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

REWINDING MACHINE.

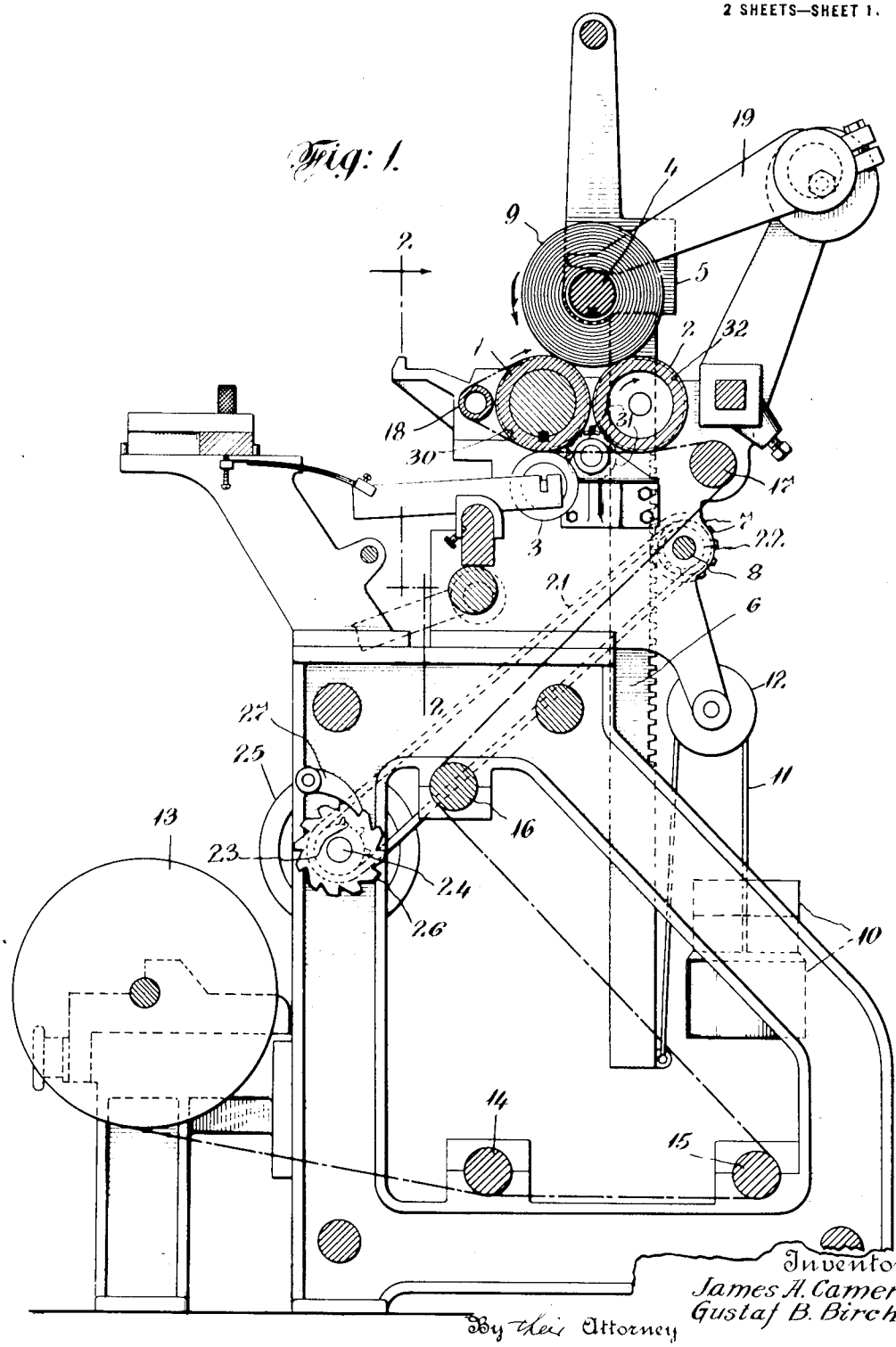
APPLICATION FILED JULY 19, 1915.

**1,258,644.**

**Patented Mar. 12, 1918.**

2 SHEETS—SHEET 1.

Fig: 1.




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James A. Cameron
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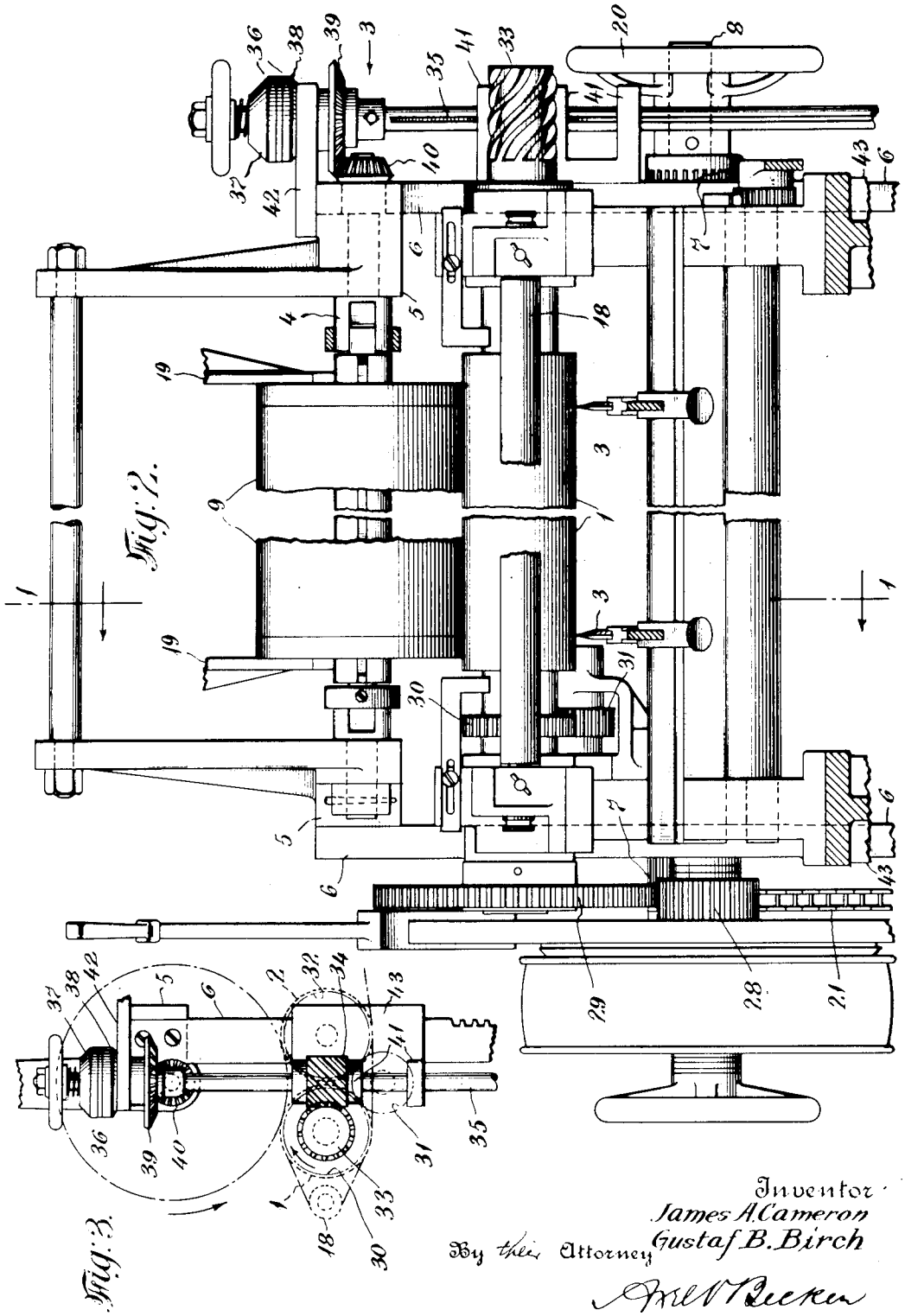


Fig. 2.



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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

## REWINDING-MACHINE.

1,258,644. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed July 19, 1915. Serial No. 40,707.

*To all whom it may concern:*

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

The present invention relates to rewinding mechanism particularly of the type used in connection with slitting machines. In Patent No. 1,076,189 there is disclosed a device in which the rewinding is effected by means of two driven rewinding rolls that afford a support for the coils to be rewound and that move at a constant speed together with a pressure exerting roller or riding roller engaging with the upper surface of the rewound coils and exerting pressure thereupon, and by means of rack bars and pinions maintaining the pressure exerting roller or riding roller parallel to the rewinding rolls, so that all the rewound coils will be of uniform diameter. This produces tightly rewound coils of uniform diameter whereby the pull on the web at all points laterally is equal, so that the web will not be distorted out of the plane of severance.

There are, however, certain materials whose surface will not resist pressure. For instance, when slitting and rewinding wax coated materials and carbon coated paper the pressure of the riding roller, together with the weight or load of the material itself, may become so great that the surface will be adversely affected. So also, when winding tacky material having a friction surface the tension upon the material by reason of such friction becomes very great and it may be desirable in such a case to relieve the rewound coils of the compression caused by their own weight. Furthermore, it is sometimes desired by the trade to rewind the material in relatively loose or "soft" coil form instead of into hard or tightly wound coils.

Again, in producing certain slitted material the requirements are not so severe. This is true, for instance, in connection with the paper known as counter-roll paper, that is to say, paper used in roll form on the counters of a store for wrapping purposes. In such cases extreme nicety of slitting and rewinding is not so essential and the work may therefore be done by a less expensive machine than that disclosed in Patent No. 1,076,189.

The main object of this invention is to produce a machine whereby the amount of pressure to which the material is subjected can be varied, especially with regard to relieving the rewound material of the compression caused by its own weight.

Another object of the invention is to produce a machine in which a riding roller may be dispensed with so as to facilitate removal of the rewound material but without sacrificing any of the advantages of the riding roller in producing tightly wound coils.

One feature of the invention resides in providing means having a constant speed which engage with the surface of the coils to be rewound together with means having a variable speed that is dependent upon the diameter of the rewound coils and which engage with the center of the coils to be rewound. This second means is in the form of a rewinding shaft to which sufficient weight can be attached to hold the coils against the first means under pressure exerted from within the coils outwardly. Means may also be provided for maintaining the said rewinding shaft parallel to the surface rewinding means so that all the rewound coils will be of the same diameter. In this manner the advantages of the construction shown in Patent No. 1,076,189 are retained, the extra riding roller, which in the old construction had to be raised before the rewound material could be removed, is dispensed with.

Preferably the surface rewinding means will be in the form of two driven rewinding rolls having a constant speed and affording support for the rewound coils, the rewinding shaft being in a plane between the two rolls.

Another feature of the invention is that this rewinding shaft may be counter-weighted to a greater or lesser extent in such a way as to compensate for its own weight and the weight of the members connected to it, as well as to compensate for the weight of the rewound coils. In this manner the weights may be so adjusted that the load, including the rewound material carried by the rewinding shaft, may be completely counteracted, so that the rewound material will barely touch the rewinding rolls, or, in extreme

cases, may even be completely out of engagement with said rewinding rolls so that by no possibility can the surface of the material be destroyed by the rewinding action.

Other features of construction, combination of parts and arrangement of elements will appear as the specification proceeds.

In the accompanying drawings the invention is disclosed in a concrete and preferred form in which, however, changes may be made without departing from the legitimate and the intended scope of the invention as expressed in the claims.

In the said drawings:

Figure 1 is a vertical sectional view on the line 1—1 of Fig. 2.

Fig. 2 is a vertical sectional view at right angles to the view shown in Fig. 1, with parts broken away, substantially on the line 2—2 of Fig. 1.

Fig. 3 is a detail view, partly diagrammatic in form, of the slip drive connection and adjacent parts, looking in the direction of the arrow 3 of Fig. 2.

Similar characters of reference indicate corresponding parts in the different views.

In the embodiment disclosed herein the surface rewinding means consist of the rollers 1 and 2, which rotate in the same direction at a constant speed, the roller 1 in the present instance also forming a cutter roll against which the score cutters 3 act to sever or slit the material as it passes between the said roller 1 and the cutters 3. So far as this part of the machine is concerned, it is the same as similar parts disclosed in Patent No. 1,076,189.

The center rewinding device in the present embodiment comprises the rewinding shaft 4, driven at a speed proportionate to the diameter of the rewound material, as will hereafter appear. This rewinding shaft is carried in a framing 5 having the two racks 6, one at each side of the machine, engaging with the pinions 7 on the shaft 8. The weight of the parts composing the rewinding shaft 4, etc., will normally tend to press the rewound material 9 into engagement with the rewinding rolls. In order, however, to counteract the weight of these parts, as well as the weight of the rewound material, or any portion of the weight of these parts and material, there are provided the counterweights 10 which may be increased or decreased at will, said counterweights being attached to the flexible connection 11 passing over the pulley 12 and attached to the lower end of the rack 6. It will be understood that the parts are in duplicate so that the parallelism of the rewinding shaft 9 with respect to the rolls 1 and 2 will be maintained.

The paper is led from the roll 13 over suitable guides, such as 14, 15, 16 and 17, whence it passes between the roller 1 and the cutters 3, and then either over the roller 18 or directly around the roller 1 up to the rewinding shaft 4.

Suitable means, such as the arms 19, are provided that engage the ends of the coils of rewound material to confine the same properly after the manner of said Patent No. 1,076,189.

The pinions 7, in addition to serving to maintain the rewinding shaft 4 parallel to the rewinding rolls, also constitute a means whereby said rewinding shaft may be raised at will. This may be effected by a hand-wheel, as 20, attached to the end of the shaft 8′, or, it may be effected by means of the chain 21 passing over a sprocket 22 on the shaft 8 and over another sprocket 23 on the shaft 24. This shaft 24 may also be provided with a hand-wheel 25 and, in addition, it may carry the ratchet 26 with which engages the pawl 27 so as to prevent backward rotation of the parts when the rewinding shaft 4 has been elevated.

In general, motion is derived from the pinion 28, on the power shaft, which meshes with the gear 29 on the end of the roller 1, said roller 1 having a pinion 30 engaging with an intermediate gear 31, which in turn imparts motion to the pinion 32 on the roller 2.

The roller 1 further carries a spiral gear 33 which meshes with another spiral gear 34 on the upright shaft 35. This upright shaft is provided with a slip friction drive 36, one member 37 of which is connected to the shaft 35, and the other member 38 of which is fast with the bevel gear 39, the latter being loose on the shaft 35. The bevel gear 39 meshes with the bevel pinion 40 which drives the rewinding shaft 4. Suitable means, such as the brackets 41, are provided for keeping the spiral gear 34 from moving up or down. The shaft 35 is carried by the extension 42 secured to one of the racks 6 so that, as the latter rise with the rewinding shaft, the shaft 35 will be moved upwardly and will thus transmit motion to the rewinding shaft in any position. The racks 6 slide in suitable guides 43 stationary with the framing of the machine.

It will be observed that as the diameter of the coils increases, less speed of the rewinding shaft 4 is required to properly rewind the material. Accordingly, the pull on the web by the rewound coils will cause a slippage between 37 and 38 and therefore the rewinding shaft 4 will be driven at a speed proportionate to the diameter of the rewound material.

What is claimed, is:

1. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and engaging with the surface of the latter, and a driven rewinding shaft in a

plane between the two rolls, having a variable speed depending upon the diameter of the rewound coils, engaging with the center of the coils to be rewound and capacitated to be displaced with respect to the rolls as the diameter of the rewound coils increases.

2. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and engaging with the surface of the latter, a driven rewinding shaft in a plane between the two rolls, having a variable speed depending upon the diameter of the rewound coils, engaging with the center of the coils to be rewound, and means for displacing the rewinding shaft with respect to the rolls as the diameter of the rewound coils increases and for maintaining the rewinding shaft in parallelism with the rolls.

3. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and engaging with the surface of the latter, and a driven pressure exerting rewinding shaft in a plane between the two rolls, having a variable speed depending upon the diameter of the rewound coils, engaging with the center of the coils to be rewound, to hold the coils against the rolls under pressure exerted from within the coils outwardly and capacitated to be displaced with respect to the rolls as the diameter of the rewound coils increases.

4. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and engaging with the surface of the latter, and a driven pressure exerting rewinding shaft in a plane between the two rolls having a variable speed depending upon the diameter of the rewound coils, engaging with the center of the coils to be rewound to hold the coils against the rolls under pressure exerted from within the coils outwardly, and means for displacing the rewinding shaft with respect to the rolls as the diameter of the rewound coils increases for maintaining the rewinding shaft in parallelism with the rolls.

5. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and adapted to engage with the surface of the latter, a rewinding shaft, in a plane between the two rolls and driven at a speed depending upon the diameter of the rewound coils, for supporting the latter, means for displacing the rewinding shaft with respect to the rolls as the diameter of the rewound coils increases and means for causing the rewinding shaft to sustain substantially the entire load of the rewound coils so as to rewind said coils without appreciable surface pressure.

6. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and adapted to engage with the surface of the latter, a vertically movable rewinding shaft in a plane between the two rolls and driven at a speed depending upon the diameter of the rewound coils for supporting the latter, means for displacing the rewinding shaft with respect to the rolls as the diameter of the rewound coils increases, and means for variably counter-weighting said rewinding shaft and the load carried thereby to press the rewound coils against the rolls with a variable pressure.

7. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and adapted to engage with the surface of the latter, a rewinding shaft, in a plane between the two rolls and driven at a speed depending upon the diameter of the rewound coils, for supporting the latter, means for displacing the rewinding shaft with respect to the rolls as the diameter of the rewound coils increases, means for causing the rewinding shaft to sustain substantially the entire load of the rewound coils so as to rewind said coils without appreciable surface pressure, and means for maintaining the rewinding shaft in parallelism with the rewinding rolls.

8. A rewinding machine comprising two driven rewinding rolls, having a constant speed, affording a support for the rewound coils and engaging with the surface of the latter, a driven rewinding shaft resting upon the rolls in a plane between the two rolls, having a variable speed depending upon the diameter of the rewound coils, engaging with the center of the coils to be rewound, racks carried at opposite ends of the rewinding shaft, and a shaft having pinions at opposite ends engaging with said racks to maintain the rewinding shaft in parallelism with the rewinding rolls.

Signed at New York city borough of Brooklyn in the county of Kings and State of New York, this 17th day of July A. D. 1915.

GUSTAF BIRGER BIRCH.
JAMES A. CAMERON.

Witnesses:
EDWIN S. KNUDSON,
JOHN L. C. MAYER.