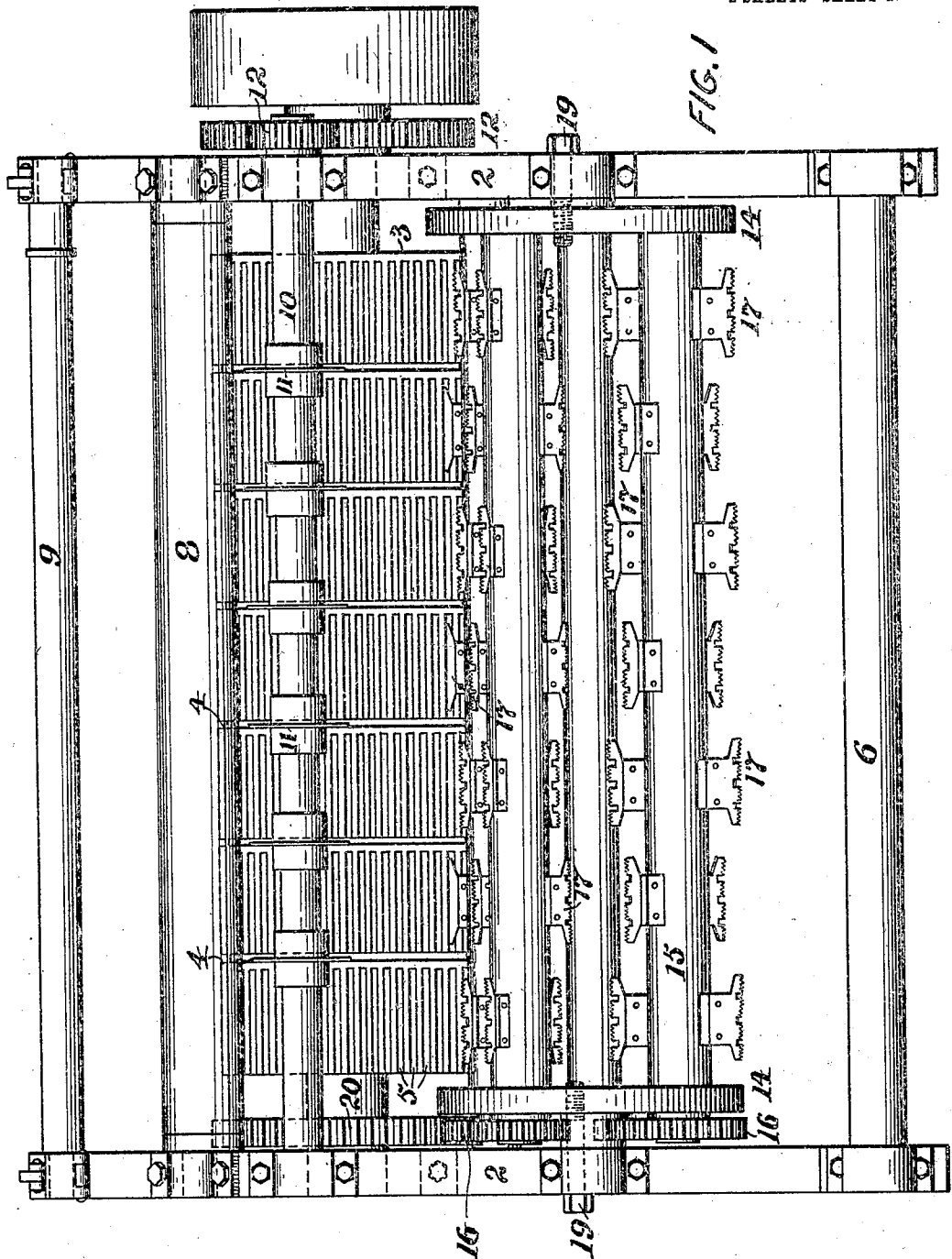


H. LIEBECK.
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APPLICATION FILED JUNE 22, 1909.

954,527.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.



WITNESSES

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Charles H. Barlow.

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Harry Liebeck
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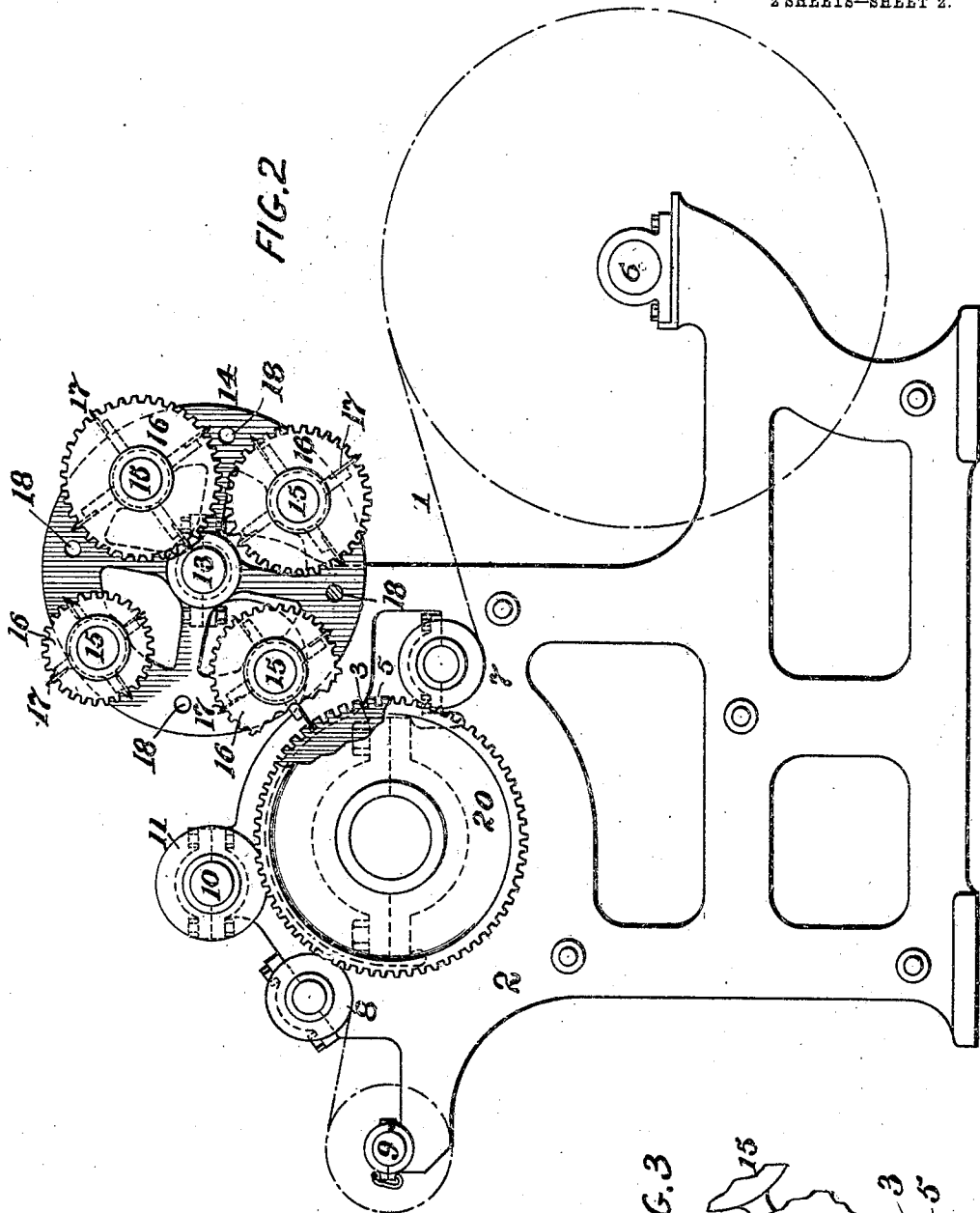
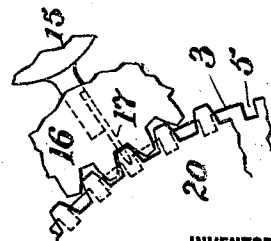


FIG. 3



WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY LIEBECK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO SCOTT PAPER COMPANY, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR MAKING TOILET-PAPER ROLLS.

954,527.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed June 22, 1909. Serial No. 503,680.

To all whom it may concern:

Be it known that I, HARRY LIEBECK, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Machines for Making Toilet-Paper Rolls, of which the following is a specification.

My invention has reference to machines for making toilet paper rolls and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a construction of paper winding machine for making paper packages in roll form from a web of paper and which will permit of the transverse perforations being placed at different distances apart in the length of the webs for different rolls so that the length of the sheets in the respective rolls may be longer or shorter, as desired, thereby giving to one machine a capacity for producing toilet paper packages having different sized sheets.

My invention consists of certain improvements in the construction of a paper perforating, slitting and winding machine having capacity for varying the position of the transverse cuts or perforations in the length, said improvements being fully set out in the following specification and more particularly defined in the claims forming part thereof.

My invention will be better understood by reference to the drawings, in which:

Figure 1 is a plan view of a perforated paper roll making machine embodying my improvements; Fig. 2 is a side elevation of the same with a portion broken away and the forward side frame removed; and Fig. 3 is an enlarged view showing details thereof.

2 is the main frame of the machine; 6 is the supporting shaft or mandrel upon which the large roll of paper is placed, the web 1 whereof passes under a guide and feed roller 7 thence over a drum 3 and finally under the guide roller 8 to the winding mandrel 9, which latter may be frictionally driven or otherwise rotated in any of the usual ways in paper winding machinery.

The drum 3 is provided with a series of circumferential grooves 4 forming cutting edges coöperating with a corresponding

number of slitting disk cutters 11 and is also provided with a series of longitudinal grooves 5 which coöperate with the perforating blades 17.

The entire circumference of the drum 9 is provided with the series of the longitudinal grooves 5, said grooves being closely arranged in parallel relation so as to provide perforating grooves at practically every point throughout the circumference of the drum.

The slitting cutters 11 are carried upon a rotating shaft 10 which is geared to the drum shaft by gearing 12.

13 is a shaft journaled in the main frame and carrying at each end a head 14 in which are journaled a plurality of shafts 15, the ends of said shafts being provided with gears 16 which, under proper adjustment of the shaft 13, may be brought into engagement with a large gear 20 on the drum 3, whereby the shaft 15 and the drum may be caused to revolve with definite speeds. Each of the shafts 15 are provided with perforating blades 17 and as shown, these may be supported about the shaft in sets of two. Each web formed by the slitting cutter 11 will have two transverse perforations with each revolution of the shaft 15.

To prevent the transverse perforations coming into alinement with each other, which would weaken the web of paper passing over the drum before reaching the slitting cutters, 11, the cutters 17 of one set are arranged relative to the cutters of the adjacent sets so as to be out of alinement, as is clearly indicated in Fig. 1 and also in dotted lines in Fig. 2. These perforating blades 17 are sufficiently long to coöperate with the longitudinal grooves 5 of the drum, as shown in Figs. 2 and 3, to perforate the paper which is stretched over and traveling with the drum. This line of perforation would lie in the pitch line of the gears 16 and 20.

As more fully shown in Fig. 2, the plurality of shafts 15 are at different distances from the axis of the shaft 13 so as to enable the said shafts 15 to respectively have different axial distances from the axis of rotation of the drum 3 during their coöperation with the said drum. Whatever the distance may be between the axis of the respective shafts 15 and the drum 3 when said parts are in proper coöperative ad-

justment, the perforating blades must be longer or shorter to correspond and the gear on the end of said shaft must have proper diameter so as to be capable of properly meshing with the gear 20 on the drum. In this way the surface speed of the cutting edges of the perforating blades will always be caused to travel at the same surface speed as the surface of the drum 3 and thus insure proper perforation of the paper without putting any dragging effort upon it.

The heads 14 of the shaft 13 may be held in either of the four adjustments required to bring the several shafts 15 respectively into operative position with the drum, by having four screw holes 18 (Fig. 2) with which screws 19 carried on the main frame engage. Under any of such adjustments, the transverse perforations in the length of the web will always be at the same distance apart and will form sheets of the same lengths, but by the different adjustments, the lengths of the sheets of the web may be made longer or shorter in any complete roll.

In the particular adjustment shown in Fig. 2 the length of these sheets is the second in size from the smallest. If it is desired to make the largest sheet, then the screws 19 are removed and shaft 13 given a semi-revolution and the screws 19 reinserted. The operation of the machine will then, under such adjustment, produce sheets of greatly increased length, the difference in the length of the sheets being proportional to one-half the circumference of the gears 16 taken on the pitch line. It will be seen that, by the arrangement of the various shafts 15 in the supporting frame at different distances from the axis of the shaft 13, the gears 16 will be of different diameters to properly engage the gear 20 on the drum.

It will be understood that, owing to different points of contact of the several perforating blades of the different shafts 15 with the drum 3, it is necessary to provide the drum with a large number of longitudinal grooves and these must also be spaced to properly coöperate with the blades. To insure this proper coöperation, it is best that there be as many longitudinal grooves as there are teeth in the gear 20, as in Fig. 3; and it is also necessary that if the said grooves are in alinement with the teeth, that the cutting edges of the perforating blades shall come in alinement between two teeth of the gear 16 by which they are being revolved through the shafts 15 as indicated in Figs. 2 and 3. When this is done, any one of the sets of perforating blades may be brought into operation and will properly coöperate with the grooves in the drum. It is not necessary that there will be a longitudinal groove in alinement with each tooth of the gear 20, but prac-

tically it is more convenient to provide such construction, as it makes the adjustment more simple.

It will now be understood that, in the operation of the machine, the drum 3 is revolved in any suitable manner and carries with it the wide web of paper; and as the said paper is carried by the drum, between the guide roll 7 and the slitting cutters 11, it is perforated by the perforating blades 17. The plurality of perforated webs thus formed are then guided under the guide roller 8 and wound upon the mandrel 9 which may be frictionally driven as is customary in paper winding machines.

While I have shown my machine to form seven distinct narrow rolls of perforated paper at one time, it is to be understood that my invention is equally adapted to the making of one or more such rolls. If one roll only is to be made, then the slitting cutters 11 may be omitted.

While the simplest way of preferably rotating the perforating cutter shaft 15 is by the gears illustrated, it is evident that other modes may be employed for driving those shafts, if it is desired. Likewise, it is also evident that the adjustment of the shaft 10 and the heads thereof may be secured by other means than by the employment of screws 19.

While I have shown four perforating cutter shafts, it is evident that two or more of the such shafts and their cutters may be employed, but I prefer to embody capacity for making four distinct length sheets in the one machine. In case the machine is only required for perforating a single web, it is evident that only one set of the perforating cutters will be required on each shaft employed.

While I prefer the construction shown, I do not limit myself to the details thereof as these may be modified without departing from the spirit of the invention.

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

1. In a machine for making rolls of perforated paper, the combination of a drum over which the paper is guided provided with a large number of longitudinal grooves in its circumference, with means for perforating the paper comprising an adjustable frame, two independent rotatable shafts journaled in the adjustable frame, a gear on the end of each of said shafts and of different diameters, a gear coupled with the drum for driving either of the gears of the perforating shafts according to the adjustment of the adjustable frame, and perforating cutters carried upon each of the rotatable shafts and adapted to coöperate with the grooves in the drum, the perforating cutters of one rotatable shaft being

adapted to cooperate wholly or in part with different grooves of the drum than are cooperated with by the perforating cutters of the other rotating shaft.

5 2. In a machine for winding paper into rolls, the combination of means to produce transverse cuts partly across the paper web and repeated at intervals in the length of the web, and adjusting devices for the
10 means for producing the transverse cuts whereby the said cuts are caused to be made at separated places of greater or less distance apart.

15 3. In a machine for winding paper into rolls, the combination of means for producing a series of transverse cuts across the paper web and repeated at intervals in the length of the web and in which the adjacent cuts of each series are out of alinement,
20 means for slitting the paper web longitudinally in lines intermediate of the transverse cuts of each series, and means for adjusting the means for producing the transverse cuts whereby the said cuts are caused to be
25 made at separated places at greater or less distance apart.

4. In a machine for winding papers into rolls, the combination of a drum over which the paper is guided having a plurality of
30 longitudinal parallel grooves in its outer surface, with a plurality of independent perforating cutters each of which cooperates with the grooves of the drum and arranged to respectively perforate the web at greater
35 or less distances apart along the length of the web, and supporting means for the perforating cutters for bringing either one of the cutters into operative relation with the drum at one time.

40 5. In a machine for winding papers into rolls, the combination of a drum over which the paper is guided having a plurality of longitudinal parallel grooves in its outer surface, with a plurality of independent perforating cutters each of which cooperates
45 with the grooves of the drum and arranged to respectively perforate the web at greater or less distances apart along the length of the web and consisting of rotatable shafts
50 carrying radial perforating blades, the blades of the respective shafts being of relatively different radial lengths, and an adjustable support for said rotatable perforat-

ing blade shafts to bring either shaft into operative relation with respect to the drum. 55

6. In a machine for winding paper into rolls, the combination of a drum over which the paper is guided having a plurality of longitudinal parallel grooves in its outer surface, a rotatable frame, a plurality of
60 shafts journaled in the frame and respectively provided with perforating cutters of relatively different radial length, means for adjusting the rotary frame for bringing either one of the cutter shafts into operative
65 relation with the drum, and power devices for rotating the shafts when brought into operative relation with respect to the drum.

7. In a machine for winding paper into rolls, the combination of a drum over which
70 the paper is guided having a plurality of longitudinal parallel grooves in its outer surface, a rotatable frame, a plurality of shafts journaled in the frame and respectively provided with perforating cutters of
75 relatively different radial length, means for adjusting the rotary frame for bringing either one of the cutter shafts into operative relation with the drum, and power devices for rotating the shafts when brought
80 into operative relation with respect to the drum consisting of a large gear on the drum and spur gears of relatively different diameters upon the respective rotary shafts and each adapted to engage the large drum gear
85 when the shaft to which it is secured is brought into operative relation with the drum.

8. In a machine for winding paper into rolls, the combination of a rotating drum
90 having its circumference provided with longitudinal grooves, a plurality of perforating cutters each adapted to cooperate with different of the grooves of the drum so as to perforate the paper at greater or less dis-
95 tances apart in the length of the web, and adjusting devices for bringing either of the plurality of perforating cutters into cooperative relation with the drum at any one time. 100

In testimony of which invention, I hereunto set my hand.

HARRY LIEBECK.

Witnesses:

R. M. HUNTER,
R. M. KELLY.