W. A. PRINGLE.

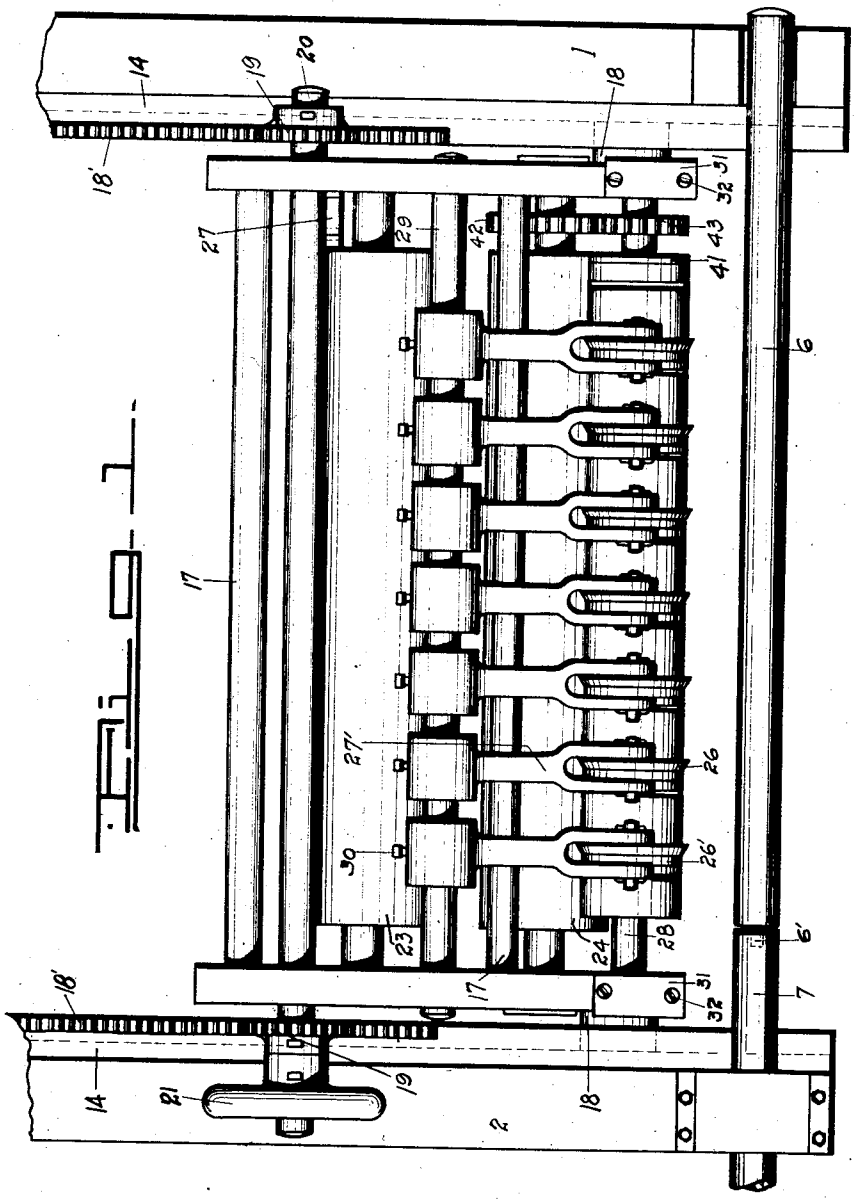
SLITTING MECHANISM.

APPLICATION FILED DEC. 7, 1916.

1,347,872.

Patented July 27, 1920.

3 SHEETS—SHEET 1.



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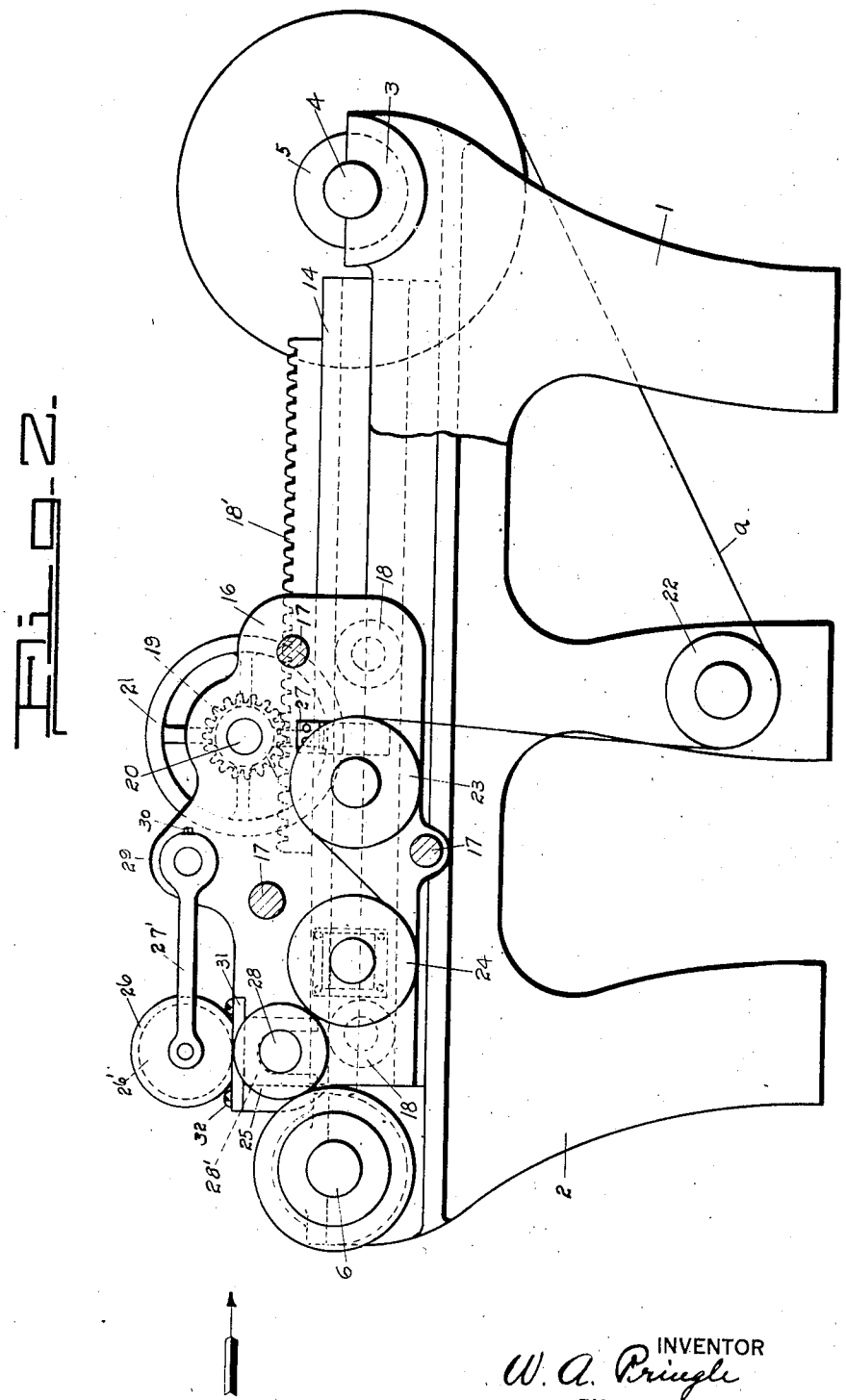
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3 SHEETS—SHEET 2.

Fig. 2.



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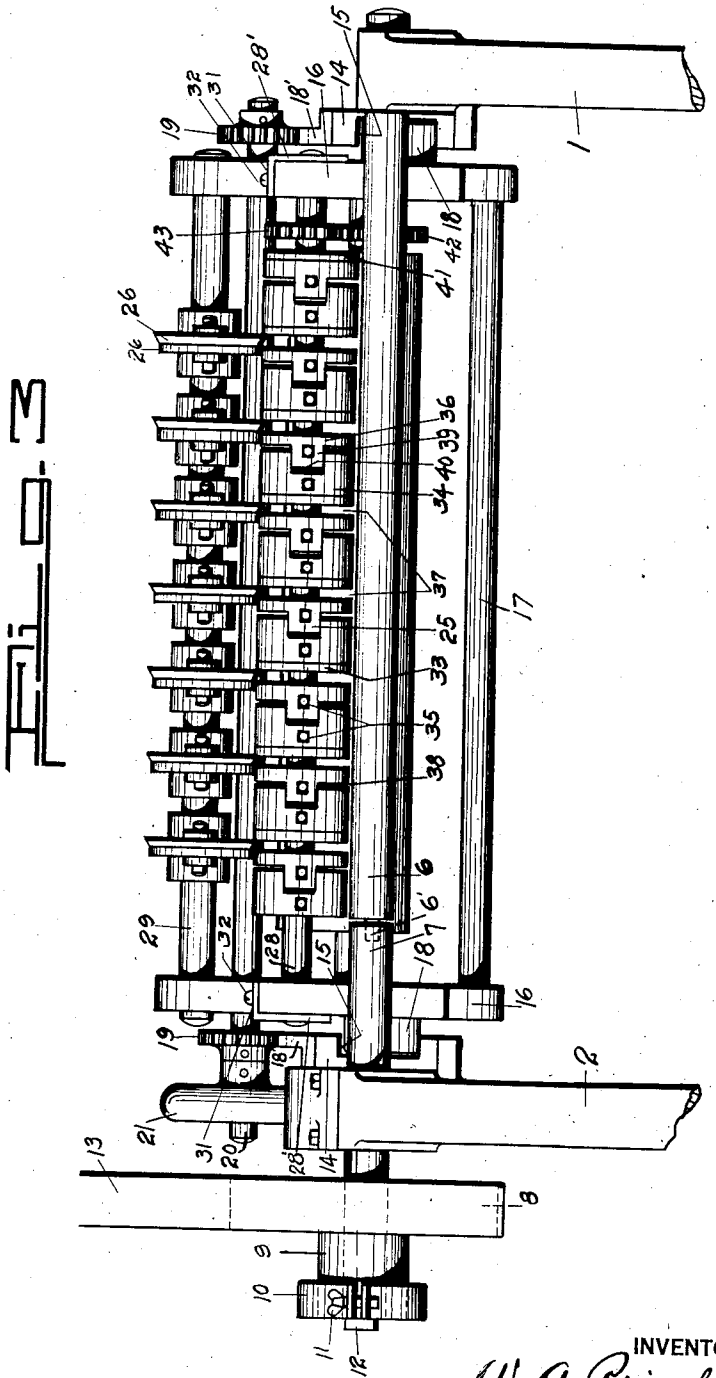
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3 SHEETS—SHEET 3.

FIG. 3.



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SLITTING MECHANISM.

1,347,872. Specification of Letters Patent. **Patented July 27, 1920.**

Application filed December 7, 1916. Serial No. 135,585.

To all whom it may concern:

Be it known that I, WILLIAM A. PRINGLE, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Slitting Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to slitting mechanism and with respect to its more specific features to mechanisms of the character referred to involving rewinding of the sections of the slit material, such as paper web, into generally coaxially located rolls.

One of the objects of the invention is to efficiently effect the rewinding of the web sections without interweaving, or overlapping, of adjacent sections, and to obtain the advantages consequent from such avoidance, such as saving of stock and ready separation of the rewound rolls one from another.

Another object of the invention is to provide a practical machine of the character referred to of such construction that it may be operated at relatively high speed and yet produce rolls tightly wound, and having plain lateral faces.

Another object of the invention is to provide a simple construction of machine of the character referred to which is readily adjustable for slitting material into different widths, as desired.

Other objects will be in part obvious and in parts pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings forming part of this specification, and wherein similar reference characters refer to similar parts throughout the several views—

Figure 1 is a plan view of a portion of a machine embodying the invention;

Fig. 2 is a side elevation of the machine, partly in section; and

Fig. 3 is an end view looking in the direction indicated by the arrow Fig. 2.

Referring now more specifically to the drawings, the embodiment shown involves a supporting frame comprising two side frames 1 and 2, spaced apart, and braced in any suitable manner. At one end of this frame provision is made for removably supporting a supply roll of the paper web to be slit, as by the provision of half bearings 3, in which a rotatable shaft 4 carrying a web spool 5 is journaled. Suitable provision for tensioning the unrolling operation of the supply roll may be provided, if desired.

At the opposite end of the supporting frame a shaft is provided on which the sections of web are rewound into roll form side by side and closely adjacent each other. In the present embodiment, the rewinding is effected on a winding roll, or shaft 6, which is removably connected to a main driving shaft 7, as by means of a squared end 6′ of the shaft 6 entering a similarly shaped recess in the inner end of the main driving shaft 7. The outer end of the winding shaft 6 is removably supported in a half bearing in one of the side frames 1 or 2, and the main driving shaft 7 is journaled in the other side frame and extends outwardly therefrom for the reception of a belt pulley 8, rotatably mounted on the shaft 7, and having an outwardly extending hub 9. Endwise play of the shaft 6, when the machine is operating, may be prevented by any suitable means. Surrounding the hub 9 is a friction ring 10, split as shown, the ends of this ring being coupled by means of a wing screw 11, the operation of which causes the friction ring to bind against the hub 9 with a desired tension. One side of the friction ring is connected to the end of the shaft 7 by means of an arm 12, and 13 indicates a belt adapted to be driven from any suitable source of power. By this construction it will be seen that the rotation of the belt pulley 8 will effect rotation of the shaft 7 and the winding shaft 6 when the friction ring 10 is clamped to the hub 9. Should the resistance to rewindings by the shaft 6 be restrained to an abnormal degree, the hub 9 may slip in the friction ring 10 and thus tearing of the web, or the sections thereof, be avoided.

The numerals 14—14 indicate two castings bolted to the respective side frames 1—2, and provided with a trackway for support-

ing and guiding a slitter carriage hereinafter referred to. The trackway is provided by grooving the inner faces of the castings 14, as at 15. The numerals 16 indicate the side frames of the slitter carriage braced and connected by a series of rods 17, and the numerals 18 indicate supporting rollers on the carriage running in the grooves 15. In this wise, the slitter carriage is freely movable in the grooves transversely toward and from the shaft 6. In order that the carriage and the parts carried thereby may be maintained in constant predetermined alinement relative to the shaft 6, the castings 14 are provided at their upper portions with racks 18′ engaged by pinions 19 fixed to a shaft 20 journaled in the frame 16 of the slitter carriage. The shaft 20 may be provided with a hand wheel 21 for turning the same to effect the manual displacement of the slitter carriage relative to the winding shaft 6.

In threading the machine preparatory to the slitting and rewinding operations, the web *a* from the supply roll passes beneath a guide roller 22 on the frame of the machine, thence over a tension roll 23, journaled in the slitter carriage 6, thence beneath a driving and alining or guiding roll 24, also journaled in the slitter carriage; thence between the last mentioned roll and the lower slitting device or roll 25 with the slitting knives of which latter coöperate upper slitting knives 26, the web thence passing to the winding shaft 6 on which the sections which have been slit by the coöperative pairs of slitting knives are rewound. The tension roll 23 is designed to place a slight tension or "drag" on the web, and for this purpose a means may be provided for yieldingly resisting the rotation of the roll 23, as for instance, by the provision of the springs 27 pressing against the ends of this roll. The upper slitting knives 26 consist of a series of circular wheels 26′, to which are fastened the slitting disks 26 having cutting edges and adjustably mounted in forked arms 27′ respectively fastened for longitudinal adjustment to an oscillatory shaft 29 by means of set screws 30, the shaft 29 being journaled in the side frames 16 of the slitter carriage. The lower slitting device comprises a series of slitter knives which coöperate respectively with the upper slitting knives 26. The construction of the lower slitting device 25 is conducive to the efficient slitting and guiding of the web, and the lower slitting knives may be set at different distances apart so as to cut the web into different widths. The numeral 28 indicates a lower slitter shaft rotatably mounted in bearing boxes 28′ removably placed in recesses in the upper edges of the side frames 16 of the slitter carriage, these boxes being held in place by the upper pieces or clamps 31 secured by screws 32. The lower slitter knives are indicated by the reference numerals 33, and each comprises a hardened metallic circular disk having a square edge to coöperate with its companion upper knife 26, this disk forming a part of or being fastened to a slitter sleeve 34 on the shaft 28 and capable of adjustment on said shaft longitudinally thereof, and held in place by a set screw 35. The numerals 36 indicate sleeve members longitudinally adjustable on the shaft 28, as are the sleeves 34, the diameter of the sleeves 34 and 36 being the same so that the surface of the slitting roll provided by the assemblage of the sleeves 34 and 36 is practically cylindrical throughout, being interrupted only by sufficient spaces 37, permitting the upper knives to coöperate with the lower knives in a shearing manner, and by the slight spaces which may occur between two adjacent sleeves 34 and 36, as indicated, for instance, at 38. The sleeves 34 and 36 in the present embodiment are arranged in pairs, one of each pair, as the sleeve 36, having a tongue or key 39 engaging a slot 40 in the other or companion sleeve 34. By this construction of slitter roll a practically continuous cylindrical surface is provided for the support of the web while being slit, and at the same time the slitter knives of this roll may be adjusted longitudinally of the shaft 28 so as to slit the web in different widths, as may be desired, within limits, and yet rotation of the sleeves of a pair relative to each other is avoided. One end of the slitter roll may be provided with a stop sleeve 41 permanently or otherwise fastened to the roll, and against which the end sleeve may bear.

One end of the roll 24 has a gear 42 secured thereto, meshing with a similar gear 43 on the slitter roll shaft 28 so that the rotation of the roll 24 by the web will be communicated to the slitter roll shaft 28 and thence to the knives on the lower shaft. The roll 24 is of light tubular construction, and in the present embodiment is mounted in elongated bearings which permit this roll to have a slight automatic translatory movement or play toward and from the slitter roll, the gears of these two rolls nevertheless being maintained in driving coöperation. In the operation of the machine the web is threaded therein, as before referred to, the front end of the web being wrapped several times around the shaft 6 so that the rotation of the latter may effectively feed the web from the supply roll, or the front end of this web may be adhesively secured to the winding shaft 6. The belt pulley being rotated will rotate the winding shaft 6 and the web of paper will be pulled from the supply roll, and as it passes between the upper and lower slitting devices, the web will be slit on even lines and subsequently rewound upon the shaft 6. As the rolls of

web on the shaft 6 increase in diameter, they may contact with the front face of the lower slitter roll, and this will effect displacement of the slitter carriage, and the parts carried thereby, without substantially changing the distance between the point or points where the web is slit by the coöperative knives, and the point where it starts to be rewound. Thus the distance between said point, and where the sections start to be rewound, may be made very short so that there is practically little tendency for the sections to have lateral movement relative to each other, either before they are rewound or during the rewinding operation.

Thus by the above described construction are accomplished, among others, the objects hereinafter referred to.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

1. In an apparatus of the character described, in combination, a winding shaft, means adapted to drive said shaft to wind material thereon, means displaceable relative to said shaft adapted to slit the material to be wound on said shaft, and means whereby the movement of the material to be slit operates the slitting means, said last-named means being maintained in driving coöperation with said slitting means during displacement of the slitting means and comprising a roller driven by the material to be slit and adapted to guide said material to the slitting means, said roller being automatically movable toward and from said slitting means.

2. In an apparatus of the character described, in combination, a winding shaft, means adapted to drive said shaft to wind material thereon, means displaceable relative to said shaft adapted to slit the material to be wound on said shaft, means whereby the movement of the material to be slit operates the slitting means, said last-named means being maintained in driving coöperation with said slitting means during displacement of the slitting means, and a slitter carriage adapted to maintain said slitting means in constant slitting alinement relative to said shaft during said displacement and comprising a roller driven by the material to be slit and adapted to guide said material to the slitting means, said roller being automatically movable toward and from said slitting means.

3. In an apparatus of the character described, in combination, a winding shaft, means comprising a slitting roll adapted to slit the material to be wound on said shaft, and a roller driven by the material to be slit and adapted to guide said material to said slitting roll, said roller being automatically translatable relative to said slitting roll.

4. In an apparatus of the character described, in combination, a slitter device comprising rotary cutter wheels, and a rotatively mounted shaft carrying cutter edges adapted to coöperate with said cutter wheels to effect slitting of material passing therebetween, a roller alongside said shaft adapted to be driven by material passing thereover, and means whereby rotation of said roller causes rotation of said shaft and said cutter edges.

5. In an apparatus of the character described, in combination, an oscillatory shaft, an arm mounted on said shaft for rotative and longitudinal adjustment, a circular wheel carrying a cutting edge rotatively mounted on said arm, a bed roll comprising a rotatively mounted shaft, a pair of adjustable circular sections mounted upon said shaft for longitudinal adjustment, one of said sections adapted to coöperate with said circular wheel to sustain the cutting edge of said wheel in operative position, the other of said sections having a cutting edge to coöperate with the cutting edge on said wheel to effect the cutting of material passing between said wheel and said sections.

6. In an apparatus of the character described, in combination, a slitter roll, means to guide material to said roll, and a roller automatically movable toward and away from, and geared to said slitter roll, adapted by its movement to maintain uniform tensioning of material operated upon.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM A. PRINGLE.

Witnesses:
W. H. HOUSTON,
P. V. KELLER.