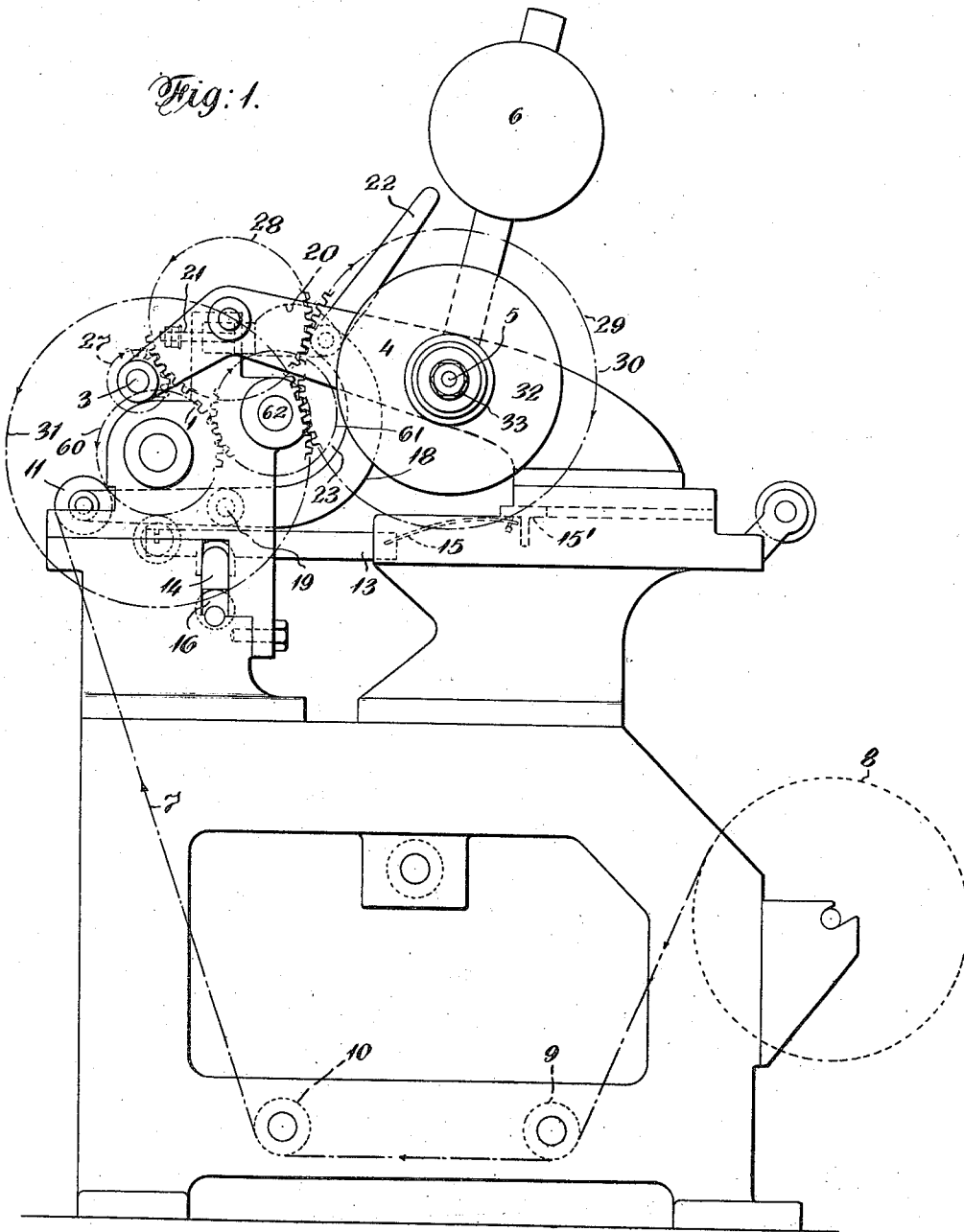


J. A. CAMERON AND G. B. BIRCH.
SLITTING AND REWINDING MACHINE.
APPLICATION FILED JULY 25, 1916.

1,310,153.

Patented July 15, 1919.

4 SHEETS—SHEET 1.



Inventors
James A. Cameron
Gustaf B. Birch
By *W. H. Peeten* Attorney
W. H. Peeten

J. A. CAMERON AND G. B. BIRCH.
SLITTING AND REWINDING MACHINE.
APPLICATION FILED JULY 25, 1916.

1,310,153.

Patented July 15, 1919.

4 SHEETS—SHEET 2.

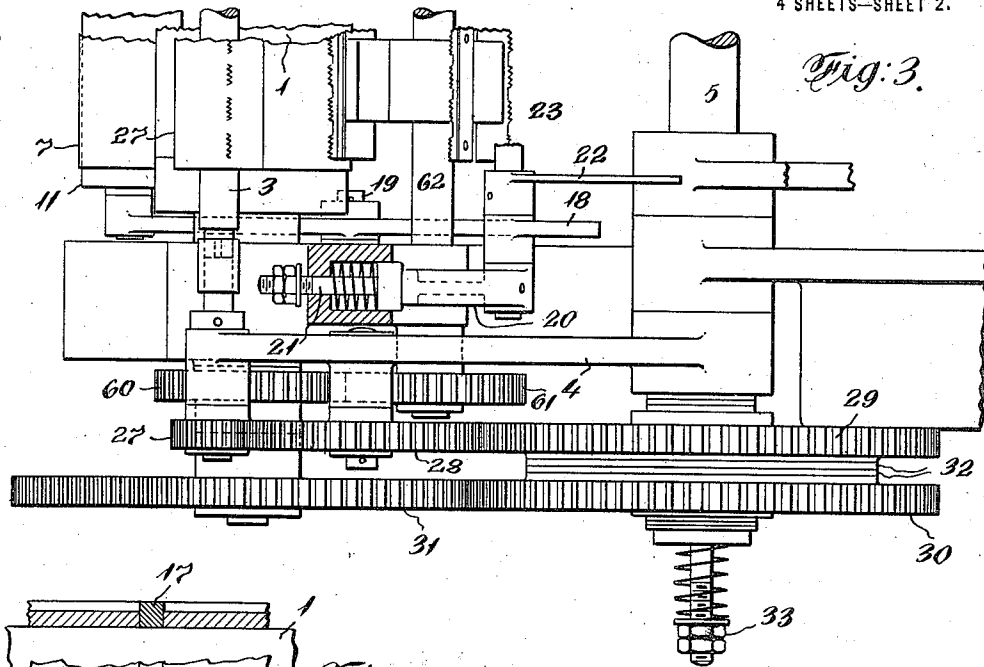


Fig. 3.

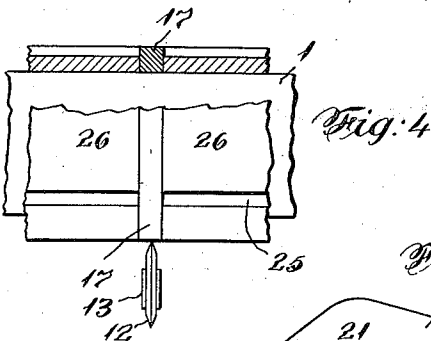


Fig. 4.

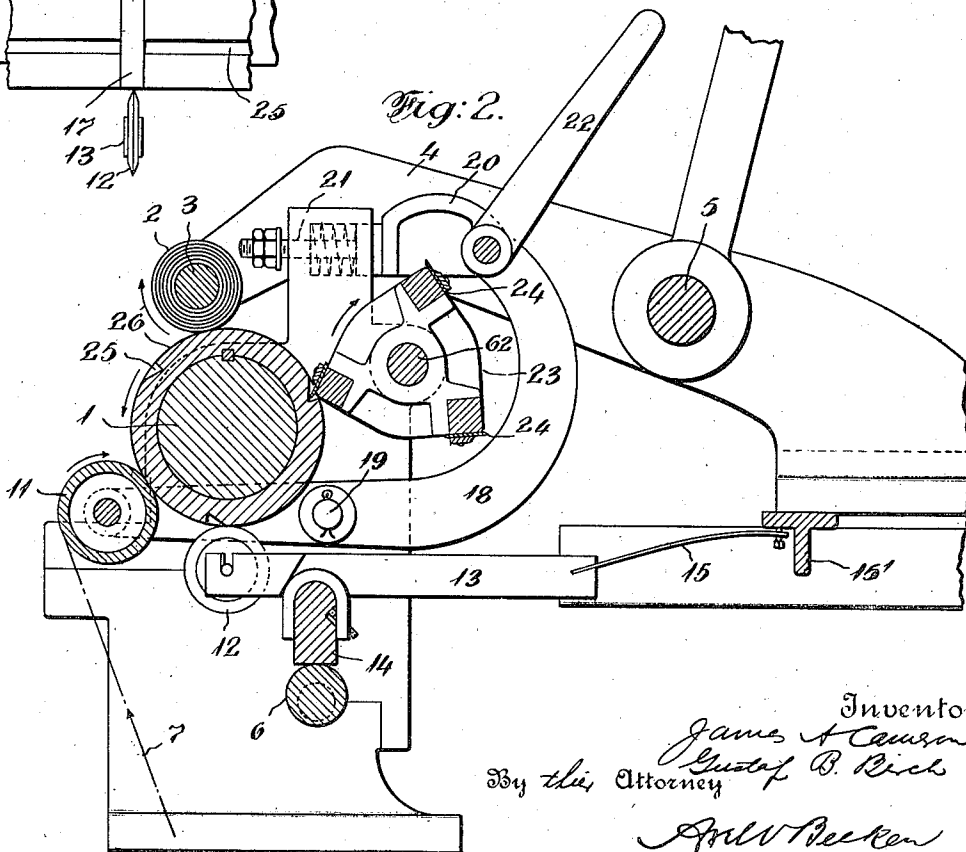


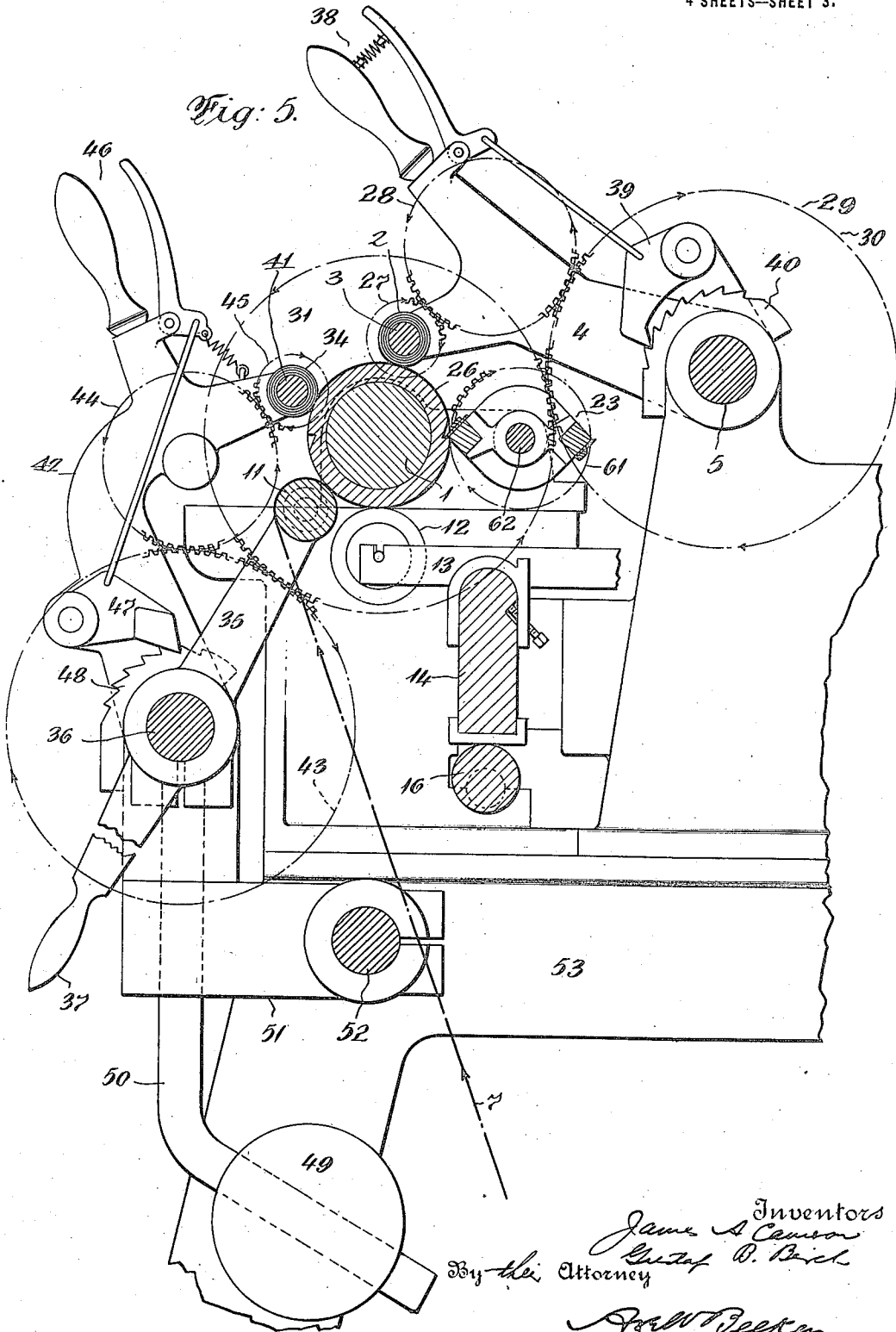
Fig. 2.

Inventors
James A. Cameron
Gustaf B. Birch
By the Attorney
Arthur W. Becken

J. A. CAMERON AND G. B. BIRCH.
SLITTING AND REWINDING MACHINE.
APPLICATION FILED JULY 25, 1916.

1,310,153.

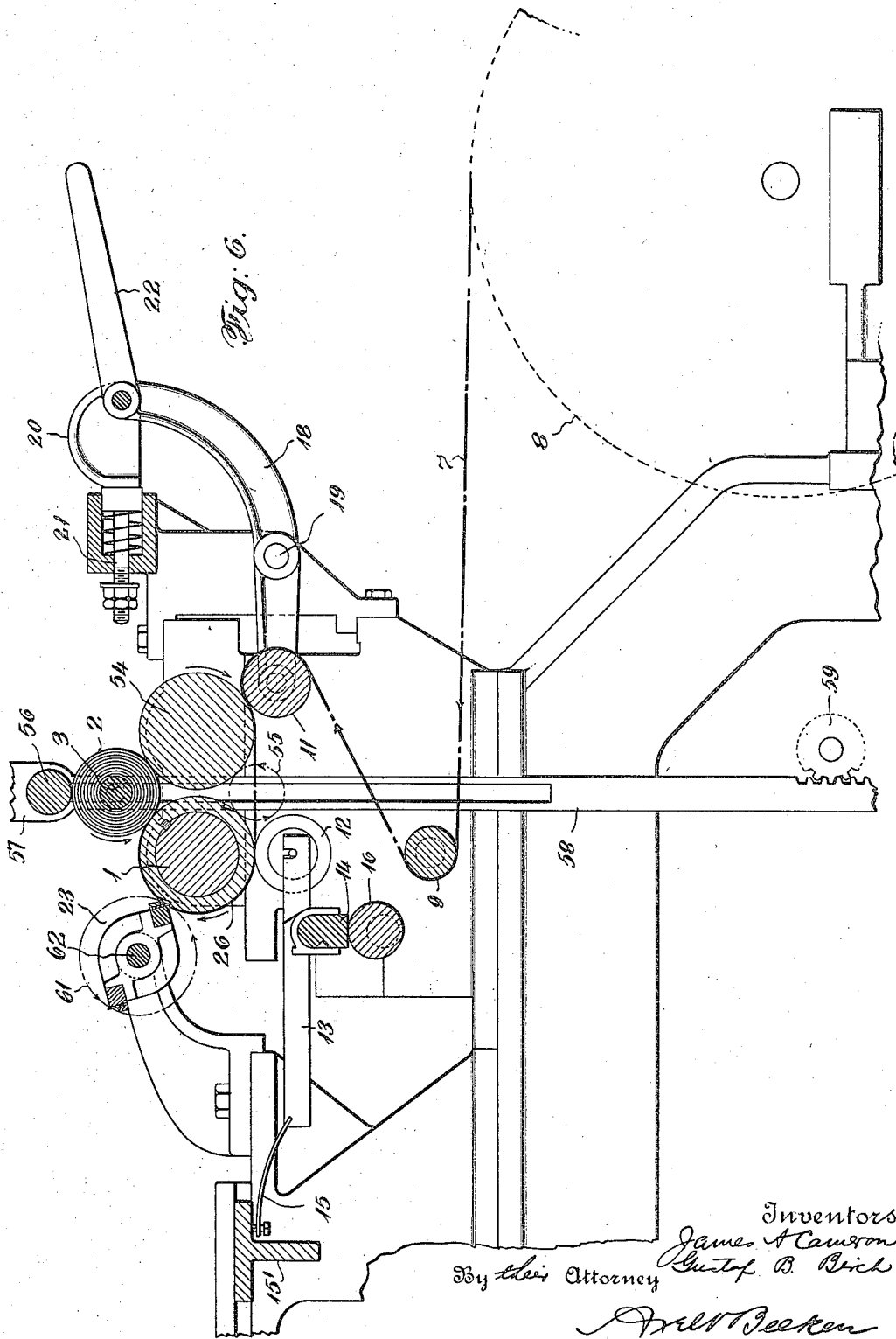
Patented July 15, 1919.
4 SHEETS—SHEET 3.



J. A. CAMERON AND G. B. BIRCH.
SLITTING AND REWINDING MACHINE.
APPLICATION FILED JULY 25, 1916.

1,310,153.

Patented July 15, 1919.
4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

JAMES A. CAMERON AND GUSTAF BIRGER BIRCH, OF BROOKLYN, NEW YORK,
ASSIGNORS TO CAMERON MACHINE COMPANY, OF BROOKLYN, NEW YORK, A
CORPORATION OF NEW YORK.

SLITTING AND REWINDING MACHINE.

1,310,153.

Specification of Letters Patent.

Patented July 15, 1919.

Application filed July 25, 1916. Serial No. 111,108.

To all whom it may concern:

Be it known that we, JAMES A. CAMERON and GUSTAF B. BIRCH, citizens of the United States, and residents of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Slitting and Rewinding Machines, of which the following is a specification.

This invention relates to a machine for slitting, perforating and rewinding webs of flexible material.

In Letters Patent No. 1,256,658, dated February 19, 1918 there is disclosed a machine for perforating slitting and rewinding sheet material such as paper toweling in which perforations are placed to provide transverse weakened lines. In the operation of this machine the web was first perforated and then drawn along to the slitting and rewinding mechanism. In slitting and rewinding flimsy materials it has occasionally been found somewhat disadvantageous to place a stretch of perforated web under tension between operations owing to a tendency on the part of the web to tear along the weakened lines formed by the perforations.

The object of this invention is to so arrange the perforating mechanism in a slitting, perforating and rewinding machine that the web is not placed under any substantial tension after the perforating operation is performed.

The invention consists in a device in which the rewinding means feed the web through the slitting and perforating means, such slitting and perforating mechanisms being so arranged that the web is slitted first and perforated afterward so that the feeding action of the rewinding means will not tend to tear the web.

The invention is disclosed in a number of concrete and preferred embodiments in the accompanying drawing in which like reference characters are used to designate like parts throughout the several views.

In the drawings:

Figure 1 is a side elevation of a machine embodying a preferred form of the invention.

Fig. 2 is a transverse vertical sectional view of the upper part of the machine shown in Fig. 1.

Fig. 3 is a view partly in plan and partly in section of a portion of the machine shown in Fig. 1.

Fig. 4 is a detailed view of a section of the combined cutter and perforator roll.

Fig. 5 is a transverse vertical section of a portion of a machine showing a modified form of the invention.

Fig. 6 is a transverse vertical section of a portion of a machine embodying still another form of the invention.

In the embodiment of the invention disclosed in Figs. 1, 2, 3 and 4 a combined cutter, and perforation roll 1 serves to support the rewound coils 2 on the shaft 3. The shaft 3 rotates in bearings on the ends of the arms 4 which are mounted at their other ends on the rock shaft 5. A counterweight 6 also mounted on the rock shaft 5 serves to regulate the degree with which the rewound coils press against the rewinding roll 1. The arms 4 can be swung back on the rock shaft 5 to move the shaft 3 out of engagement with the rewinding roll 1.

The web 7 is drawn from the web roll 8 over the successive guiding and smoothing rolls 9, 10 and nip roll 11 to the roll 1. The nip roll 11 is mounted on an arm 18 by means of which the nip roll can be swung away from the roll 1 to facilitate the threading operation. The arm 18 is pivoted at 19 and is provided at the other end with a cam 20, the flat face of which is normally in engagement with a spring pressed plunger 21 which tends to swing the arm 18 to such a position that the nip roll 11 is pressed against the roll 1. A handle 22 is provided by which the cam 20 can be turned down to present a shorter radius to the end of the plunger 21 and thereby move the nip roll 11 away from the rewinding roll 1.

The shaft 3 is not driven through frictional engagement with the roll 1, but preferably by means of the pinion 27, meshing with the intermediate gear 28, which in turn meshes with the gear 29 rotating on the rock shaft 5 which carries the arms 4. By this construction the pinion 27 will be in constant operative connection with the driving gear 29 whatever the position of the arms 4. A gear 31 on the end of the roll 1 meshes with and drives the gear 30 which is preferably connected with the gear 29 through the friction clutch 32 which is con-

trolled by the nuts 33. The friction clutch forms in effect a slip connection whereby the relative change in surface speed relation between the rewound coils 2 and the roll 1 which is made necessary by the constantly increasing diameter of the rewound coils can be provided for. A second gear 60 on the end of the roll, meshes with and drives a gear 61 on the end of the shaft 62 on which the perforator 23 is mounted.

At 12 is shown one of a number of scoring cutter disks which are of the same type as those shown in Patent No. 1,076,189, Oct. 21, 1913. The cutter disks are mounted in bars 13 adapted to rock on the supporting rail 14 and are yieldingly pressed against the surface of the roll 1 by the action of the springs 15 which bear against the underside of the bar 13'. The rail is adapted to be raised to move the cutters into operative position by manipulation of the eccentric 16 as in the patent referred to. The roll 1 is preferably provided with rings 17, shown in Fig. 4, which have glass-hard surfaces against which the cutting edges of the cutter disks 12 operate. It will be obvious that a hardened ring 17 will be provided for each cutter disk in use.

It will be noted that the first operation performed on the web is that of slitting which takes place as the web passes the cutter disks 12 at the underside of the roll 1. The next step in the operation is preferably that of perforating and is performed by the perforator 23, the perforating blades 24 of which cooperate with grooves 25 in the surface of the roll 1 to perforate the web in its progress from the slitting disks 12 to the rewound coils 2. In order to provide for the perforating function, the roll 1 has mounted thereon not only the hardened cutter rings 17 but also the longitudinally grooved cylinders 26 so mounted as to cooperate with the perforator 23.

The next step in the operation is that of rewinding which takes place when the web has traversed the short remaining space on the periphery of the roll 1 that lies between the perforator 23 and the rewound coils 2. By so placing the perforator that it acts on the web after the slitting operation is performed, the tension which was exerted on the web subsequent to the perforating operation in the machine disclosed in the prior application already referred to, is eliminated and the likelihood of tearing the web along the transverse lines of the perforations is greatly reduced. Furthermore, the construction of the single roll 1 whereby it cooperates with the slitting, the perforating, and the rewinding mechanism tends to the simplification and improvement of the apparatus generally.

In Fig. 5 of the drawing we have shown a perforator 23 combined in a construction

in which two sets of rewound coils 2 and 34 are employed. The slitting cutters 12 and the perforator 23 are similar to the corresponding devices already described but the structure comprising the guide roll 11 and the rewound coils is somewhat different. The nip roll 11 in this embodiment of the invention is mounted on the arm 35 which is pivoted on the rock shaft 36. A handle 37 is provided by means of which the roll 11 may be moved away from the rewinding roll 1 in order to facilitate the threading operation.

The shaft 3 for the rewound coils 2 is mounted in the arms 4 as in the embodiment already described, but in the modification shown in Fig. 5 a handle 38 is provided for manipulation of the arms 4 and shaft 3. A pawl 39 and ratchet 40 cooperate with the handle to hold the shaft 3 in positions removed from the roll 1. The shaft 41 is mounted in arms 42 which correspond to the arms 4 and which are carried by the rock shaft 36. The gears 43, and 44, and the pinion 45 correspond to the corresponding members 29, 28 and 27 and serve to communicate motion to the shaft 41. The handle 46, pawl 47 and ratchet 48 correspond to the similar members connected with the arms 4. A weight 49 carried by an arm 50 attached to the rock shaft 36 exerts a constant pressure tending to hold the coils 34 against the rewinding roll 1. The rock shaft 36 is supported in brackets 51 carried by the stay shaft 52 of the framework 53.

The operation of the machine disclosed in Fig. 5 is much like that of the modification already described. The web of material passes over the nip roll 11 to the points of engagement of the cutter disks 12 with the roll 1. The web is thereby severed and passes the perforator 23 and after having been perforated passes to the two sets of rewinding coils 2 and 34. These coils are preferably arranged to build up in alternate order so that there will be substantial gaps between adjacent coils which will overcome any tendency for the edges of adjoining coils to interlap.

In the embodiment of the invention shown in Fig. 6 of the drawing the perforating mechanism has been combined with a slitting and rewinding machine of the type shown in the patent to which reference has already been made.

The rewinding mechanism consists briefly of two rewinding rolls 1 and 54 on which rests the shaft 3 carrying the rewound coils 2. The rewinding roll 54 is driven from the roll 1 through an intermediate pinion 55. A pressure roll 56 is preferably provided which bears upon the upper surface of the rewound coils and tends to keep them parallel and to facilitate the rewinding generally. The pressure roll 56 is carried in a

vertically movable frame 57 which is guided in its movement by the downwardly projecting guide and rack bars 58. In order to remove the pressure roll from engagement with the rewind coils for any purpose, a pinion 59, which can be manually operated, is provided.

In this modification a nip roll 11 is provided which, however, engages the rewinding roll 54 instead of the rewinding and cutter roll 1. The rewinding roll 1 which cooperates with the cutter disks 12 also cooperates with the perforator 23 which is so mounted as to operate on the web after the web has passed through the slitting mechanism.

It will therefore be seen that in this embodiment of the invention as in the two already described, the slitting, the perforating, and the rewinding operations are performed while the web is in close frictional engagement with the surface of a single roll. By this construction the web is materially supported between operations and the placing of a stretch of unsupported web under tension between operations is eliminated.

What is claimed, is:—

1. A slitting and rewinding machine com-

prising: means for slitting a web longitudinally, means for transversely perforating the slitted sections, said last mentioned means arranged to operate on the web after the slitting means, and rewinding means for drawing the web past the slitting and perforating means and for rewinding the slitted and perforated sections.

2. A slitting and rewinding machine comprising: means for slitting a web longitudinally, perforating members in alignment with each other for forming a transverse set of perforations in the slitted sections, said last mentioned means arranged to operate on the web after the slitting means, and rewinding means for drawing the web past the slitting and perforating means and for rewinding the slitted and perforated sections.

Signed at Brooklyn New York in the county of Kings and State of New York this 20th day of July, A. D. 1916.

JAMES A. CAMERON.
GUSTAF BIRGER BIRCH.

Witnesses:

W. B. WILSHUSEN,
JOHN L. C. MAYER.