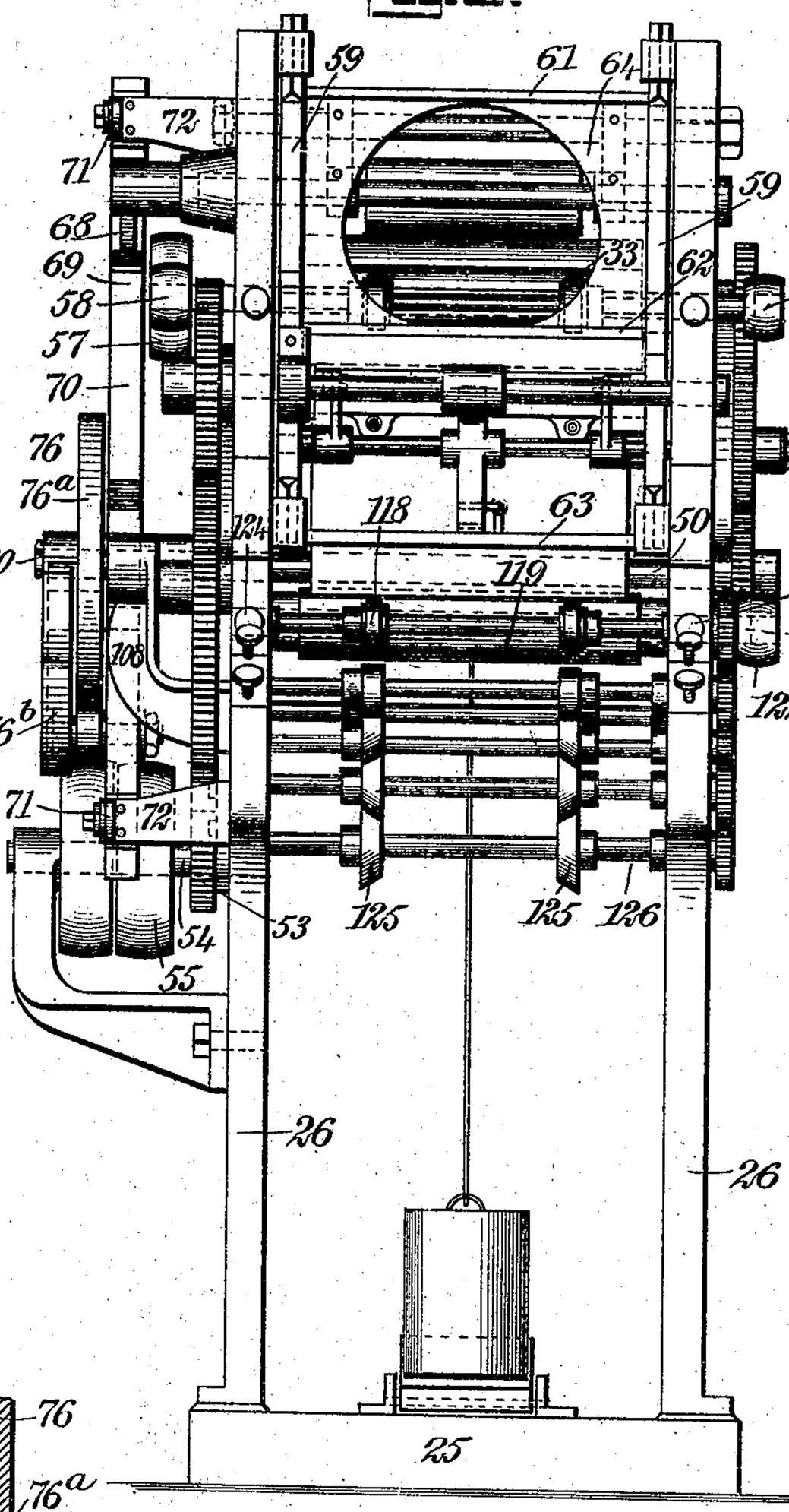


Fig. 17.

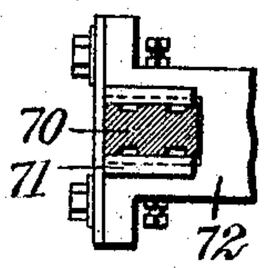


Fig. 16.

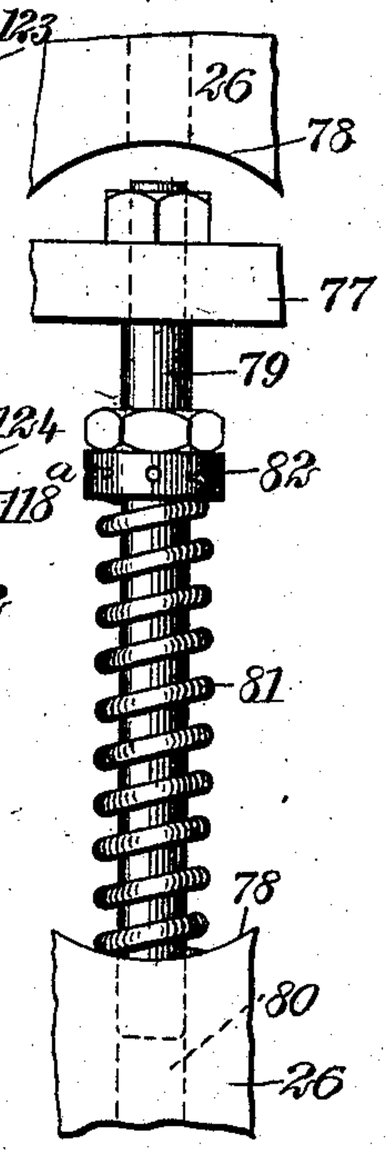


Fig. 18.

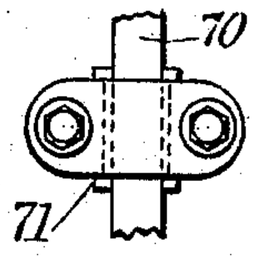


Fig. 14.

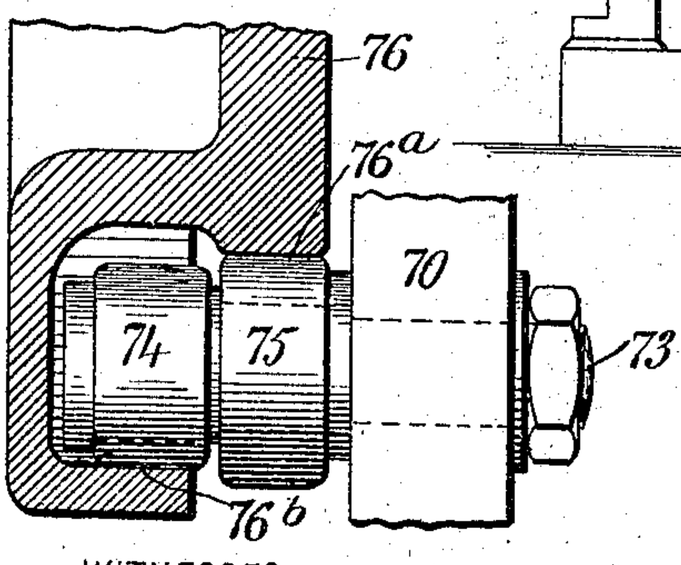
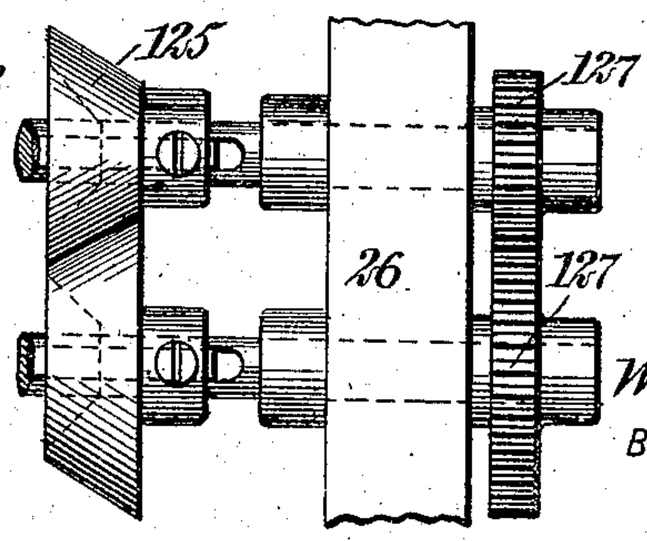


Fig. 15.



WITNESSES

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3 SHEETS—SHEET 3.

Fig. 3.

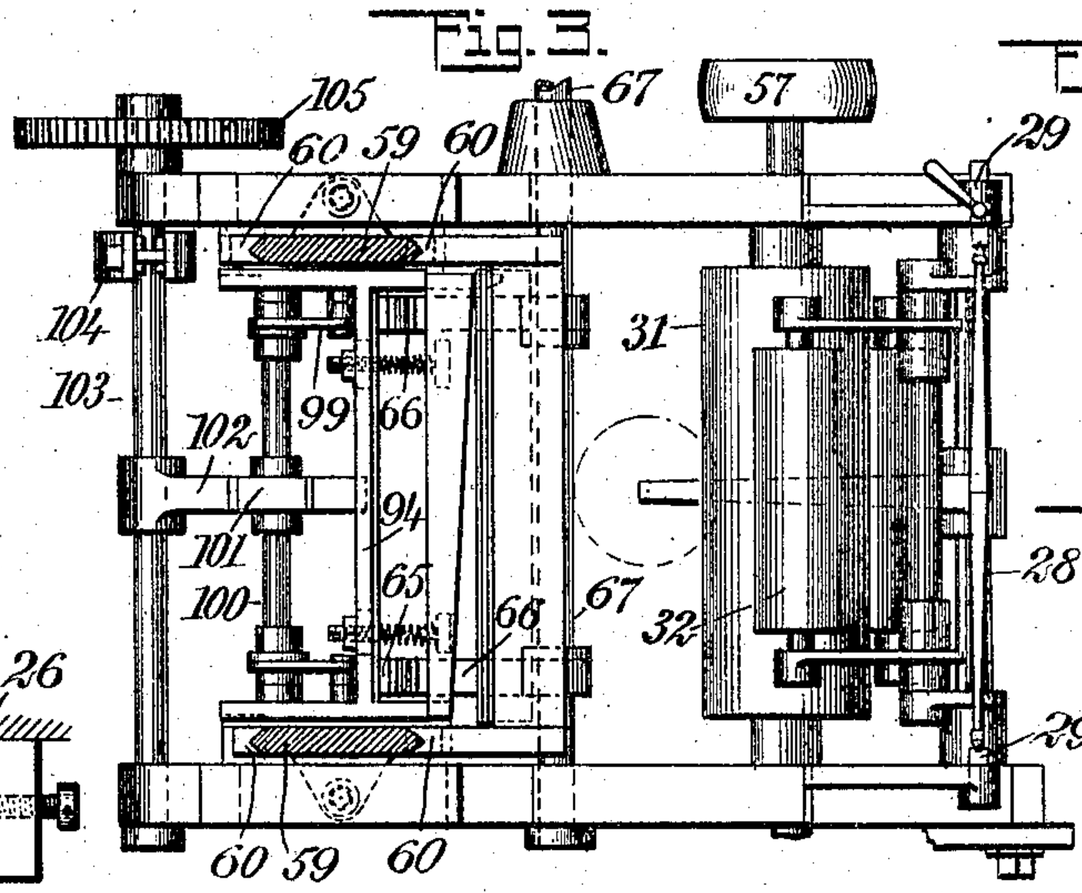

Fig. 11.

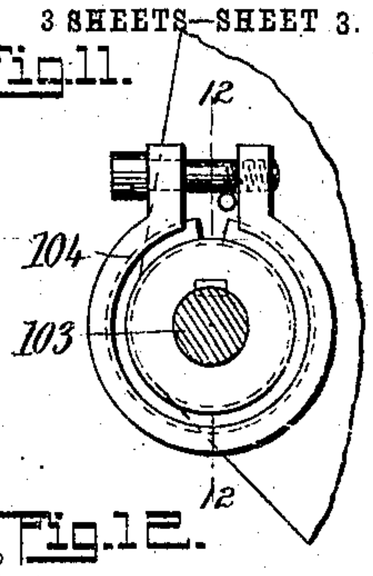

Fig. 12.

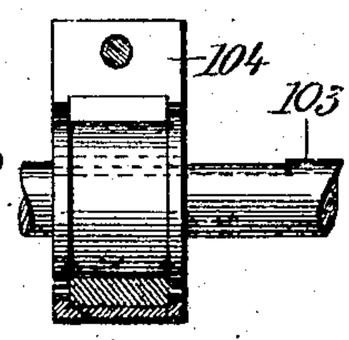

Fig. 7.

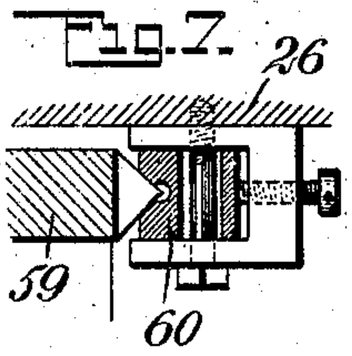

Fig. 4.

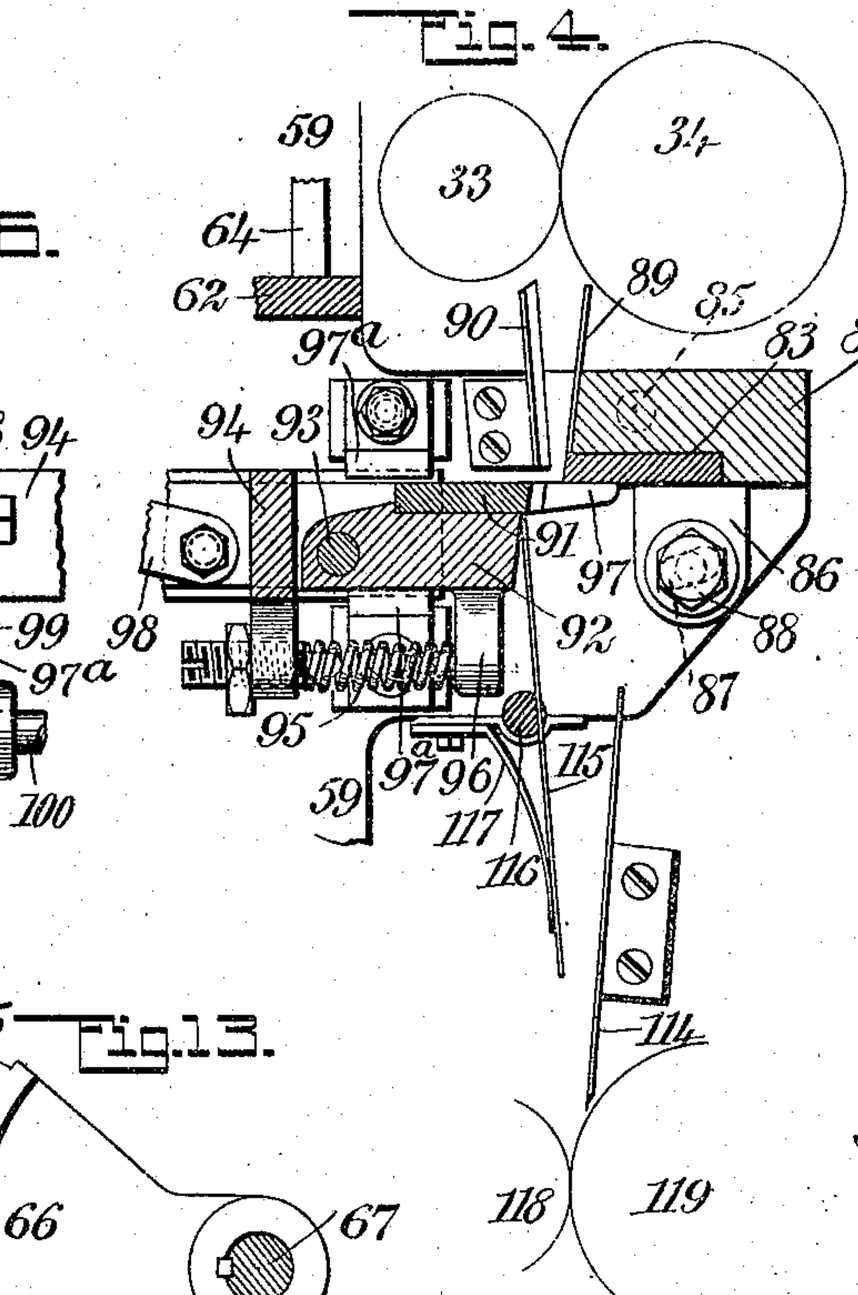

Fig. 19.

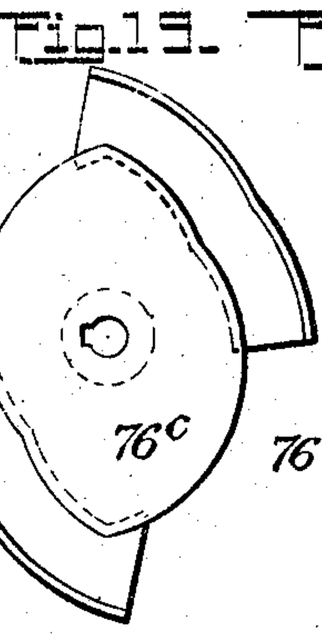

Fig. 20.

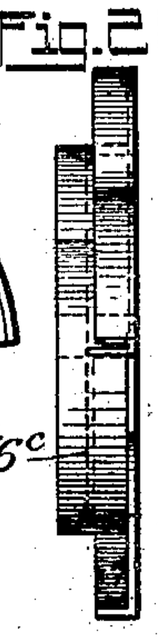

Fig. 6.

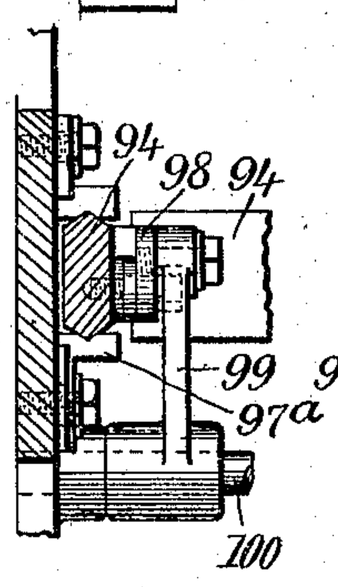

Fig. 9.

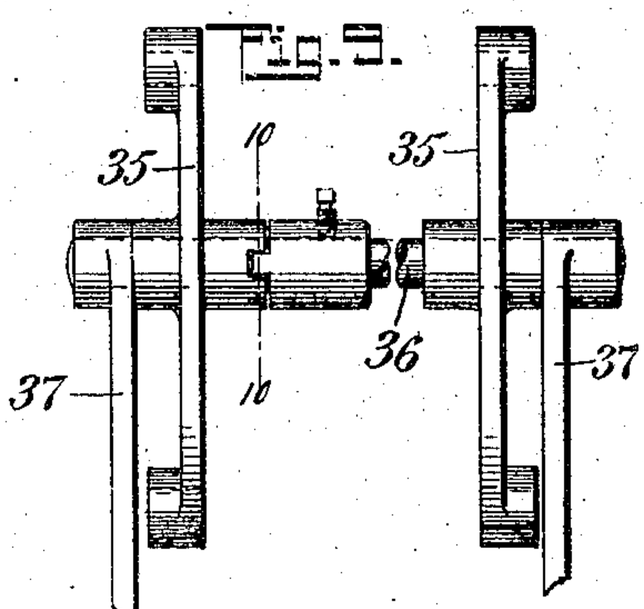

Fig. 13.

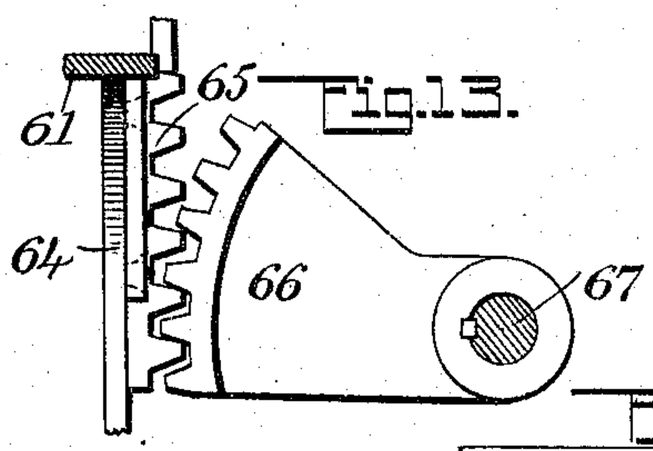

Fig. 5.

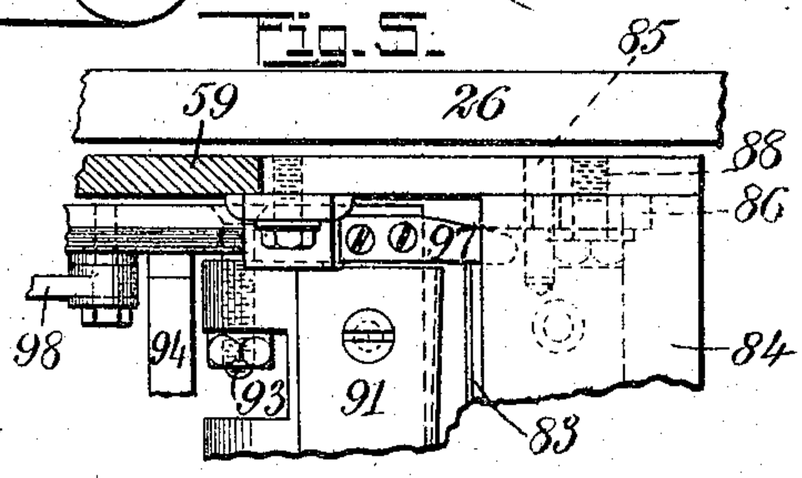

Fig. 10.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM D. SKIDMORE, OF PELHAM, NEW YORK.

MACHINE FOR CUTTING WEB MATERIALS.

No. 847,838. Specification of Letters Patent. Patented March 19, 1907.

Application filed April 19, 1906. Serial No. 312,652.

To all whom it may concern:

Be it known that I, WILLIAM D. SKIDMORE, a citizen of the United States, and a resident of Pelham, in the county of Westchester and State of New York, have invented a new and Improved Machine for Cutting Web Materials, of which the following is a full, clear, and exact description.

My invention relates to a machine for cutting web materials, such as paper and woven fabrics, into various lengths.

An apparatus practically embodying the principles of my invention involves a feeding and tensioning mechanism through which the web material is passed and by which it is fed to the cutting mechanism. This involves a carriage arranged to reciprocate along the line of movement of the paper or other stock and actuated by a peculiar cam device to move with and in the direction of the stock during the cutting operation. The cutting of the stock is effected by peculiarly-arranged ledger and shear blades mounted on the carriage, the latter blade being periodically advanced to cut by a tappet mechanism geared to work in time with the movements of the stock and carriage. From the knives the cut stock is received by a set of delivery-rolls which deliver it from the machine, and these rolls may also be made to crease the edges of the cut material so that each length will preserve its direction until clear of the machine, or, in other words, make room for the succeeding length.

The invention resides in certain features of construction and coöperative organization of parts, which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, which illustrate, as an example, the preferred embodiment of my invention, in which drawings—

Figure 1 is a side elevation with parts of the rear side of the frame broken away to show the knife-carriage and knives in section and part of the far side of the frame broken away to show the adjustable gear-bracket. Fig. 2 is an elevation of the machine at the delivery end. Fig. 3 is a partial plan view of the machine, showing the feeding and tensioning rolls and also showing the knife-carriage partly in horizontal section and part of the gear for driving it. Fig. 4 is an enlarged fragmentary vertical section taken through the knives and the immediately-adjacent parts of the carriage. Fig. 5 is an enlarged fragmentary plan view showing one end of the knives and the adjacent parts. Fig. 6 is an enlarged vertical detail section showing parts of the gear for actuating the shear-blade. Fig. 7 is an enlarged fragmentary horizontal section showing the means for mounting the carriage. Fig. 8 is a fragmentary rear elevation of the feeding and tensioning means. Fig. 9 is a fragmentary elevation showing the shaft carrying the presser-roller arms and the means for actuating the same. Fig. 10 is a detail section on the line 10 10 of Fig. 9. Fig. 11 is a detail of the drag which is applied to the shaft of the tappet for operating the shear-blades. Fig. 12 is a section on the line 12 12 of Fig. 11. Fig. 13 is a detail view showing one of the racks and sectors for operating the carriage. Fig. 14 is an enlarged detail section showing the cam and rollers for operating the carriage-driving sectors and racks, one of which is shown in Fig. 13. Fig. 15 is an enlarged detail showing one pair of the delivery-rolls. Fig. 16 is a detail ol one of the springs pressing the knife-carriage. Fig. 17 is a plan view of the guide for the rack-bar actuating the carriage-driving sectors, the view showing said rack-bar in section. Fig. 18 is an outer side elevation of the said guide. Fig. 19 is a face view of a double cam which may be used for actuating the carriage in place of the single cam shown in Figs. 1 and 2, and Fig. 20 is an edge view of said double cam.

The frame of the machine as here shown comprises a bed 25, with two parallel side members 26 rising therefrom, the side members 26 sustaining the various operating parts, as shown in Figs. 1 and 2.

The paper, woven fabric, or other web material or stock is carried in a roll 27, a fragment whereof is shown in Fig. 1, and passes from the roll to and over a spindle 28, which is rotatably mounted by bearings 29 at the upper rear side of the machine, as shown in Figs. 1 and 3. From the spindle the stock passes downward under a pressure-roll 30 and upward around the rear side of a feed-roll 31 and under a pressure-roll 32, which bears on top of the feed-roll. From this point the stock passes forward in the machine between two feed-rolls 33 and 34, which, as well as the rolls 30, 31, and 32, may, if desired, be faced with rubber or the like. From the feed-rollers 33 and 34 the stock passes

downward to the knives and thence to the delivery devices, which will be hereinafter described.

The feed-roll 31 has its axle mounted in the side frames 26, while the pressure-rolls 30 and 32 are carried by rocker-arms 35. (See Figs. 1, 8, and 9.) Said rocker-arms are attached to a shaft 36, which is carried loosely in arms 37. Said arms are attached to a shaft 38, mounted in the side frames 26, and to this shaft an arm 39 is secured, which extends forward toward the center of the machine and to the end of which a tension-weight 40 is connected by a cord 41 or the like. Said weight 40 is located over the bed 25, and a treadle-lever 42 is arranged under the weight, so that the weight may be lifted and the tension on the cord 41 relaxed at will. This allows disengaging the pressure-rolls 30 and 32 from the feed-roll 31 to facilitate adjusting the goods in the machine. The feed-roll 31 is positively driven through a gear 43, secured to the shaft of the feed-roll on the right hand of the machine, as shown in Fig. 1. This gear is in mesh with a gear 44, carried on a stub-shaft 45, which shaft is mounted in an arm 46, adjustable around the center of the gear 43 and held at the desired adjustment by means of a clamp-screw 47 engaging the transversely-disposed slotted end 48 of the arm. The gear 44 is meshed with and driven from a gear 49, which is fastened on a shaft 50, mounted transversely in the side frames 26. Said shaft 50 carries at the opposite side of the machine a gear 51, (shown by broken lines in Fig. 1,) and this is meshed with a gear 52, which is mounted on a stub-shaft carried by one of the side frames 26. The gear 52 is driven by a gear 53, located on the drive-shaft 54, which carries fast and loose pulleys 55 or other means for controlling the movement thereof. In this manner it will be observed that the feed-roll 31 is driven in the direction of the arrow shown in Fig. 1, while the pressure-rolls 30 and 32 hold the goods firmly against the feed-roll, enabling the feed-roll to advance the goods steadily in the direction of the arrow applied thereto in Fig. 1. The two tensioning feeding-rolls 33 and 34 have their shafts geared together to cause them to work in unison, and the roll 34 is driven by a belt, (indicated by broken lines 56 in Fig. 1,) which belt passes from a pulley 57 on the shaft of the roll 31 around a pulley 58 on the shaft of the roll 34. The roller 33 is adjustable toward and from the roller 34 to apply the necessary pressure to the paper or other web material, and for maintaining the said roll 33 yieldingly engaged with the roll 34 I provide springs 33^a, the tension of which is controlled by screws 33^b, both located in suitable cavities formed in the side frames 26 and the bearings of the roll 33 being allowed a slight transverse movement in the side frames, as will be understood.

The knife-carriage comprises two side members 59, which are disposed vertically, respectively, at the inner sides of the frames 26 and which have their edges slidably held by guides 60, secured to said frame members. The frame members 59 are, as shown best in Fig. 1, joined securely together by means of three transverse webs 61, 62, and 63, and between the webs 61 and 62 a vertical web 64 is located. The knife-carriage is arranged to reciprocate vertically, and the movements are so timed that the carriage and its knives will move with the goods during the cutting operation. Said movement of the carriage is effected by gearing, which will now be described.

Fastened to the web 64 are two racks 65, with which are meshed sectors 66, fastened to a transverse rock-shaft 67. This rock-shaft carries outside of the frame a toothed sector 68, which is meshed with a rack 69, formed on the upper end of a rod 70. The rod 70, as shown by full lines in Fig. 1 and dotted lines in Fig. 2, extends vertically along the left-hand side of the machine and, as shown best in Figs. 17 and 18, is held in guide-bearings 71, carried by brackets 72, projecting out from the adjacent side frame 26, so that the rod is free to reciprocate vertically. The rod 70 carries at its lower portion, as shown in Figs. 2 and 14, a stud 73, on which rollers 74 and 75 are mounted. These rollers coact with the surfaces 76^a and 76^b of a rotary cam 76, which is secured on the before-mentioned shaft 50. This cam is arranged to impart to the rod 70 a full reciprocation downward and upward for each revolution of the cam, the downward motion being imparted by the surface 76^a and the upward motion by the surface 76^b, thus by the rack 69 and sector 68 rocking the shaft 67 and through the sector 66 and racks 65 moving the carriage downward and thence upward. During this downward movement of the carriage the knives become active, as will hereinafter fully appear. In order to assist in the return of the carriage in its raised position and to hold the same yieldingly in such position, I provide the side members 59 of the carriage with outwardly-projecting ears 77, which fit into openings 78 in the side frames 26, (see Figs. 1 and 16,) and to which ears pins 79 are secured. These pins project downward through the openings 78 and have their lower ends slidably fitted in sockets 80, formed in the side frames 26.

81 indicates springs which surround the pins 79 within the openings 78, and 82 indicates adjustable nuts for regulating the tension of these springs.

83 indicates the ledger-blade, and this is shown best in Figs. 1 and 4. Said blade is

carried transversely between the side members 59 of the knife-frame by a bar 84, which is pivoted to said side members on a pin indicated by broken lines 85 in Fig. 4. This allows the adjustment of the ledger-blade around the center of said pin 85, and for holding the knife the bar 84 is provided with ears 86, having slits therein, (indicated by broken lines at 87 in Fig. 4,) in which slots the clamp-screws 88 are received. The slots 87 are arranged in an arc concentric to the pin 85. Said bar 84, carrying the ledger-blade 83, also sustains a guide-plate 89, which projects upward from the bar immediately below the feed-roller 34. Coacting with the guide-plate 89 are two guides 90, which are secured to the side member 59 of the knife-frame opposite the guide 89 and directly under the roll 33. One of said guides is shown in Fig. 4, and these guides, with the guide 89, receive the paper or other material from the rolls 33 and 34, passing the same down past the ledger-blade to permit the shear-blade to act thereon. The shear-blade 91 is mounted on a bar 92, which is carried by a transverse pivot 93 in a slide 94. 95 indicates a spring engaging an ear 96, depending from the bar 92 and pressing said bar and the shear-blade 91 upward. 97 indicates a tongue which projects from the shear-blade in the plane thereof and bears on the ledger-blade to limit the upward movement of the shear-blade and insure the proper engagement of the blades as the shear-blade moves into operation. At the same time the mounting of the shear-blade as described insures that the blade has a steady upward pressure against the side of the ledger-blade. The said slide 94, as shown best in Figs. 3, 4, 5, and 6, is mounted to move horizontally in guides 97^a, carried by the knife-carriage, and pivoted to the ledger-blade slide 94 are links 98, the outer ends of which are pivoted to arms 99, fastened to a rock-shaft 100. The rock-shaft is mounted transversely in the knife-frame and has secured thereto a finger 101. (Best shown in Fig. 1.) This finger coacts with a tappet 102, secured to a rotary shaft 103, mounted transversely in the side frames 26 and provided with a drag or brake 104 to prevent idle motion. Secured to the shaft 103 is a gear 105, and this is in mesh with a gear 106, secured to a stub-shaft 107, carried by a bracket 108, which is mounted to swing around the center of the shaft 50 and which has a slot 109 therein receiving a lock-bolt 110 for holding the bracket 108 at the desired adjustment. This gear 106 meshes with the before-described gear 51 on the shaft 50 and takes its motion therefrom. The knife-carriage therefore reciprocating in a certain time and the shaft 103 rotating continuously, as the carriage drops the finger 101 is moved into the path of the tappet 102, and the tappet running against the finger imparts a rocking motion to the shaft 100, and through the arms 99 the slide 94 is moved inward, carrying with it the shear-blade, which strokes under the ledger-blade, effecting the cut in the stock or web material. The tappet 102, having cleared the finger 101, continues its rotation, and the knife-carriage, with its attached parts, then ascends. For returning the shear-blade to its inactive position a spring 111 is provided, (see Fig. 1,) this spring being fastened to the lower web 63 of the knife-carriage and engaging an arm 112, secured to the shaft 100. This return of the shear-blade takes place the instant that the cutting stroke of the blade has been completed, and upon the return upward movement of the knife-carriage the two blades pass alongside of the uncut goods one at each side thereof ready to renew the operation as the carriage again descends.

Beneath the knives is arranged a stationary guide 114, adapted to have the goods passed at the left-hand side thereof, (see Fig. 4,) and opposite the guide 114 is a rockable guide 115, the same being mounted on a rock-shaft 116, carried in the knife-frame, and the said guide 115 is pressed toward the guide 114 by a spring 117. The sheet thus cut from the body of the web material falls between the guides 114 115 and is taken up by rollers 118 and 119, which are located directly below the guides. (See the lower part of Fig. 4 and Fig. 2.) These rollers extend transversely between the side frames, and their shafts 118^a and 119^a, as shown in Fig. 1, project through the left-hand side frame and carry gears 120 and 121, which are meshed with each other to drive the rollers in unison. The shaft 118^a carries a band-pulley 122, over which a belt is adapted to pass from a similar pulley 123, carried on the shaft of the roll 33, thus imparting to the roll 118 rotary motion which in turn is imparted to the roll 119 by the gears 120 and 121.

124 indicates springs and adjusting-screws.

From the rollers 118 and 119 the severed sheet passes to three or more pairs of delivery-rollers 125, which are shown best in Figs. 2 and 15. These rollers have beveled matching faces, as shown, and are carried on shafts 126, which are mounted on the side frames 26 and connected with a train of gears 127 from the gear 121.

In the operation of the machine the parts are set in motion from the drive-shaft 54, and the web material passing over the various feed and tensioning rolls is drawn down between the ledger and shear blades. At the proper instant the cam causes the knife-frame to descend, and the parts are so arranged that the instant that this takes place the tappet 102 will strike the finger

101, rock the shaft 100, and move in the slide 94, causing the shear-blade to act and the material to be severed, this operation taking place, it will be observed, during the downward movement of the carriage. The instant that the tappet 102 leaves the finger 101 the spring 111 returns the shear-blade to its inactive position, and at this time the carriage returns to its upper position preparatory to a second cut. The cut material passes down through the guides 114 and 115 and is delivered from the machine by the rollers 118, 119, and 125. The peculiar beveled form of these rollers causes the sheets to take a curving or channel-like cross-sectional form, which gives stiffness to the sheets and allows them to be projected from the machine in a superimposed pile as contradistinguished from falling limp in a confused heap under the machine.

The single cam 76 (shown in Figs. 1, 2, and 14) is arranged to move the knife-carriage once for each revolution of the shaft 50 and to cut the web material in regular lengths, one length during each revolution of the shaft. The form of the cam may, however, be changed to cause the operation to take place more or less frequently, thus varying the lengths of the material cut from the web.

Following this, the double cam 76^c (shown in Figs. 19 and 20) may be employed, which will bring about two reciprocations of the carriage to each revolution of the shaft 50, and consequently two cuts to each revolution of each shaft. When this change is made, a change in the ratio of the gears 51, 106, and 105 will also be necessary, and to permit this to be readily done I provide the swing-frame 108 and its appurtenant parts. After this change in the ratio of the gearing, the gear 105 should be removed from the shaft 103 and a similar gear (indicated by the broken lines 105^a in Fig. 1) should be placed on said shaft. The bolt 110 should then be loosened and the frame 108 swung up to the position shown by broken lines in Fig. 1. This causes the gear 106 to roll around the gear 51 until it comes into mesh with the gear 105^a. This, it will be seen, will drive the shaft 103 faster proportionately to the increase in the number of movements imparted to the knife-carriage owing to the change in the form of the cam. The rapidity at which the material is fed into the machine may be regulated by controlling the ratio of the gears 43, 44, and 45. To do this, the gear 49 should be displaced from the shaft 50 and a gear substituted, by means of which the desired change in the ratio of the gearing is effected. Then by adjusting the arm 46 the gear 44 may be caused to mesh properly with the gear which has been selected for the shaft 50 in place of the gear 49. After the desired adjustment of the arm 46 is effected said arm may be fastened securely by the clamp-screw 47.

The purpose in rendering the rolls 125 frusto-conical in form is to enable them to feed and roll the paper or other goods in such shape that it may be more readily deposited—that is to say, as the paper passes between the rolls it is bent in a plane lateral to its general path of travel, and thus assumes a curvature which renders it comparatively stiff and easy to be fed out.

Having thus described the preferred form of my invention, what I actually claim, and desire to secure by Letters Patent, is—

1. In a machine for cutting web material, the combination of a ledger-blade, means for adjustably mounting the same, a shear-blade, a slide on which the same is pivotally mounted, and a spring pressing the shear-blade toward the ledger-blade.

2. In a machine for cutting web material, the combination of a ledger-blade, means for adjustably mounting the same, a shear-blade, a slide on which the same is pivotally mounted, a spring pressing the shear-blade toward the ledger-blade, and a finger attached to the shear-blade and continuously engaged with the ledger-blade.

3. In a machine for cutting web material, the combination of a means for feeding the material, a knife-carriage, means for moving the same in unison with the said material, a ledger-blade mounted on the knife-carriage, a shear-blade, a slide mounted on the carriage, and carrying the shear-blade, and means for periodically actuating the same.

4. In a machine for cutting web material, the combination of means for feeding the material, a knife-carriage, a knife and its operating means, a rack in connection with the carriage, a toothed sector meshed with the rack, a shaft on which the toothed sector is carried, a second toothed sector fastened to said shaft, a sliding rod having teeth thereon meshed with the second toothed sector, and a cam adapted to impart reciprocal motion to said rod.

5. In a machine for handling web material, the combination of a feed-roll, pressure-rolls engaged therewith, a yoke in connection with the axes of said pressure-rolls, and means for exerting pressure against the yoke, for the purpose specified.

6. In a machine for handling web material, the combination of a feed-roll, pressure-rolls engaged therewith, a yoke in connection with the axes of said pressure-rolls, and means for exerting pressure against the yoke, for the purpose specified, said means comprising a rocking arm in connection with the yoke, a second arm in connection with the rocking arm, and a weight joined to the second arm.

7. In a machine for handling web material, the combination of a feed-roll, pressure-rolls

engaged therewith, a yoke in connection with the axes of said pressure-rolls, a means for exerting pressure against the yoke, for the purpose specified, said means comprising a rocking arm in connection with the yoke, a second arm in connection with the rocking arm, a weight joined to the second arm, and means for raising the weight at will.

8. In a machine for cutting web material, the combination of a ledger-blade, a shear-blade, a spring pressing said shear-blade toward said ledger-blade, and mechanism including a tappet for periodically pressing against said spring.

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

WILLIAM D. SKIDMORE.

Witnesses:
F. W. HANAFORD,
JNO. M. RITTER.