J. A. CAMERON & G. B. BIRCH.

SLITTING AND REWINDING MACHINE.

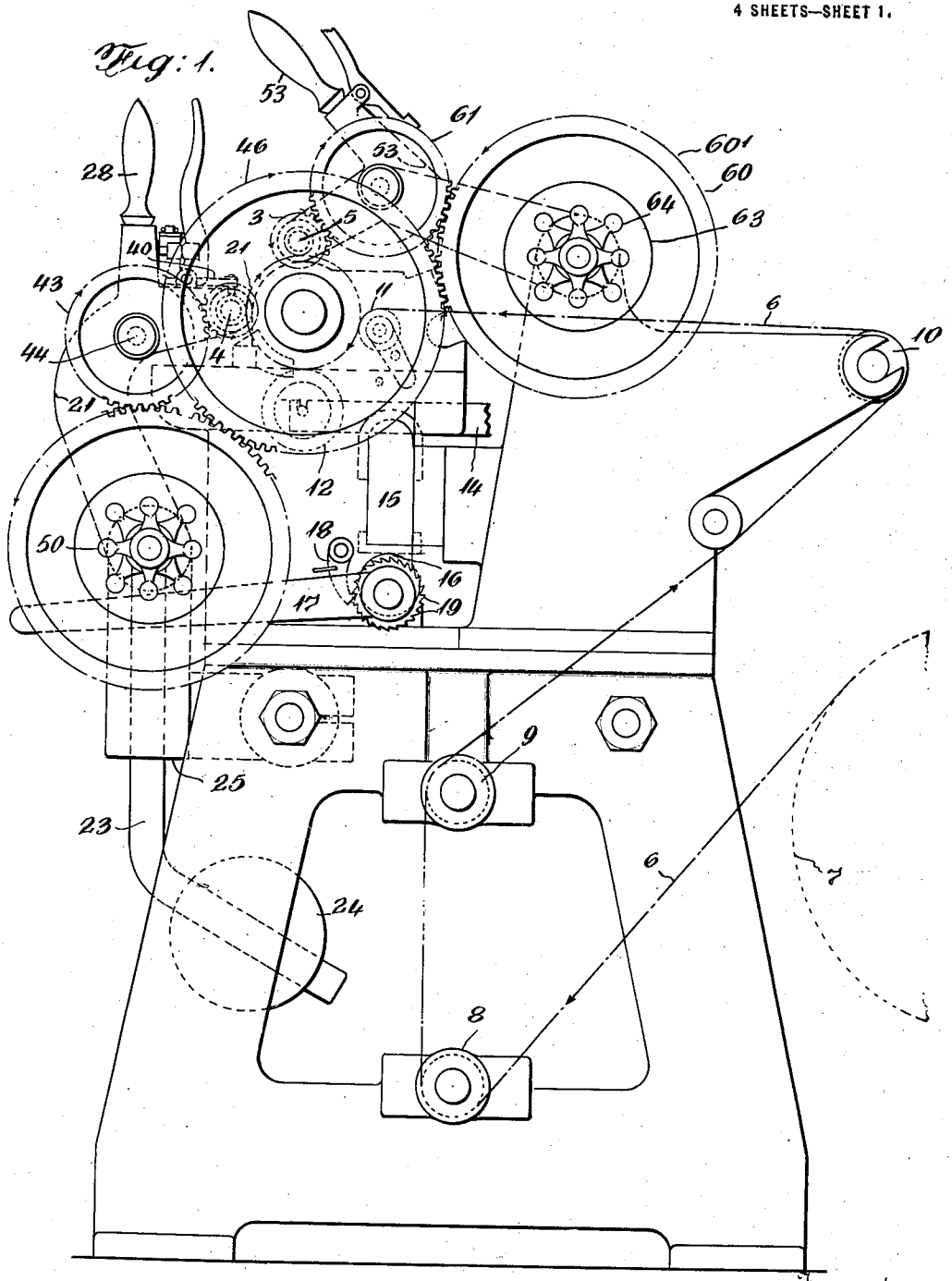
APPLICATION FILED JULY 25, 1916.

1,258,185.

Patented Mar. 5, 1918.

4 SHEETS—SHEET 1.

Fig. 1.



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By their Attorney

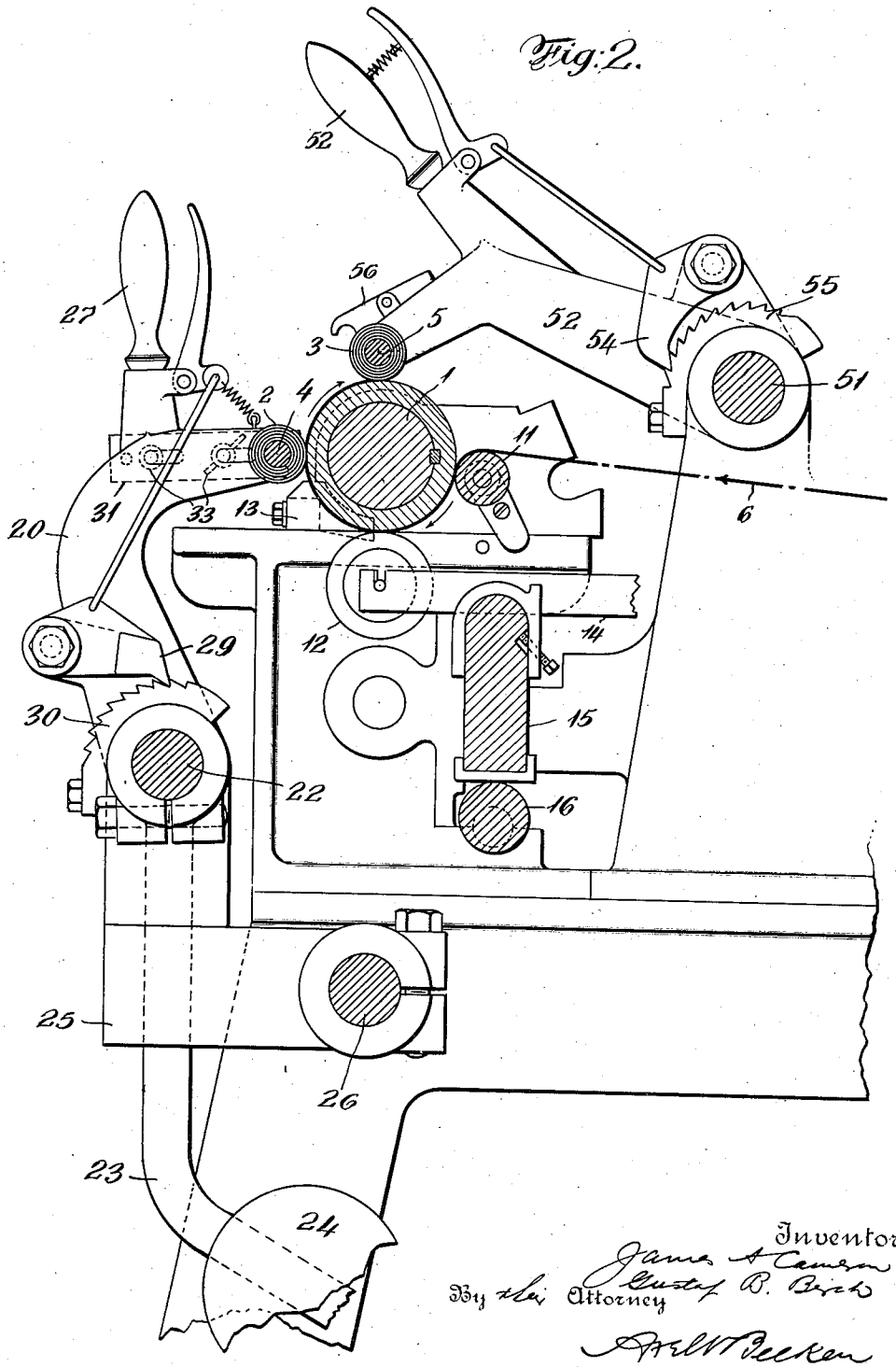
Arthur Becker

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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

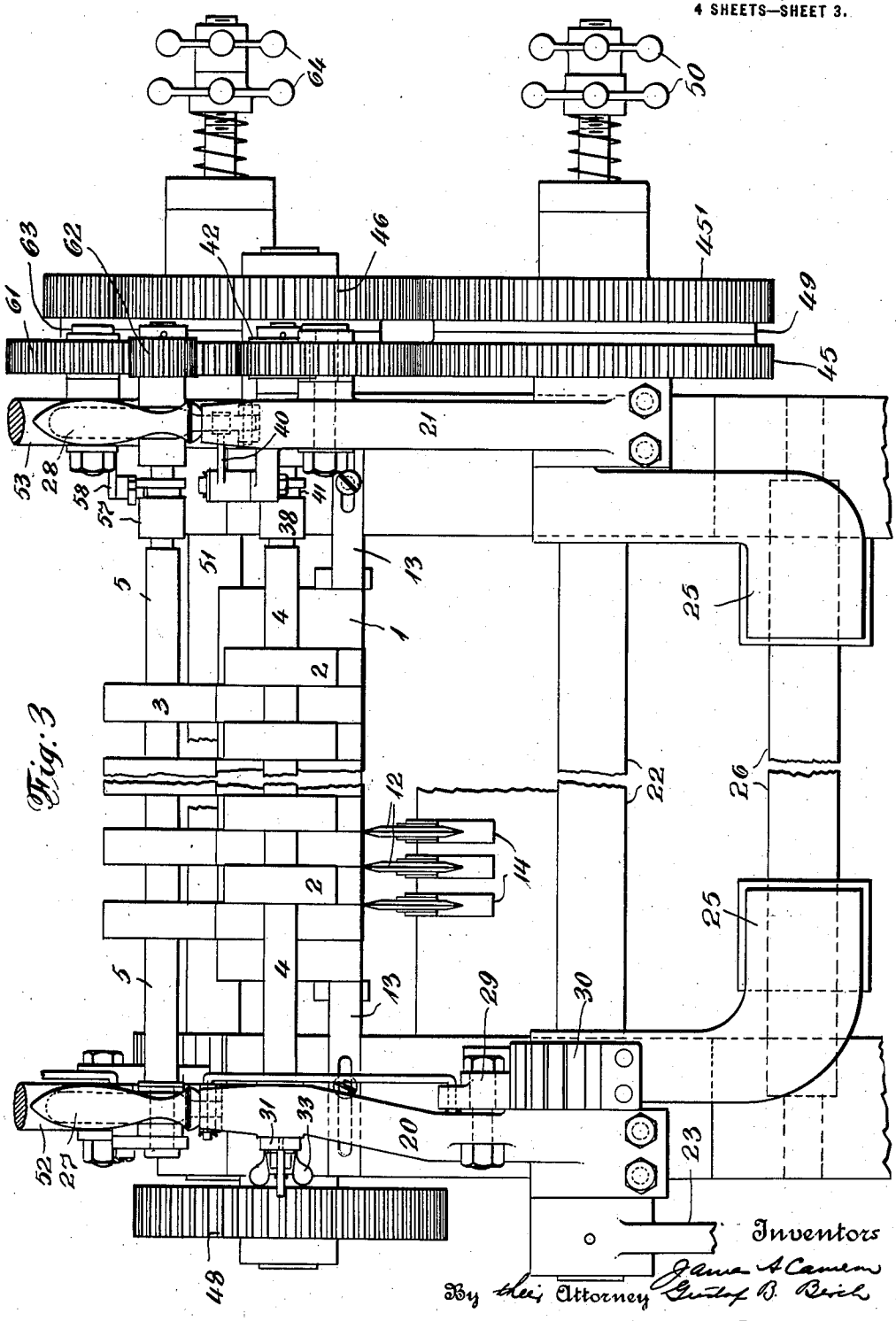


Fig. 3

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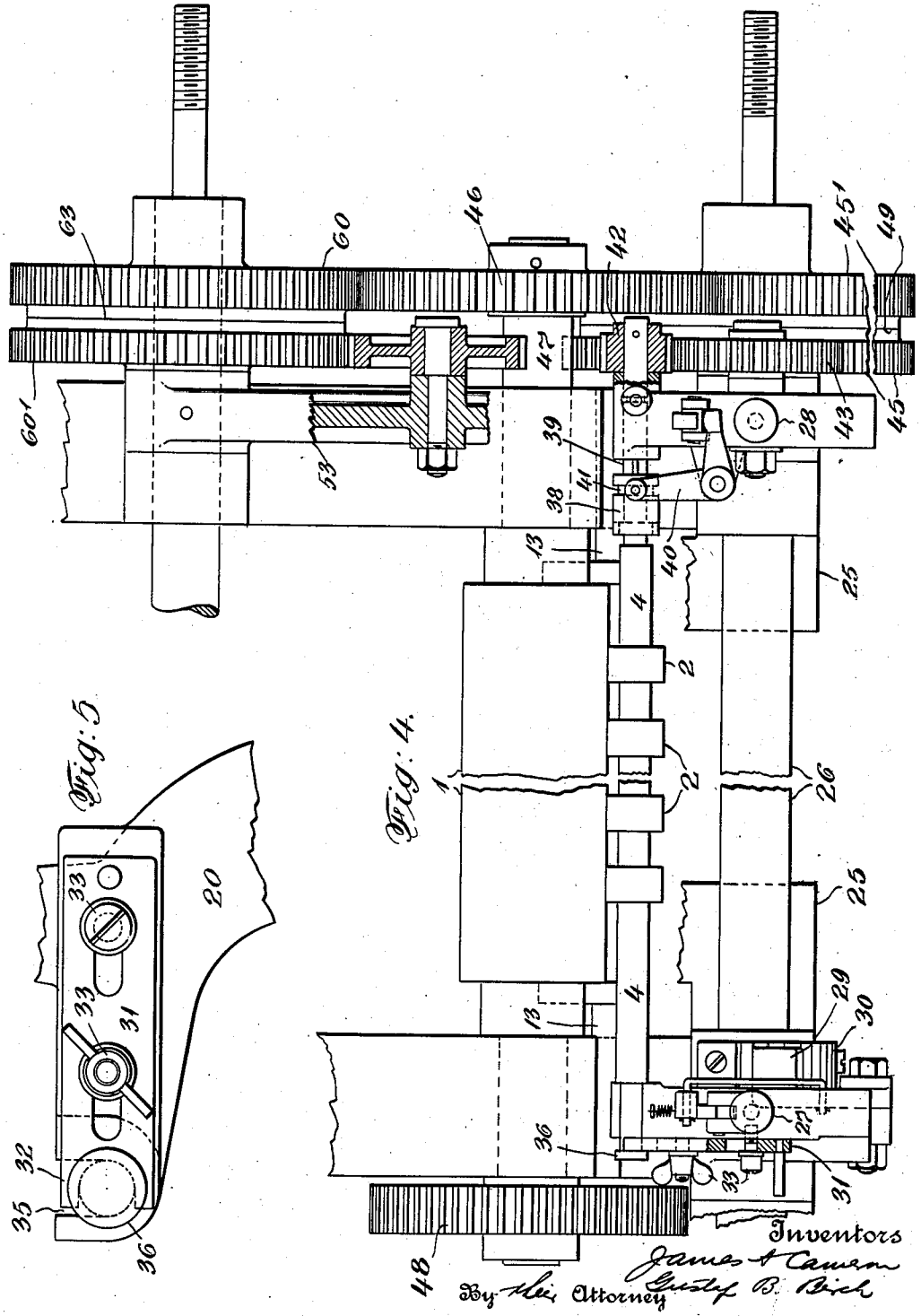


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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SLITTING AND REWINDING MACHINE.

1,258,185. Specification of Letters Patent. Patented Mar. 5, 1918.

Application filed July 25, 1916. Serial No. 111,107.

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 improvements in slitting and rewinding machines and particularly to machines of the type in which a plurality of shafts for supporting the rewound coils is employed.

In the art as heretofore practised when a plurality of shafts has been made use of on which to wind the strips produced by the slitting operation, no effective means has been found for preserving uniform diameters among the various coils, with the result that different tensions have been exerted on the different strips in the plane of severance of the webs which resulted in unsatisfactory rewinding and also in distortion of the web in slitting.

The main object of this invention is to admit of the web being slit without distortion in the plane of severance when a plurality of rewinding shafts are used for pulling the web through the slitting means.

In the drawing in which a preferred form of the invention is disclosed, like reference characters are used to designate like parts.

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

Fig. 2 is a sectional view taken on a vertical transverse plane through the machine.

Fig. 3 is a front elevation of the upper part of the machine.

Fig. 4 is a view partly in plan and partly in section of the upper part of the machine.

Fig. 5 is an enlarged detailed view of the shaft locking mechanism.

In the preferred embodiment of the device a combined rewinding and cutter roll 1 serves both to partially support and frictionally drive the rewound coils of material 2 and 3 as they are wound on the shafts 4 and 5. The rotation of the rewinding roll acts to draw the web of material 6 from the web or mill roll 7 and over the successive guiding and smoothing rolls 8, 9, 10 and 11, into contact with the rewinding roll 1 and thence onto the rewound coils 2 and 3.

Means consisting of the scoring cutters 12 are arranged to press against the surface of the rewinding and cutter roll and to cut the web as it passes through. The cutter roll 1 is provided with a surface sufficiently hard to resist any tendency of the cutters to score or groove the roll and this hardened surface, because of the difficulty in uniformly hardening the whole surface of the roll, is preferably made up of a plurality of separate ring sections. A pair of adjustable gage members 13 is preferably provided for holding the hardened ring sections in such lateral relation to the length of the roll 1 that none of the scoring cutters will coincide with a joint between two contiguous rings.

The scoring cutters are preferably mounted in the bars 14 which are adapted to rock on the curved upper edge of the supporting rail 15. The supporting rail can be raised or lowered, to thereby move the cutters into and out of engagement with the roll 1 by means of the eccentric 16 which can be manipulated by means of the hand lever 17 acting through the pawl 18 and ratchet 19. The removable cutter carrying bars 14 can be moved laterally of the machine along the rail 15 so as to be adjusted to webs of different widths.

The rewinding mechanism, which operates to wind the web into coils after the cutters have acted, includes the shafts 4 and 5 which have already been referred to. The shaft 4 is removably carried in the arms 20 and 21 mounted on the rock shaft 22; and on the depending arm 23, fixed to the rock shaft 22, is carried a weight 24. The position of the weight 24 is such that it constantly tends to press the shaft 4 and rewound coils 2 into close frictional engagement with the rewinding shaft 1. Supporting brackets 25 for the rock shaft 22 are mounted on the fixed cross bar 26. Handles 27 and 28 attached to the arms 20 and 21 respectively are provided for manually swinging the arms and rewound coils carried thereby out of engagement with the rewinding roll. A manually operable pawl 29 carried by the arm 20 is adapted to coöperate with the ratchet 30 to hold the rewound coils at any given distance removed from the center of the rewinding roll.

In order to provide for the removal and replacement of the shaft for the rewound coils, a locking plate 31, having a notched end 32, is slidably mounted on the extension

of the arm 20 which supports the corresponding end of the rewound coils 2. Screws 33 working in slots 34 are adapted to lock the plate in the shaft holding position shown in Fig. 5 of the drawing. It will be noted that the end of the shaft 4 rests in a notch 35 in the end of the arm 20 and that when the plate 31 is moved to the left the notch 32 therein closely engages the shaft 4 and thereby locks the shaft in place in the notch 35. A flange 36 on the end of the shaft coöperates with a shoulder 37 to prevent the shaft from moving longitudinally in its support. It will be clear that by loosening the screws 33, the plate 31 can be moved to the right thereby freeing the shaft 4 so that it can be lifted from the notch 35.

The other end of the shaft 4 is supported in a clutch member 38 which can be moved out of engagement with the end of the shaft by sliding along the splined shaft 39. The forked end of the bell crank 40 engages a groove 41 in the clutch member 38 whereby the clutch member can be moved into and out of shaft engaging position and the other end of the bell crank is adapted to be engaged by the movable member of the handle 28.

The shaft 4 is driven from a pinion 42 keyed to the shaft 39. The pinion 42 meshes with a gear 43 mounted on a stub shaft 44 carried by the arm 21. The gear 43 in turn meshes with an intermediate gear 45 rotating on the rock shaft 22 which in turn is operated through the clutch 49 from the gear 45′ which engages the gear 46 carried on the end of the rewinding roll shaft 47. A gear 48 at the other end of the rewinding shaft is adapted to receive power from any suitable source.

In operating the machine it has been found desirable to place a slip connection in the driving means for the rewound coils because of the varying relation of the surface speeds of the rewinding roll and coils due to the increasing diameter of the coils. This slip connection takes the form of the friction clutch 49 the effectiveness of which is regulated by the hand wheels 50 to vary the speed at which the pinion 42 is driven.

The construction of the mechanism comprising the shaft 5 for the rewound coils 3 is practically a duplication of that already described. The rock shaft 51 corresponds to the rock shaft 22. The arms 52 and 53 which carry the shaft 5 correspond to the arms 20 and 21. In connection with the arm 52 there is also a pawl 54 and ratchet 55. There is, however, no weight such as the weight 24 which is used in connection with the rock shaft 22. The position of the arms 52 and 53 with the parts carried thereby is such that pressure is exerted on the coils 3 without the necessity for the use of a special weight for that purpose.

The means 56 for locking one end of the shaft 5 into a notch in the end of the arm 52 is somewhat different than the slidable plate 31 used on the arm 20. The means 56 consists of a pivoted locking member provided with a notch for locking the shaft 5 in place. The clutch 57 for engaging the other end of the shaft 5 corresponds exactly to the clutch 38. The bell crank 58 for controlling the clutch is actuated from the handle 59 of the arm 53.

The driving means for the shaft 5 is a duplication of the driving means for the shaft 4 and consists of the gear 60 which meshes with the gear 46 on the end of the rewinding roll shaft. The gear 60 drives the gear 60′ through the clutch 63. The gear 60′ meshes with the intermediate gear 61 carried by the arm 53 which gear in turn meshes with the pinion 62 on the shaft 5. The friction clutch 63 is controlled by the hand wheels 64.

In operating the device it is preferred to wind the coils 2 and 3 in alternation on the shafts 4 and 5 as is best shown in Fig. 3. It will be seen that by the provision of two shafts on which the rewound coils are wound, no interweaving of the edges of adjacent coils is possible since there exist substantial gaps between all adjacent coils. It will also be obvious that by means of the ratchets 30 and 55 the arms carrying the shafts 4 and 5 may be moved to and latched in such a position that the rewind shafts are spaced from the roll instead of being in contact with it. This relation of the parts may of course be preserved during the progress of the work by moving the arms outwardly from one tooth to another along the ratchet as the diameter of the rewound coils increases. This construction permits of the slitting and rewinding of material that requires to be more loosely rewound than are the coils produced by the surface contact method.

What is claimed, is:—

1. A slitting and rewinding machine comprising: means for slitting the web lengthwise without distortion out of the plane of severance including a rotating backing roller having a constant speed and a score cutter rotating by friction against said backing roller, the latter being harder than the former, and means for drawing the web through the slitting means and for rewinding the slitted sections into a plurality of coils including a plurality of rewinding shafts, and means for independently rotating each shaft controlled by the diameter of the coil carried by it, the coils thereby exerting an equal pull at all points laterally of the plane of severance regardless of the differences in diameter of the coils.

2. A slitting and rewinding machine comprising: means for slitting the web length-

wise without distortion out of the plane of severance including a rotating backing roller having a constant speed and a score cutter rotating by friction against said backing roller, the latter being harder than the former, and means for drawing the web through the slitting means and for rewinding the slitted sections into a plurality of coils including a plurality of rewinding shafts, means for independently rotating each shaft controlled by the diameter of the coil carried by it, the coils thereby exerting an equal pull at all points laterally of the plane of severance regardless of the differences in diameter of the coils, and means independent of the driving connections for varying the tightness of the convolutions of the coils.

3. A slitting and rewinding machine comprising: means for slitting the web lengthwise without distortion out of the plane of severance including a rotating backing roller having a constant speed and a score cutter rotating by friction against said backing roller, the latter being harder than the former, means for drawing the web through the slitting means and for rewinding the slitted sections into a plurality of coils including a plurality of rewinding shafts normally resting against the backing roller and mounted to be displaced with respect thereto as the diameter of the coils increase, and means other than the surface of the backing roller for independently rotating each shaft controlled by the diameter of the coil carried by it, the coils thereby exerting an equal pull at all points laterally of the plane of severance regardless of the differences in diameter of the coils.

4. A slitting and rewinding machine comprising: means for slitting the web lengthwise without distortion out of the plane of severance including a rotating backing roller having a constant speed and a score cutter rotating by friction against said backing roller, the latter being harder than the former, means for drawing the web through the slitting means and for rewinding the slitted sections into a plurality of coils including a plurality of rewinding shafts normally resting against the backing roller and mounted to be displaced with respect thereto as the diameter of the coils increase, means other than the surface of the backing roller for independently rotating each shaft controlled by the diameter of the coil carried by it, the coils thereby exerting an equal pull at all points laterally of the plane of severance regardless of the differences in diameter of the coils, and means for adjusting at will the position of the rewinding shafts with respect to the backing roller to engage the former with the latter under more or less pressure or not at all.

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.