F. MEISEL.

MACHINE FOR MAKING TOILET PAPER ROLLS.

APPLICATION FILED MAR. 30, 1911.

1,037,284. Patented Sept. 3, 1912.

4 SHEETS—SHEET 1.

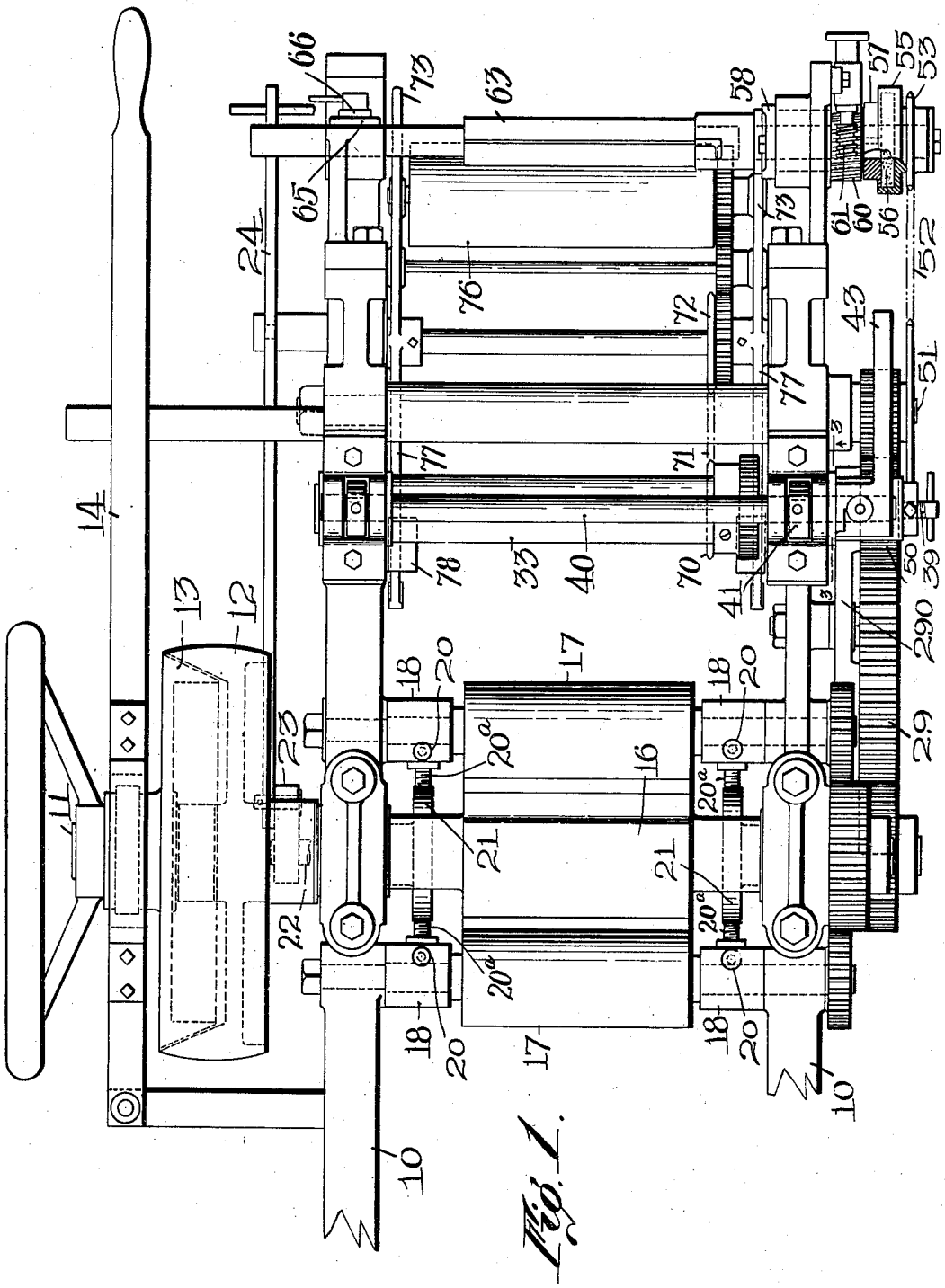

Fig. 1.

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M. E. Regan.

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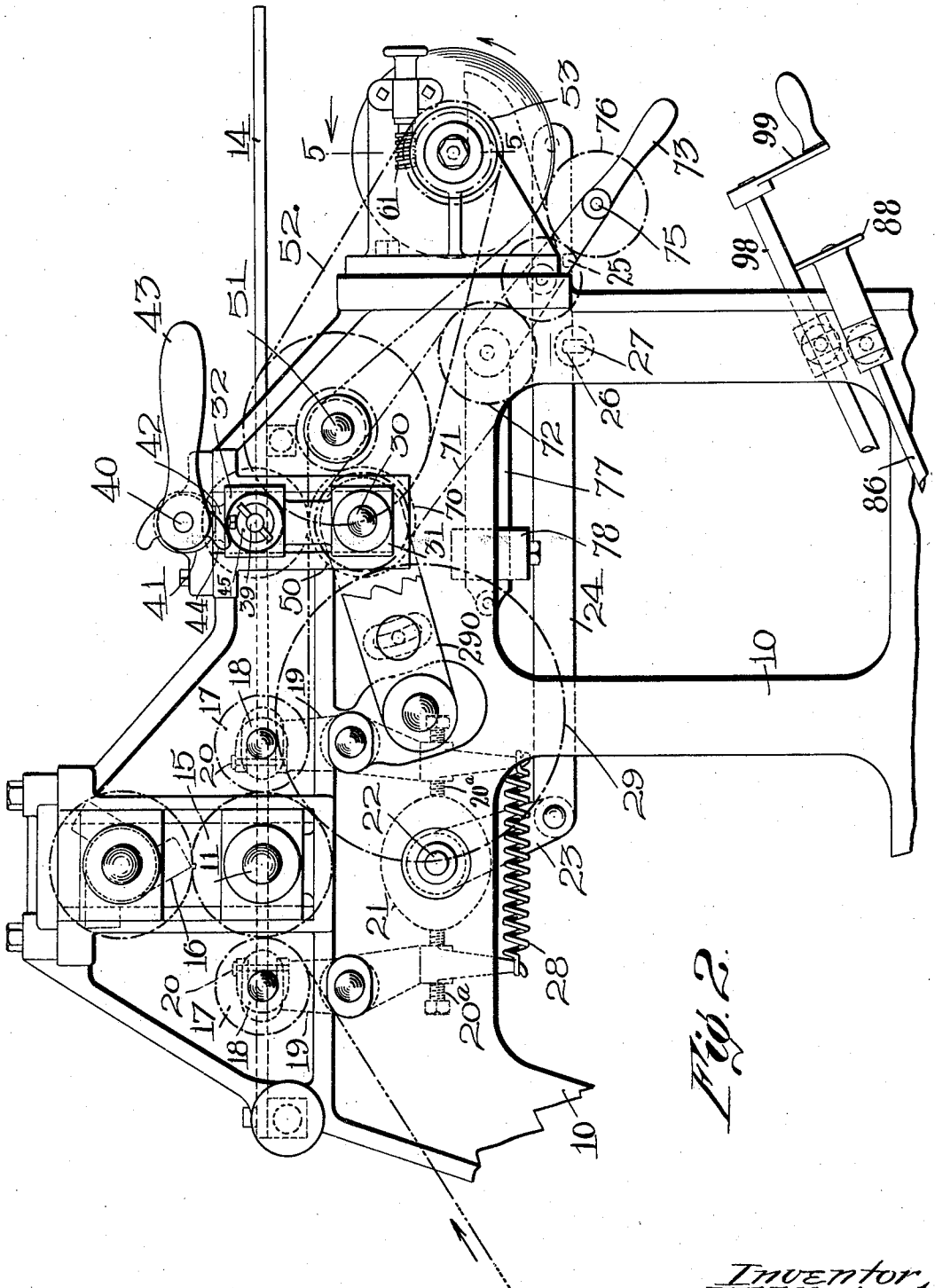

Fig. 2.

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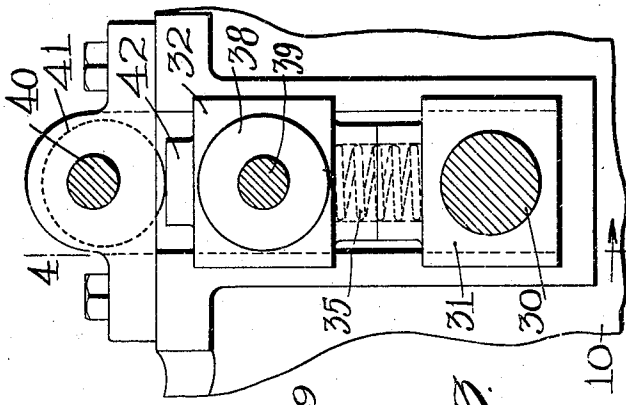


Fig. 3.

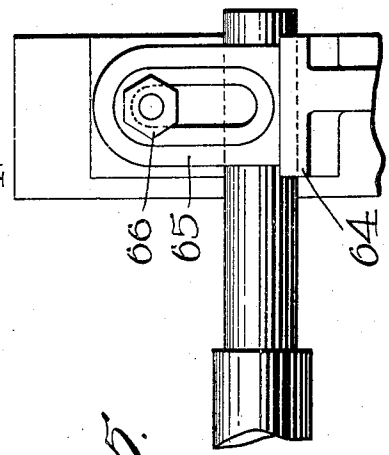


Fig. 5.

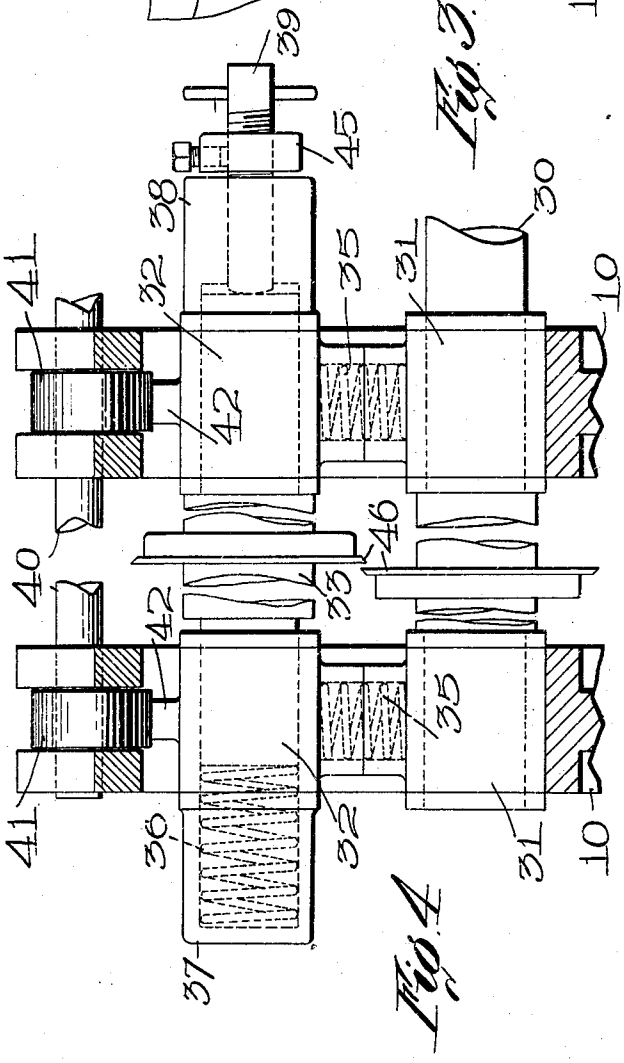
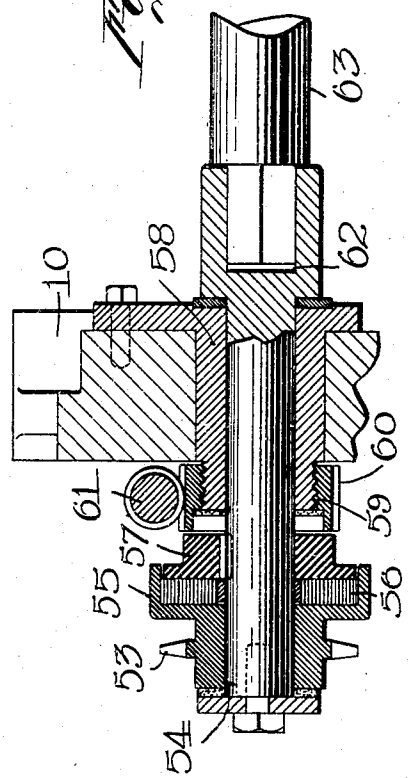


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 8.

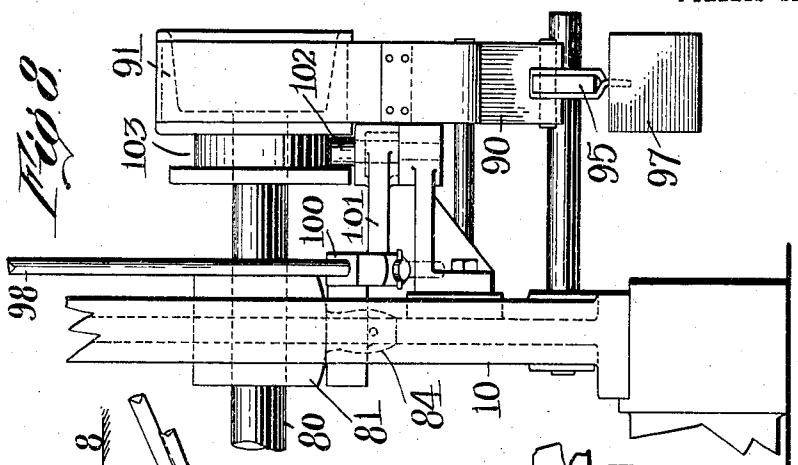


Fig. 6.

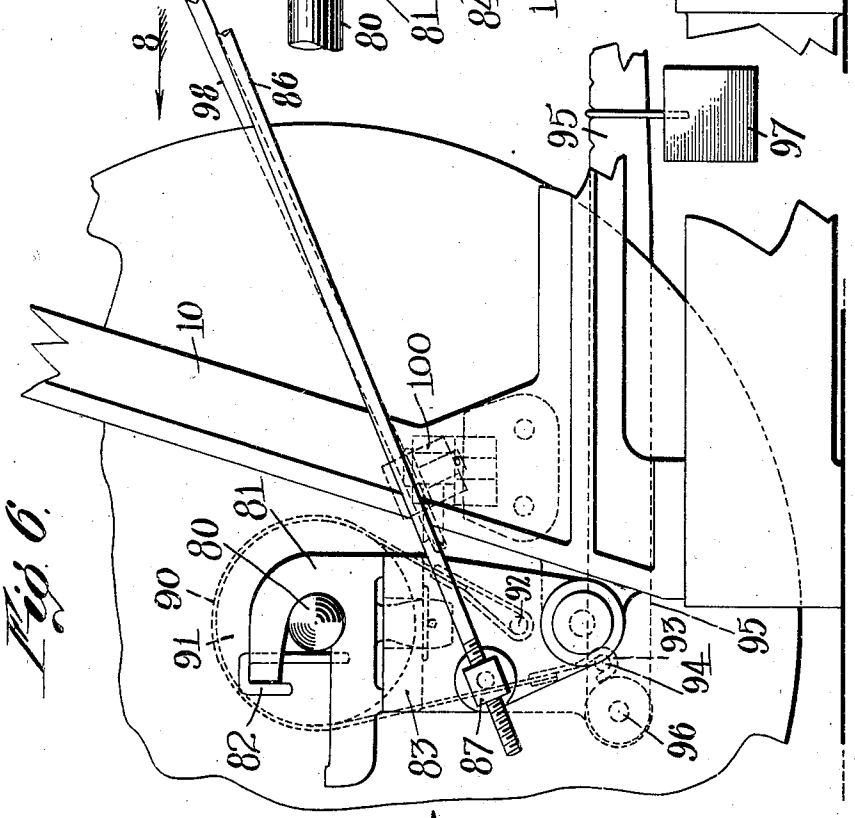
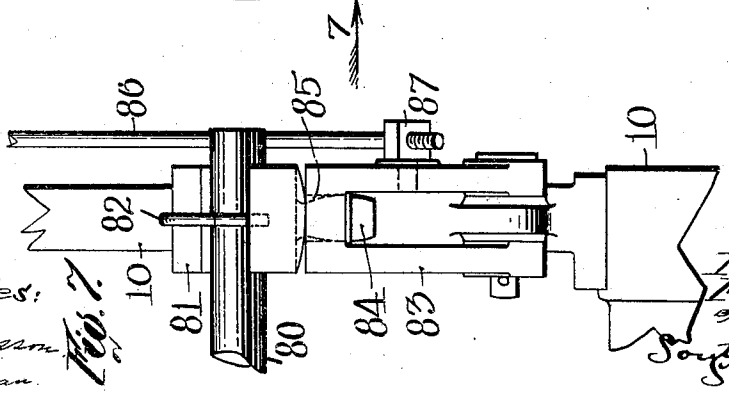


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANCIS MEISEL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO MEISEL PRESS & MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MACHINE FOR MAKING TOILET-PAPER ROLLS.

1,037,284. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed March 30, 1911. Serial No. 617,798.

To all whom it may concern:

Be it known that I, FRANCIS MEISEL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine for Making Toilet-Paper Rolls, of which the following is a specification.

This invention relates to a machine for cross-wise perforating, slitting, and rewinding the strips on one shaft to make toilet-paper rolls.

The principal objects of the invention are to provide a construction in which the mill roll bearings will readily adjust themselves to any position the shaft for the mill roll may assume and to provide for adjusting the mill roll so that the web will be drawn therefrom to the feed roll smoothly and without wrinkles; to provide improved means whereby a space is secured for passing the paper quickly through the machine and pulling the web taut and smooth so that when the machine starts the web will not be wrinkled; to provide for adjusting each bearing in which the pressure rolls are mounted independently on the machine; to provide for moving the two pressure rolls away from the lower perforating cylinder so as to secure room for entering the paper and to bring the same against the lower perforating cylinder instantly and with the same pressure; to provide a simple and convenient means for separating the slitting cutters and raising the top slitter shaft in combination with the means for throwing on or off the pressure rolls, and to provide an improved friction driving mechanism for winding loose or soft rolls and in combination with a surface winder for winding hard rolls so that the machine can be used for either purpose at will.

The invention also involves details of construction as will appear hereinafter.

Reference is to be had to the accompanying drawings in which—

Figure 1 is a plan of a machine constructed in accordance with this invention. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view on the line 3—3 of Fig. 1. Fig. 4 is a sectional view on the line 4—4 of Fig. 3. Fig. 5 is a sectional view on the line 5—5 of Fig. 2. Fig. 6 is a side elevation of the web roll stand therefor. Fig. 7 is a view of one end thereof, and Fig. 8 is a view of the opposite end.

The invention is shown as applied to a machine mounted on a frame 10 and having a driving shaft 11 provided with a driving pulley 12 adapted to be connected with the shaft by a friction clutch 13 of any desired character, operated by means of a lever 14 or the like. On this shaft is located the lower perforating cylinder 15 and the shaft is geared to the upper perforating cylinder 16 as will be understood. These elements constitute a perforating device and may be of any well known type.

At the sides of the lower perforating cylinder are located the pressure rolls 17. These are mounted in open-ended bearings 18 on four levers 19. These bearings are adapted to be closed by pins 20 which can be removed for the purpose of removing the pressure rolls. These levers are pivoted on studs on the machine. Each of these levers is provided with an adjusting screw 20^a and between each pair of adjusting screws is a cam 21, both mounted on an oscillatory shaft 22. This shaft is provided with an arm 23 which is adapted to be operated by a connection 24. This connection is provided with two slots 25 and 26 and there is a fixed stop 27 on the frame so that as the connection is moved back and forth it will be stopped in its two extreme positions. In the position shown in Fig. 2 this brings the cam 21 to a position in which it forces the lower arms of the levers 19 away from each other against the force of two springs 28. This causes the pressure rolls to press against the lower perforating cylinder. When the connection 24 is moved inwardly the cam is oscillated so as to allow the springs to pull the arms in and move the pressure rolls apart. In this way a space is opened up very quickly between each pressure roll and the lower perforating cylinder for arranging the web between the same. Thus the web can be inserted quickly and pulled taut and smooth so that the machine can start without wrinkles in the web. This is an important improvement over the usual type of machines in which the feed-rolls, can be only slowly adjusted up against the perforating cylinder, thus preventing any quick motion such as that indicated.

To allow the web to be readily passed be-

tween the slitting cutters mechanism shown in detail in Figs. 3 and 4 is provided. The shaft 11 through a gear 29 mounted on an adjustable arm 290 drives the lower slitter shaft 30, which has its bearings in blocks 31 mounted on the frame. Mounted to slide vertically in guides on the frame are blocks 32 which support the upper slitter shaft 33. These blocks 32 are supported from the blocks 31 by strong springs 35. The shaft 33 is normally pressed in one direction longitudinally by a spring 36 mounted in a casing 37 on the block 32 at one end. At the other side of the machine there is a support 38 for an adjusting screw 39. Obviously the adjusting screw can be forced inwardly against the force of the spring 36, to move the shaft 33 longitudinally as it bears on the end thereof. At the top of the frame on each side are bearings for a parallel shaft 40 on which are mounted two cams 41, each adapted to press on a projection 42 on one of the blocks 32. An arm 43 is mounted on this shaft for turning it. This arm has stops 44 for limiting its motion. A check nut 45 is set on the screw 39 in such position that when it comes into contact with the support 38 the slitting cutters 46 will be in proper position. The object of the spring and screw in the top boxes is to separate the cutters so that the cutters cannot be injured by raising and lowering the upper shaft.

In order to pass the web between the slitting cutters, each pair of cutters is separated by moving the upper shaft longitudinally by means of the screw 39. Then the top shaft with the slitting cutters is raised by turning the shaft 40 so as to permit the springs 35 to force the blocks 32 up. It will be seen therefore that the paper can be passed between the perforating cylinders and their pressure rolls and between the slitting cutters very rapidly without waiting for tedious adjustments and without introducing the liability of wrinkling it in getting it into the machine.

For rewinding the paper so that it can be rewound either in hard or soft rolls the following mechanism is provided. Driven from a gear 50 on the lower slitter shaft is a shaft 51 which by means of chain 52 constantly drives a sprocket wheel 53 mounted to loosely turn on a shaft 54. This sprocket wheel is provided with a cup-shaped projection 55 in which is a fiber disk or the like 56. Mounted to slide on the shaft 54 and keyed thereon so as to rotate it is a clutch member 57. The shaft 54 is journaled at its end in a member 58 fixed on the frame and provided with a screw-thread 59 on its outer end. On this thread is arranged a worm-wheel 60 and a worm 61 is mounted on the frame for operating it. When this is turned the wheel 60 will be screwed on or unscrewed. If turned so as to be unscrewed it will move the member 57 to the left in Fig. 5 and force the friction disk into frictional engagement with the cup so that the rotation of the sprocket wheel will cause the shaft to rotate with it. The shaft or stud 54 is provided with a socket 62 in its end in which fits the end of a shaft 63 so that the latter shaft will be turned with the shaft 54. At the other end this shaft is mounted in a bearing 64 and removably held therein by a guard piece 65 secured in position by a bolt 66 or the like.

The friction driving the rewinding shaft is one of the most important features on a machine manufacturing perforated toilet roll paper, because there is no strength left to speak of when the paper is perforated. This friction acts instantly when the machine is started, preventing slack of paper between the slitters and rewinding shaft; at the same time it slips so that the surface speed of the rewinding shaft may be greater than that of the paper.

In the above described construction loose soft rolls are wound, the comparative tightness of winding being regulated by the worm. I wish, however, to provide for winding hard rolls on the same machine and for that purpose a surface winder is shown driven by a sprocket-wheel 70, mounted on the lower slitting cutter shaft 30 and connected by a chain 71 with a sprocket-wheel 72 located on a stud on which stud are pivotally mounted levers 73, one of them having a handle. On one lever are gears driven from a gear on said stud, the last one mounted on a shaft 75 on which is located a cylinder 76 that is adapted to engage the roll on the rewinding shaft. Arms 77 rigidly connected with the arms 73 are provided with adjustable counter-weights 78 so that the cylinder 76 can be held up in position at any desired pressure.

The web roll shaft 80 is mounted in two bearings 81 having open ends and is held in position by removable pins 82. One of these bearings is mounted on a flat top surface on one side of the frame 10 and the other is mounted on a similar surface on top of an oscillatable casting 83 on the other side of this frame. The bearing members 81 are held in position on these surfaces by vertical bell-shaped extensions 84 located in open topped conical or cylindrical openings 85 in the surfaces on which the bearings rest. The casting 83 can be moved toward or from the frame by means of a rod 86 threaded through a nut 87 on the casting. The rod is provided with a hand wheel 88 for rotating it and thus adjusting this end of the web roll shaft. By this means the bearings can adjust themselves to any posi-

tion the shaft may assume and it is a simple matter to adjust the mill rolls so that the web will be drawn to the feed rolls smoothly and without wrinkles. The friction is shown as secured by a band 90 passing over a friction wheel 91 on the mill roll shaft, one end of the band being secured to the frame by a pin 92 and the other having a hook 93 in which rests a pin 94 on a lever 95. This lever is pivoted at 96 on the frame and is provided with an adjustable counter-weight 97 for adjusting the tension.

For the purpose of moving the web roll shaft longitudinally to adjust it to proper relation to the perforating device, a rod 98 is shown provided with a crank 99 for operating it and screw-threaded into a nut 100 on the end of a bell-crank 101 which has a roll 102 extending into a groove 103 in the end of the wheel 91. The operation will be obvious. In this way it will be seen that the above mentioned difficulties are guarded against and a practicable and efficient machine is secured for cross-wise perforating, slitting, and rewinding the web in either loose or hard rolls.

While I have illustrated and described a preferred embodiment of the invention, I am aware that many modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details of construction herein shown and described, but

What I do claim is:—

1. In a perforating machine, the combination with a perforating mechanism comprising a cylinder, of pressure rolls for engaging opposite sides of said cylinder, and a yielding device for instantly throwing both pressure rolls away from said cylinder and yieldingly holding them in that position, whereby the web can be quickly introduced and adjusted.

2. In a perforating machine, the combination with a pair of cross-wise perforating cylinders, over one of which the web is adapted to pass, of a pressure roll for engaging the same, positive means for holding the pressure roll against the perforating cylinder, said means being constructed and adapted to be readily moved to inoperative position to permit the pressure roll to move away from the perforating cylinder, and yielding means for moving the pressure roll away from the cylinder.

3. In a perforating machine, the combination with perforating mechanism comprising a cylinder, of a pair of pressure rolls for engaging said cylinder and holding the web thereon, two sets of pivoted arms for supporting said pressure rolls, and cams adapted to be turned to two positions in one of which they move said levers to hold the rolls in contact with the cylinder, and in the other of which they permit the rolls to move away from the cylinder.

4. In a perforating machine, the combination with a perforating cylinder, of a pressure roll for holding the paper thereon, a pair of levers on which said pressure roll is mounted, a cam for operating each lever, and adjustable means on each lever for engaging the cam.

5. In a perforating machine, the combination with a perforating cylinder, of a pressure roll for holding the paper thereon, a pair of levers on which said pressure roll is mounted, a cam for operating each lever, adjustable means on each lever for engaging the cam, and a spring connected with each lever and operating in opposition to the cam for forcing the pressure roll away from the cylinder.

6. In a perforating and slitting machine, the combination of a perforating device comprising a lower cylinder, a pair of pressure rolls adapted to engage opposite sides of said cylinder to hold the paper thereon, a pair of levers for supporting each of said pressure rolls, each lever having an open sided bearing for the ends of the pressure roll, a screw on each lever, said screws at the same end of the rolls projecting toward each other, a cam located between each pair of levers and adapted to be turned on its axis to two positions in one of which it engages the screws and forces them apart to force the rolls against the cylinder, and in the other of which it permits the screws to move toward each other, and a pair of springs each connected with two opposite levers for keeping said screws in engagement with the cam and moving the pressure rolls away from the cylinder when the cams are turned to the latter position.

7. In a perforating and slitting machine, the combination with a perforating device comprising a cylinder, pressure rolls for keeping the paper on the cylinder, of means for simultaneously throwing both rolls toward the cylinder or away from it, whereby the web can be introduced readily into the perforating mechanism.

8. In a slitting machine, the combination of a slitting cutter shaft, a pair of bearings located with their axes parallel thereto, a second slitting cutter shaft supported by said bearings, a pair of springs bearing on said bearings for normally yieldingly separating them from the first named shaft, a third shaft mounted parallel with the other two shafts and beyond the second one, and cams on the third shaft for positively and simultaneously moving the second set of bearings and shaft toward the first named shaft in oppositio nto the springs.

9. In a slitting machine, the combination of a slitting cutter shaft, a second pair of

bearings movably supported by said springs, a second slitting cutter shaft supported by the second set of bearings, a shaft, and cams on said shaft for positively moving the second set of bearings toward the first named bearings in opposition to the springs.

10. In a slitting machine, the combination of a frame, fixed bearings thereon, a slitting cutter shaft mounted in said bearings, springs supported by said bearings, a second pair of bearings movably supported by said springs, a second slitting cutter shaft supported by the second set of bearings, a shaft, cams on said shaft for positively moving the second set of bearings toward the first named bearings in opposition to the springs, a spring for longitudinally moving the second shaft, and a screw for controlling said longitudinal motion and moving the second shaft in opposition to the spring.

11. In a slitting and rewinding machine, the combination with adjustable slitting cutters, of a rewinding shaft, means for directing a web from the slitting cutters to the rewinding shaft, a driving shaft, a rotatable member connected with the driving shaft and concentric with the rewinding shaft, a pair of friction elements, one connected with the rotary member, and one rotatable with the rewinding shaft but slidable axially with respect thereto, friction material between said elements, and means for moving the slidable element longitudinally.

12. In a rewinding machine, the combination with a rewinding shaft and a driving shaft, of a rotatable member connected with the driving shaft and concentric with the rewinding shaft, a pair of friction elements, one connected with the rotatable member, and one rotatable with the rewinding shaft but slidable axially with respect thereto, friction material between said elements, a fixed support having a screw thread, an internally screw-threaded worm-wheel mounted on said screw thread and in position to engage said member, and a worm-wheel meshing with the said worm for turning it and screwing it on or off the screw-thread to cause said friction elements to rotate together or to stop the rewinding shaft.

13. In a rewinding machine, the combination with a shaft, of a rotatable member connected therewith, a pair of friction elements having friction material between them, a fixed support having a screw-thread, an internally screw-threaded worm wheel mounted on the screw thread in position to engage one of said friction elements, and a worm meshing with said worm wheel for turning it on or off the screw-thread to cause said friction elements to engage each other or separate.

14. In a slitting and rewinding machine, the combination with slitting cutters, of a rewinding shaft adapted to wind up the web from said cutters, a main shaft, frictional means connected with the main shaft for operating the rewinding shaft, a counterweighted lever, a roller on the counterweighted lever in position to engage a roll of paper on the rewinding shaft, and means connected with the main shaft for positively driving said roller.

15. In a machine of the character described, the combination with a frame and slitting and rewinding means thereon, of a pair of bearings, rigid means on the frame for supporting one of said bearings, and movable means on the frame for supporting the other, said bearings being adapted to carry a mill-roll shaft, and means on said frame below the slitting device for adjusting said movable means.

16. In a machine of the character described, the combination of a frame, a fixed member on one side, and a movable member on the other, a pair of bearings for a mill-roll shaft mounted on the fixed and movable member respectively, and means for adjusting the movable member toward and from the frame to keep the mill-roll in central position.

17. In a device of the character described, the combination of a frame, a pivoted member located on one side thereof, a pair of bearings for a mill-roll shaft, one located on the pivotal member and the other on a fixed part of the frame, each of said bearings having means whereby it can turn on an axis transverse to the mill-roll shaft, and means for adjusting said pivoted member transverse to the mill-roll shaft.

18. In a device of the character described, the combination of a fixed member, and a pivoted member, each having an opening in the top thereof, a pair of bearings for the opposite ends of a mill-roll shaft each having a ball-shaped extension entering one of said openings, and means for adjusting the pivoted member whereby the angular position of the mill roll shaft can be varied.

19. In a device of the character described, the combination of a support having an opening in the top thereof, a bearing member for a mill-roll shaft having a projection entering said opening, said bearing member being adapted to rest on the top of said support, whereby the mill roll shaft can be swung about said projection as a center.

20. In a machine of the character described, the combination of a frame, a fixed member on one side, and a movable member on the other, a pair of bearings for a mill-roll shaft mounted on the fixed and movable member respectively, and means for adjusting the movable member toward and from the frame to keep the mill-roll in central position comprising a screw threaded rod connected therewith.

21. In a device of the character described,

the combination with bearings for a mill-roll shaft, of a friction wheel and band for said shaft, said friction wheel having a groove, a bell-crank having a roll extending into said groove and provided with a screw thread on its other arm, and a screw-threaded rod entering said screw threaded arm for adjusting the position of said friction wheel.

22. In a device of the character described, the combination with bearings for a mill roll shaft, of a friction wheel, a band for said shaft, said friction wheel having a groove, a bell-crank having a roll on one arm extending into said groove, and means for adjusting the other arm on the bell-crank to move said roll and friction wheel.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

FRANCIS MEISEL.

Witnesses:
HERBERT A. RHOADES,
CHARLES D. M. BISHOP.