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PATENTED MAR. 28, 1905.

R. B. FRIEND.
PAPER FOLDING AND PACKAGING MACHINE.

APPLICATION FILED JAN. 6, 1904.

2 SHEETS—SHEET 1.

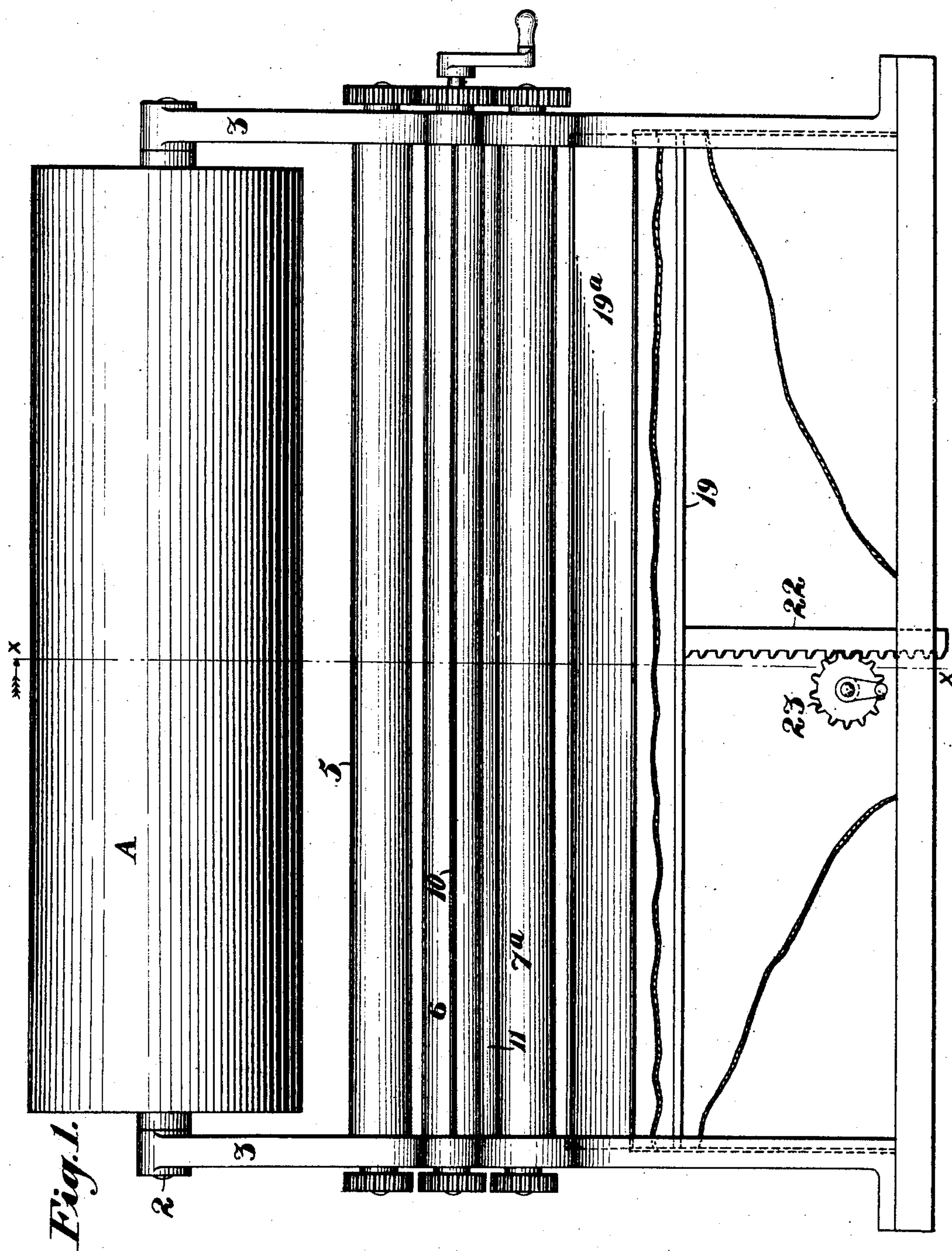


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

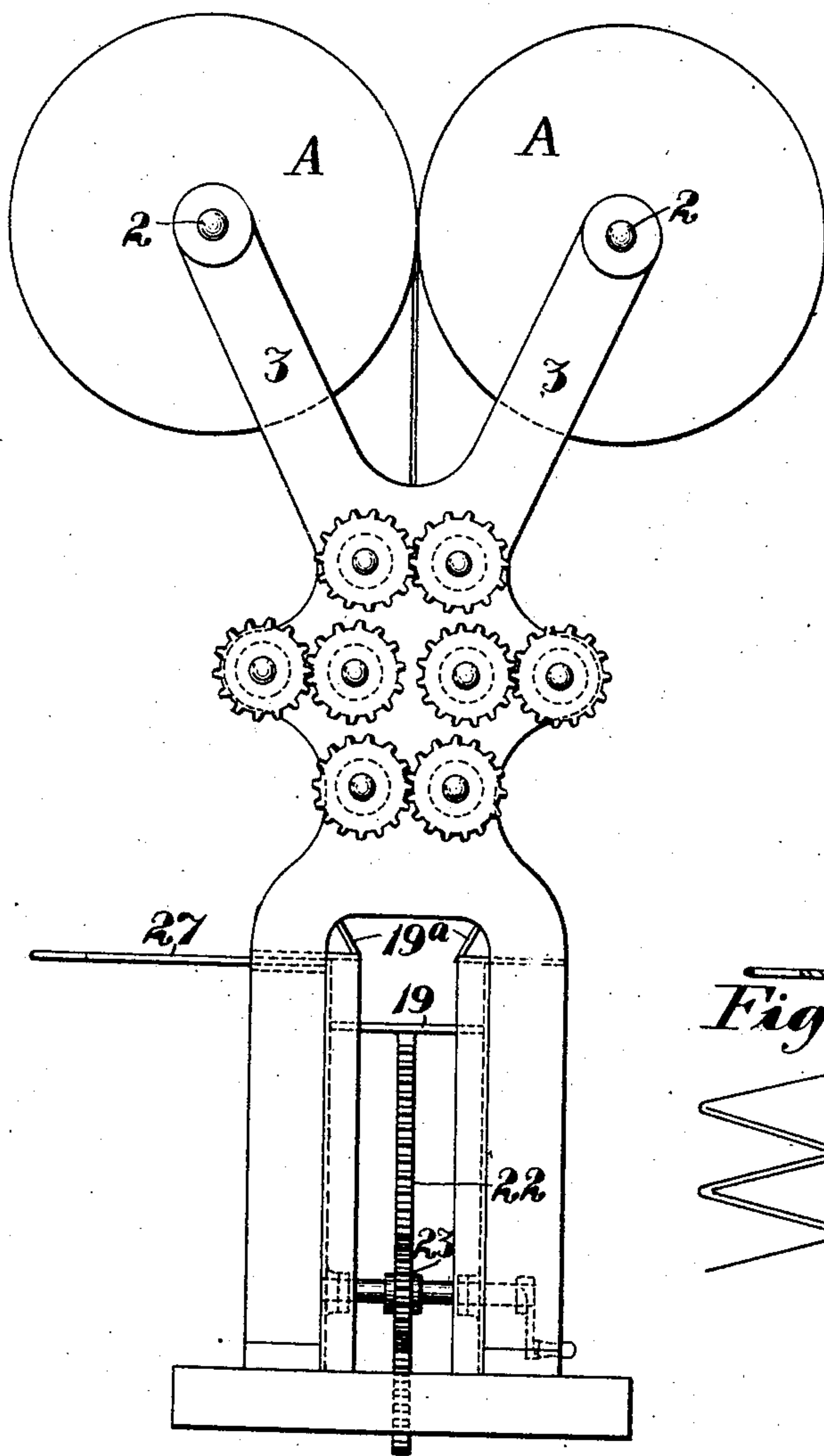


Fig. 3.

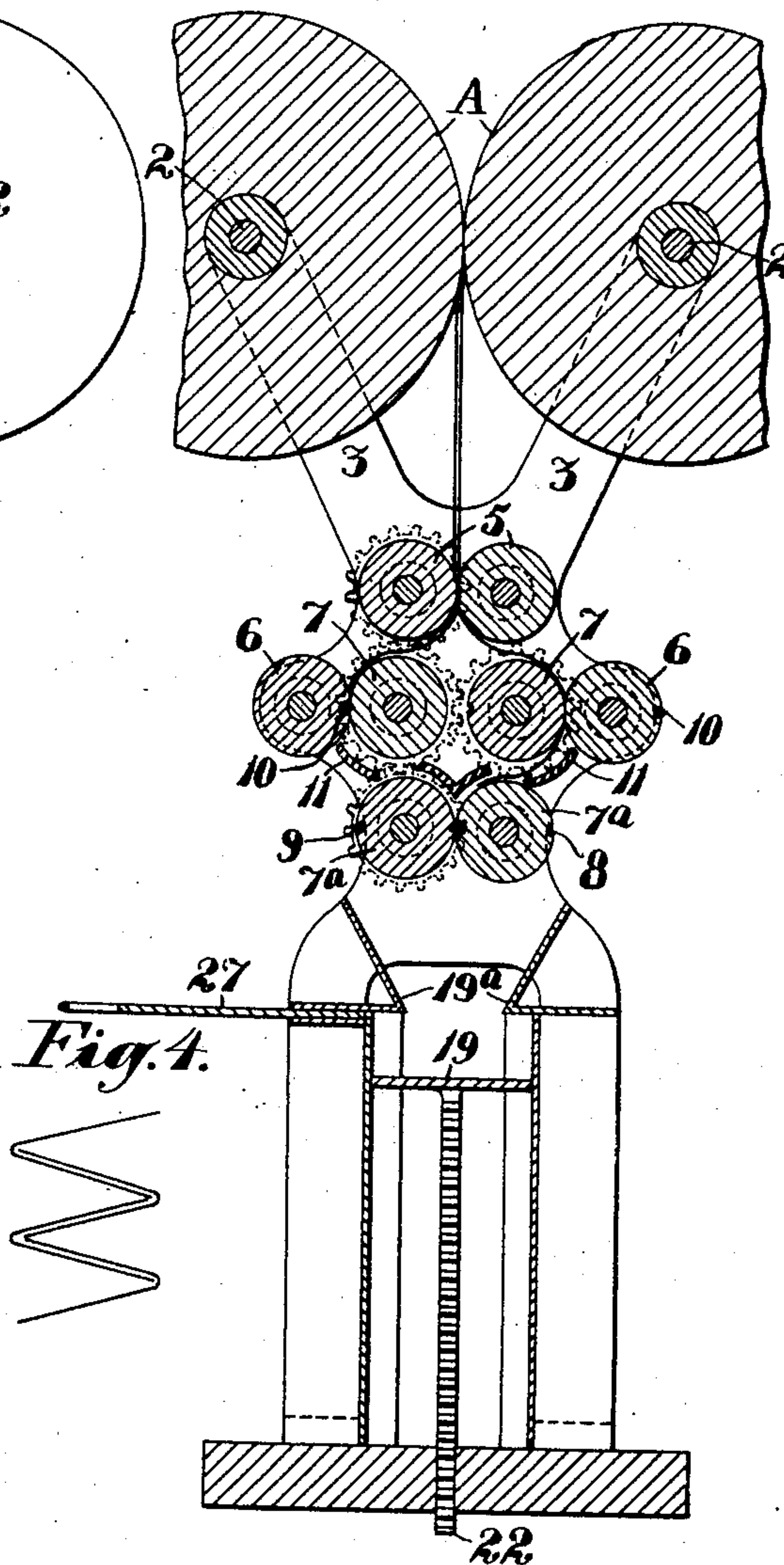
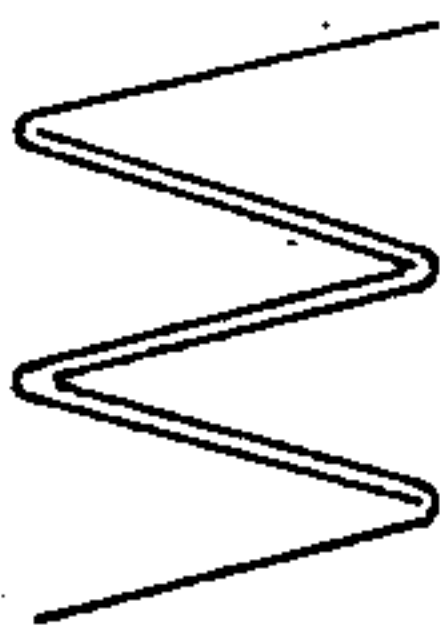


Fig. 4.



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ROGER B. FRIEND, OF OAKLAND, CALIFORNIA.

PAPER FOLDING AND PACKAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,021, dated March 28, 1905.

Application filed January 6, 1904. Serial No. 187,914.

To all whom it may concern:

Be it known that I, ROGER B. FRIEND, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Paper Folding and Packaging Machines, of which the following is a specification.

My invention relates to an apparatus for folding and packaging paper; and it is particularly adapted for toilet and cigarette papers.

It consists of combinations of mechanism by which a continuous web of paper is cut into length, said lengths folded intermediate of their ends, and the folded sheets interlocked and formed into packages.

My invention also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of my machine. Fig. 2 is an end elevation. Fig. 3 is a vertical section through *xx*. Fig. 4 shows the interlocking sheets.

It is the object of my invention to provide an apparatus by which paper may be cut into regular sizes and afterward folded into packages, in which each sheet is folded in the middle and the sheets interlock with each other from opposite sides, so that when one sheet is withdrawn from the package it rises and presents the edge of the next sheet in readiness for withdrawal. Such packages are usually employed for toilet or cigarette paper, which is cut into even sizes and is afterward placed in holders, from which it may be withdrawn, as above described.

In my present apparatus, A represents rolls containing webs of the paper to be folded and packaged. These webs may be of any suitable or desired length, and the paper can be cut, after leaving the rolls, into such widths or lengths as may be desired by suitable cutting devices. These rolls have shafts, as at 2, journaled in standards or supports, as at 3, and easily revoluble. The sheets from these rolls are delivered toward the inside, the rolls being revoluble toward each other,

so that two sheets pass down close together between two rollers 5, which may be revolved toward each other by a suitable application of power, and the surfaces of the rollers are such that they press upon the paper sufficiently to draw it from the rolls A and constantly deliver it downwardly between the rolls 5. Beneath the rollers 5 are rollers 6 and 7, journaled, as here shown, in a substantially horizontal plane. The paper after leaving the rollers 5 passes over and above the roller 7, thence passes between these rollers and the exterior rollers 6, which are contiguous to them. The pairs of rollers 6 and 7 are driven by suitable gearing, as plainly shown in Fig. 2. These rollers have upon them the cutting knives 10, extending from end to end, and the revolution of the rollers 6 and 7 toward each other will cut the sheets of paper as they pass between the rollers. Beneath the rollers 6 and 7 are rollers 7^a; the inner peripheries of which are contiguous.

11 represents guides by which the paper as it is delivered from the rollers 6 and 7 is delivered between the rollers 7^a. The rollers 7^a have upon them creasing devices, as at 9. These creasing devices are preferably in the form of projecting wedge-shaped edges, and these coincide with corresponding grooves or channels 8, located upon opposite sides of the rollers.

The operation of the apparatus will then be as follows: The gearing at one end of the frame is so intermeshed that the trains of gears will be moved to feed the paper properly first between the rollers 5, thence the two webs being separated pass, respectively, between the pairs of rollers 6 and 7, and each of these pairs of rollers having a knife or cutter, as at 10, will cut the respective webs of paper as they pass. The disposition of the cutting knives of these rollers is such that one sheet will be cut so that its end will substantially coincide with the center of the sheet arriving from the opposite side, and these sheets being directed by the guides 11 are brought together and pass between the rollers 7^a. The creasing-knives are so disposed that each sheet of paper as it arrives will be folded across the

center by one of the creasing-knives, and as the lengths of paper arrive in the overlapping position above described it will be seen that the crease of one sheet will correspond with the edge of the next succeeding sheet. The sheets passing from the rollers 7^a then fall upon the inclined convergent surfaces or walls 19^a and upon the packaging floor or platform 19 in such a manner that they interlock and fold by gravitation without the use of intermediate folding devices.

27 is a slide which serves as a presser-plate and which is movable transverse with relation to the platform 19, and its object is as follows: The platform 19 being located at a sufficient distance below the guides 19^a, the sheets will fall in their interlocked position upon the platform until a certain number have thus loosely accumulated. The slide may then be moved across above the platform and the paper which is accumulated thereon can then be compressed by the upward movement of the standard 22, which forms the support for the platform. This standard may be operated in any suitable manner. In the present case I have shown it in the form of a rack which is engaged by a gear or pinion 23 and which may be operated by any suitable crank or connecting device to raise or depress the platform 19. Thus the platform 19 being depressed to a certain point the paper falling loosely thereon will accumulate in its interlocked condition until it is necessary to advance the slide 27. Then by moving the standard 22 up the paper will be compressed together by pressing against the bottom of the slide, and after this the platform may be again depressed and the slide withdrawn and an additional number of sheets piled upon those previously in place until the platform has been depressed so as to admit of as many sheets as it may be desired to form into a package or a part of a package.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An apparatus for folding and packaging paper consisting of a source of supply, feed-rollers between which the paper is drawn and by which it is delivered, creasing and cutting rollers between which the sheets pass, guide-channels into which the sheets are alternately delivered and means by which said sheets are delivered upon a surface and alternately folded and interlocked with each other.

2. An apparatus for folding and packaging paper, said apparatus consisting of a source of supply, feed-rollers between which the paper is delivered, other rolls located below the feed-rollers and from which the paper is directed between said second rollers, cutters carried upon said rollers whereby the sheets are cut preparatory to folding and creasing, devices by which the sheets are folded at substantially equal distances from the ends.

3. A paper folding and packaging apparatus consisting of a source of supply, feed-rollers by which the paper is delivered from said source, rollers located below the feed-rollers and from which the paper is delivered between said rollers, cutters carried by the rollers whereby the paper is secured transversely at substantially equal distances from the ends, guides located below the cutting-rollers and rollers with creasing devices between which the sheets are alternately delivered, folded and interlocked.

4. In an apparatus for folding and packaging paper, a source of supply, feed-rollers by which the paper is taken from said source, cutting and folding rollers and guides by which the paper is delivered from said cutting to the folding rollers, guides located below the folding-rollers and convergent downwardly therefrom, and an adjustable receiving-platform and adjusting means below the guides.

5. A paper folding and packaging apparatus consisting of a supply means, rollers between which the paper is delivered therefrom, said rollers having cutting and folding devices whereby the paper is successively severed into lengths and folded, guide-channels into which the sheets are alternately delivered from the folding-rollers and alternately laid across the packaging-floor from opposite sides and folded and interlocked to form a package.

6. In a device for folding and packaging paper, feeding, cutting and folding means, direction-chutes by which the paper is delivered from the cutting to the folding rollers, with the ends of each sheet registering with the fold of an adjacent opposed sheet, guides by which the folded and interlocked sheets are deposited with the folds upon opposite sides of a packaging-floor, and the sheets interlocked from opposite sides to form a package.

7. An apparatus for folding and packaging paper consisting of feeding, cutting and folding rollers, guides and interlocking means by which the folded and interlocked sheets are delivered, a floor upon which said folding and interlocked sheets are received, and a vertically-movable standard supporting the floor, said standard being gradually depressed in unison with the formation of the package upon the floor.

8. In a paper folding and packaging apparatus, feeding, cutting and creasing means, devices by which the sheets are alternately folded and interlocked upon a packaging-floor, a toothed vertically-guided rack upon which said floor is carried, a pinion engaging and revolving with the depression of the rack and floor in unison with the increase of the package upon said floor, and a crank or means for returning the rack and floor to normal position after the package has been completed and removed.

9. In a paper folding and packaging appa-

ratus, feeding, cutting and creasing devices
and means by which the sheets are folded and
interlocked upon a receiving-floor, said floor
being depressed as the package increases
5 thereon; and a supplemental presser-plate
against which the package may be compressed
during its formation.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

ROGER B. FRIEND.

Witnesses:

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JESSIE C. BRODIE.