W. T. LAZAR.

PAPER INTERFOLDING MACHINE.

APPLICATION FILED AUG. 3, 1920.

1,372,173.

Patented Mar. 22, 1921.

4 SHEETS—SHEET 1.

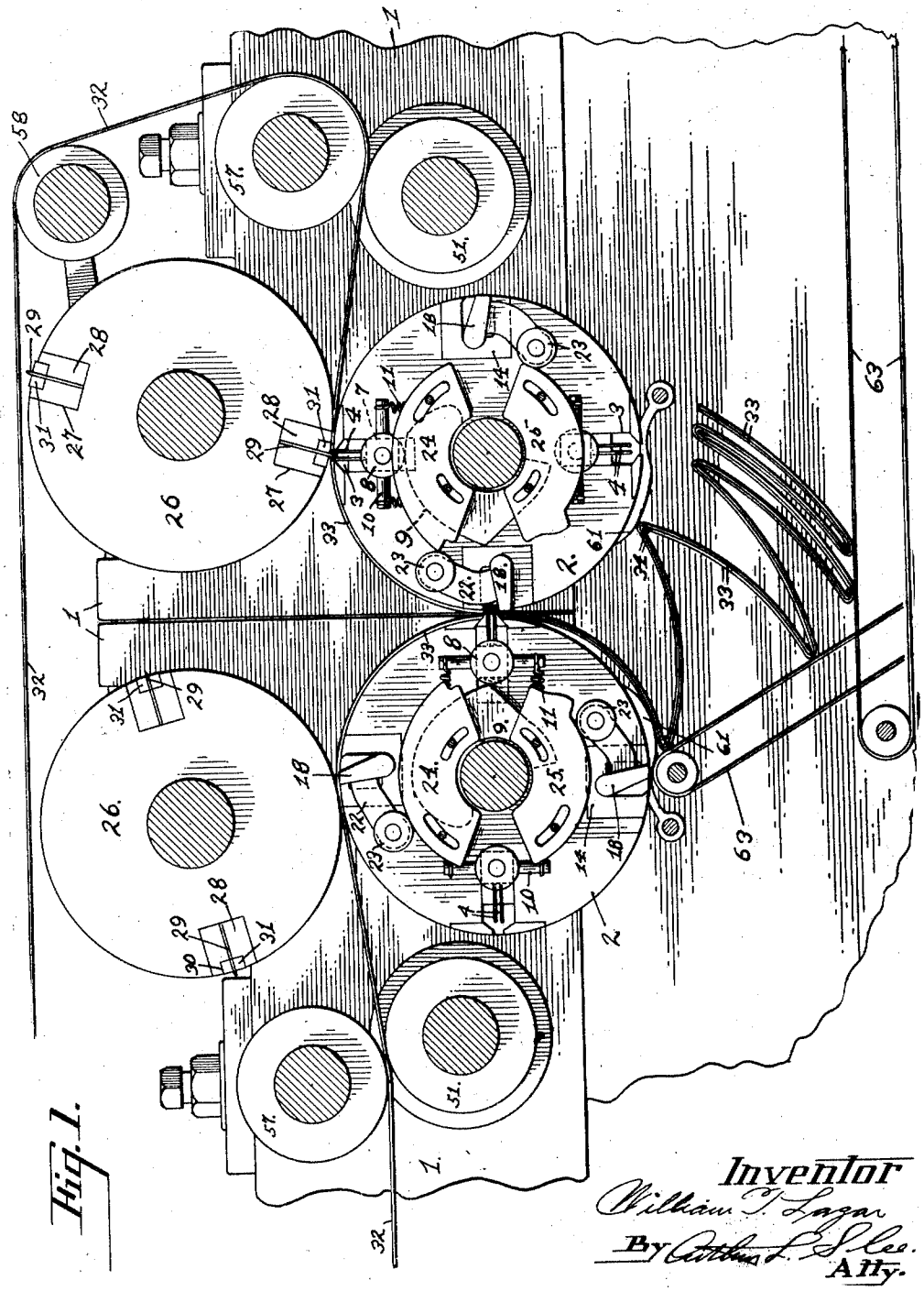


Fig. 1.

Inventor
William T. Lazar
By Arthur L. Lee.
Atty.

W. T. LAZAR.

PAPER INTERFOLDING MACHINE.

APPLICATION FILED AUG 3, 1920.

1,372,173.

Patented Mar. 22, 1921.

4 SHEETS—SHEET 2.

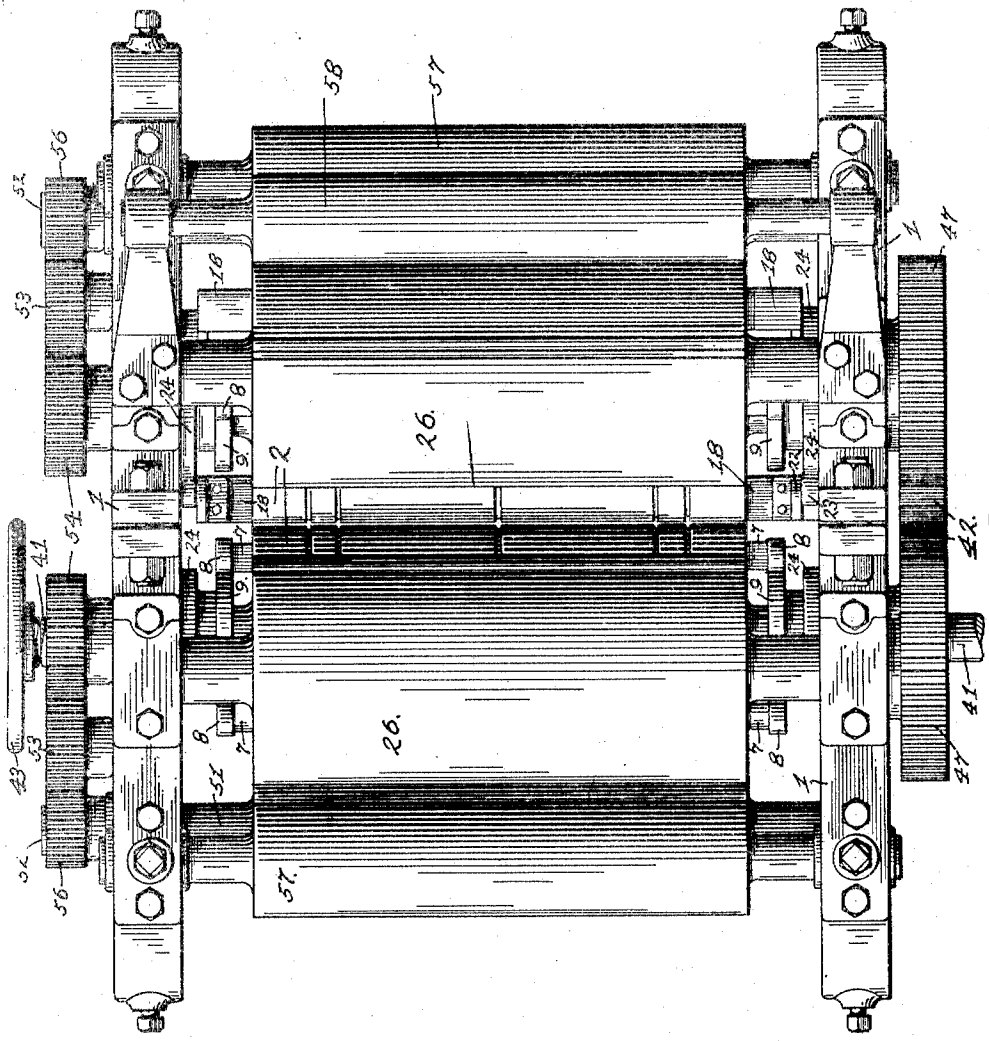


Fig. 2.

Inventor
William T. Lazar
By Arthur L. Sale.
Atty.

W. T. LAZAR.

PAPER INTERFOLDING MACHINE.

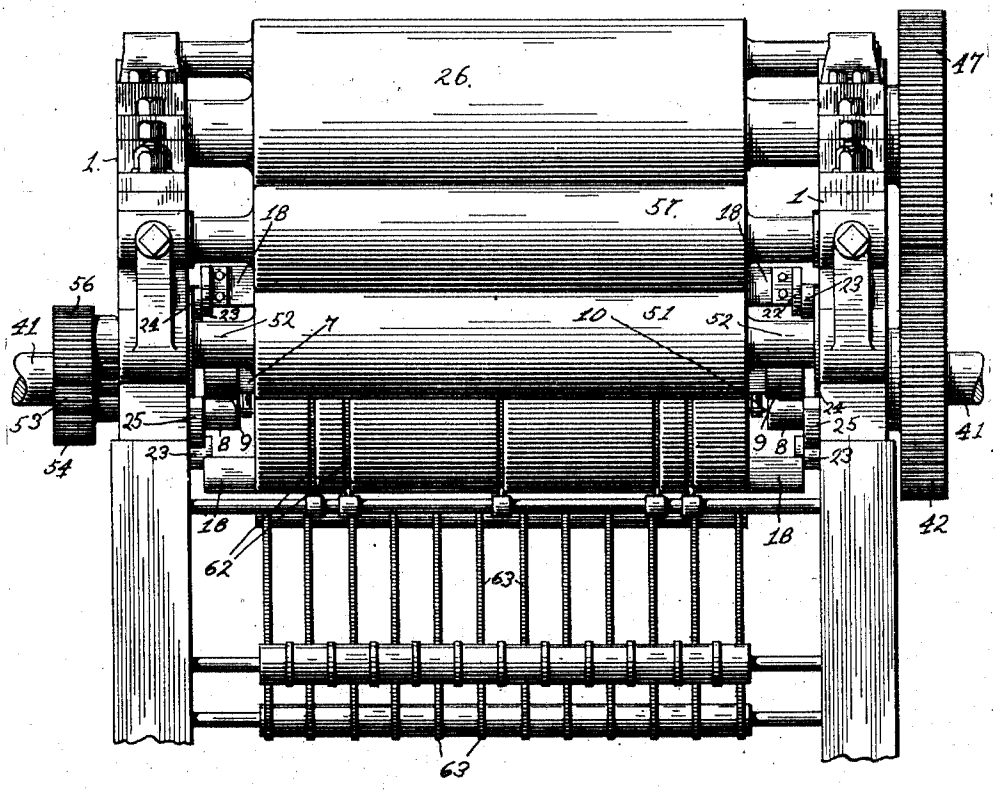
APPLICATION FILED AUG. 3, 1920.

1,372,173.

Patented Mar. 22, 1921.

4 SHEETS—SHEET 3.

Fig. 3.



Inventor
William T. Lazar
By Curtiss L. Sloe
Atty.

W. T. LAZAR.

PAPER INTERFOLDING MACHINE.

APPLICATION FILED AUG. 3, 1920.

1,372,173.

Patented Mar. 22, 1921.

4 SHEETS—SHEET 4.

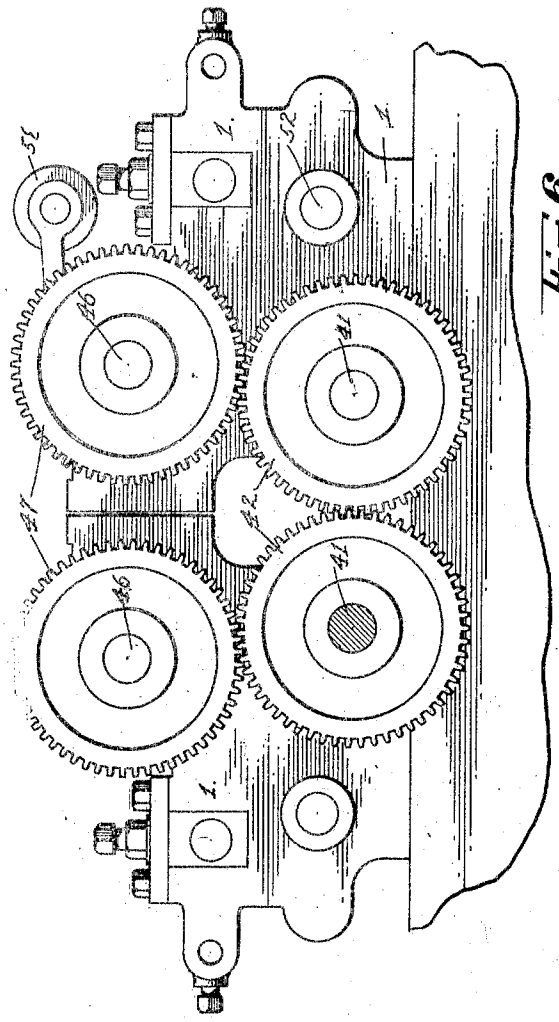


Fig. 4.

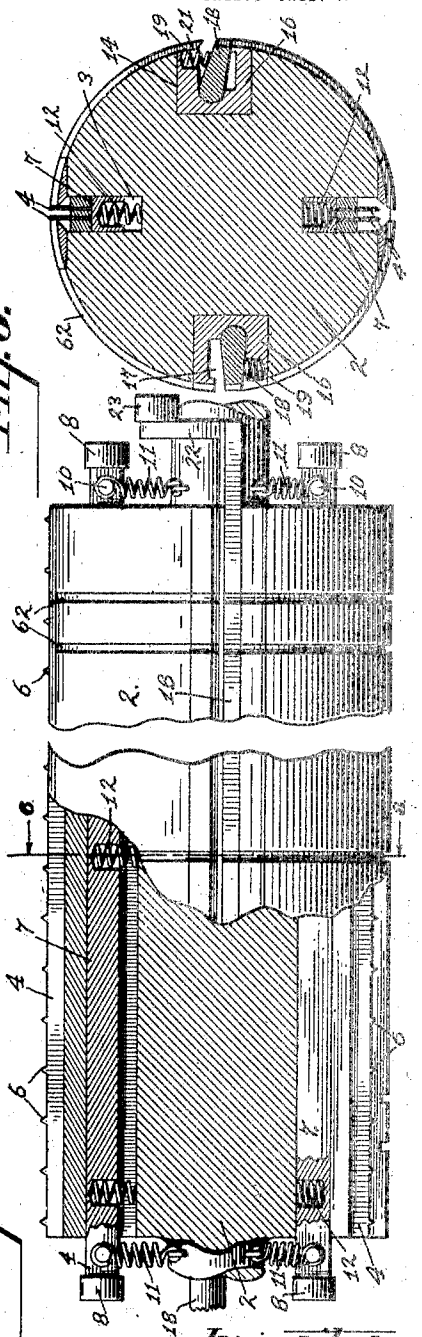


Fig. 5.

Fig. 6.

Inventor

William T. Lazar

By Cattlin & Slee

Atty.

UNITED STATES PATENT OFFICE.

WILLIAM T. LAZAR, OF APPLETON, WISCONSIN.

PAPER-INTERFOLDING MACHINE.

1,372,173. Specification of Letters Patent. Patented Mar. 22, 1921.

Application filed August 3, 1920. Serial No. 401,062.

To all whom it may concern:

Be it known that I, WILLIAM T. LAZAR, a citizen of the United States, residing in the city of Appleton, in the county of Outagamie and State of Wisconsin, have invented a new and useful Improvement in Paper-Interfolding Machines, of which the following is a specification.

My invention relates to improvements in paper interfolding machines wherein a plurality of rollers operate in conjunction with novel cutting, securing and folding means to cut sheets from a plurality of paper webs and deliver said sheets in interfolded relation, and the objects of my invention are:

First, to provide an improved machine of the character described adapted to interfold sheets of paper severed from a plurality of webs.

Second, to provide improved means for severing sheets of paper from a continuous roll, and engaging the severed ends.

Third, to provide a machine of the character described having a reduced number of elements, thereby obtaining a device of more simple construction and operation.

I accomplish these and other objects which appear hereinafter by means of the novel device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout said specification and drawings and in which:

Figure 1 is a side elevation of my improved paper interfolding machine, the housing being removed to disclose the operating elements.

Fig. 2 is a plan view of my invention.

Fig. 3 is a rear elevation of device disclosed in Fig. 2.

Fig. 4 is a side elevation of the machine disclosed in Figs. 2 and 3.

Fig. 5 is a broken side elevation partly in section of a folder roll.

Fig. 6 is a cross sectional view taken along the line 6—6 of Fig. 5.

Referring to the drawings the numeral 1 is used to designate in general a suitable housing provided with bearings to receive a pair of cylindrical folder rolls 2, each provided with a pair of diametrically opposed folder blade slots 3 longitudinally disposed in the surface thereof, said folder rolls 2 being rotatably mounted in horizontal proximate relation. Parallel folder blades 4 having piercing points 6 formed upon the outer edge thereof are mounted in spaced relation in a folder bar 7 slidably mounted within the slot 3 and extending beyond the ends of the roll 2. Rollers 8 are mounted upon the ends of the folder bar and arranged to engage cams 9 secured to the supporting frame 1. Springs 11, secured at one end thereof to the roll 2 and at the other end to pins 10 mounted upon the folder bar 7, are provided to normally retain the folder bar 7 resiliently seated upon springs 12 within the slot 3, the purpose of which will hereinafter be more fully explained.

Longitudinally disposed in the rolls 2 and positioned midway between the folder bar slots 3 are provided gripping jaw slots 14 within which is mounted a gripping block 16 provided with a recess 17 adapted to receive a movable jaw 18 normally maintained in closed position by a plurality of springs 19 mounted in recesses 21 provided in the gripping block 16. The movable jaws 18 extend beyond the ends of the rolls 2 and are provided at the ends thereof with lever arms 22 upon each of which is mounted a roller 23 arranged to engage cams 24 and 25 secured to the frame 1 and adapted to operate said movable jaw 18 against pressure by the springs 19 to open the gripping jaws at predetermined intervals as hereinafter described.

Cutter rolls 26 provided with diametrically opposed slots 27 within which are mounted cutter blade blocks 28 adapted to receive cutter blades 29 extending beyond the circumference of the cutter rolls 26 are rotatably mounted in the housing 1. A resilient packing 31 is secured in recesses 30 formed in the blocks 28 adjacent the sides of the cutter blades 29 for a purpose hereinafter more fully explained. The cutter rolls 26 are spaced a sufficient distance from the folder rolls 2 to permit the feeding of a continuous web of paper 32 therebetween, and are arranged to coöperate with said folder rolls 2 to sever sheets of paper 33 from the continuous web by entrance of the cutter blades 29 between the spaced folder blades 4.

The folder rolls 2 are provided with journals 41, formed integrally therewith, and rotatably mounted in suitable bearings provided in the housing 1. One of the rolls 2 is arranged to be actuated by any suitable driving means, not shown, connected upon one end of one of the journals 41, a hand

wheel 43 being secured to the journal 41 at the opposite end of the roll 2 for hand operation in threading the machine and in making adjustments. Gears 42 are secured in meshing relation on the journals 41 whereby rotation of the driving roll actuates the other folder roll 2 to rotate in an opposite direction.

The cutter rolls 26 have journals 46 formed at the ends thereof, said journals 46 being rotatably mounted in suitable bearings provided in the housing 1. A gear 47 is secured to each of journals 46 upon the driving roll and of the rolls 26, each of said gears 47 being arranged to mesh with the gear 42 of the coöperating folder roll 2 whereby each cutter roll 26 is driven in opposite direction to the complementary folder roll 2. In my present practice I have made the folder rolls 2 and cutter rolls 26, together with the gears 42 and 47, of equal diameter, thereby obtaining the same peripheral speed for each roll, but, rolls of any size provided with suitable gears to obtain the same peripheral speed may be substituted if desired.

Power driver feed rolls 51, provided with journals 52, are rotatably mounted in the housing 1 and arranged to be driven at the same peripheral speed as the folding rolls 2 and cutting rolls 26 by means of pinions 53 engaging gears 54 provided on the feed roll journals 52 and gears 56 mounted upon the journals 41 of the folder rolls 2 at the end opposite the driving gears 42. Free rotating feed rolls 57 are rotatably mounted adjacent the power driven rolls 51 in coöperating relation thereto for feeding the paper webs 32 to the cutting and feeding rolls at the required speed thereby insuring against displacement of the severed ends of paper during the interfolding process. An idler roller 58 is suitable mounted above one set of the feed rollers 51 and 57 whereby both paper webs 32 may be supplied from one end of the machine.

In operation my invention is as follows: The paper webs 32 are threaded between the several rolls as shown in Fig. 1 of the drawings. When power is applied to the driving roll the folder rolls 2, together with their coöperating cutter rolls 26 are simultaneously driven in opposite directions at equal peripheral speed. The cutter rolls 26 are arranged in a manner to direct the cutter blades 29 to enter between the spaced folder bars 4, thereby severing a sheet of paper 33 from the paper web 32. The diametrically opposed cutter blades 29 and folder blades 4 cause two sheets 33 to be severed from each web 32 at each revolution of the rolls. The entrance of the cutter 29 between the folder bars 4 causes the ends 34 of the sheets 33 to be turned inwardly between said folder bars 4 and engaged by the piercing points 6 and carried forward during the succeeding period of rotation.

The folder rolls 2 are arranged in such manner that each pair of folder blades 4 will register with a coöperating gripping jaw recess 17 of the adjacent roll 2 during rotation. The slidably mounted folder blades 4 are normally inclosed within the slots 3. As the rolls 2 are rotated the rollers 8 engage the cams 9, thereby moving the folder bar 7 outwardly to bring the folder blades 4 into operative position, severing the web 32 and engaging the severed ends 34 of the sheets 33. The resilient packing 31 is provided adjacent the cutter blades to permit the points 6 to pierce the ends 34 of the sheets 33 as severed from the web 32. As rotation is continued the folder bar 7 is further outwardly displaced to cause the end folder blades 4 to enter the jaw recess 17. As the cutting elements of the two coöperating sets of rolls are arranged to operate alternately, the severed ends 34 of one web 32 will be brought opposite the lateral median line of the sheet severed from the opposite web. In this manner the folder bars 4, engaging the severed ends of one web 32, operates to fold said severed ends into the opposite sheet 33 at the median line by entering the jaw recess 17.

The movable jaw 18 which is normally maintained in closed position is caused to open to admit the folder blades 4 by engagement of the rollers 23 with cams 24. At the instant the folder blades 4 reach the extreme point of entrance within the open jaw recess 17, the cam 24 releases the roller 23, thereby causing the movable jaw 18 to engage the sheet 33 and the severed end 34, the folder bar 7 being simultaneously released to disengage the severed ends 34. In this manner sheets 33 are alternately severed from the two webs 32 and successively folded at the middle to inclose the severed ends 34 of sheets 33 severed from the opposite web 32.

The tension of the springs 11 is enough to normally retain the bars 7 seated within the slots 3. As the folder bars are withdrawn from the extended position as the rollers 8 pass the high points of the cams 9 the return is cushioned by the springs 12, thereby preventing any sharp impact with the roll 2. In this manner noise is prevented and wear and tear on the machine greatly reduced.

The folded sheets 33 are released when the roller 23 engages a second cam 25 operating to open the jaw 18 as rotation continues.

Suitable strippers 61 are mounted adjacent the folder rolls 2 in engaging relation with annular grooves 62 formed in the surface of the folder rolls 2. Conveying tapes 63 are operatively mounted below the

strippers 61 to receive the folded sheets 33 therefrom and to deliver same to any desired point thereby keeping the space below the strippers clear to receive the sheets successively folded.

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

1. A paper interfolding machine comprising a pair of rotatably mounted folder rolls; a pair of cutter rolls rotatably mounted adjacent said folder rolls; means mounted upon the cutter rolls for severing sheets of paper from a plurality of continuous paper webs; double folder blades slidably mounted within the folder roll; means formed upon the folder blades for engaging the severed ends of paper; and means for actuating said folder blades to interfold said severed ends within the next succeeding sheet of paper.

2. A paper interfolding machine comprising a pair of rotatably mounted folder rolls; a pair of cutter rolls rotatably mounted adjacent said folder rolls; double folder blades slidably mounted in spaced relation within the folder rolls to form a cutter slot therein; cutter blades mounted upon the cutter roll adapted to enter said cutter slot to sever sheets of paper from continuous paper webs; piercing points formed upon the folder blades for engaging the severed ends of paper; means for actuating said folder blades to interfold said severed ends within the next succeeding sheet of paper.

3. A paper interfolding machine comprising a pair of rotatably mounted folder rolls; a pair of cutter rolls rotatably mounted adjacent said folder rolls; double folder blades slidably mounted in spaced relation within the folder rolls to form a cutter slot therebetween; cutter blades mounted upon the cutter rolls adapted to enter said cutter slot to sever sheets of paper from continuous paper webs; piercing points formed upon the folder blades for engaging the severed ends of paper; gripping jaws operatively mounted within the folder rolls, said gripping jaws coöperating with the folder blades of the adjacent folder roll to interfold said severed ends within the next succeeding sheet of paper and grip the folded sheet and ends to carry the sheets to a point of delivery.

4. A paper interfolding machine comprising a pair of rotatably mounted folder rolls; a pair of cutter rolls rotatably mounted adjacent said folder rolls; double folder blades slidably mounted in spaced relation within the folder rolls to form a cutter slot therebetween; cutter blades mounted upon the cutter rolls adapted to enter said cutter slot to sever sheets of paper from continuous paper webs; piercing points formed upon the folder blades for engaging the severed ends of said gripping jaws coöperating with the folder blades of the adjacent folder roll to interfold said severed ends within the next succeeding sheet of paper and grip the folded sheet and ends to carry the sheets to a point of delivery; and stripping means mounted adjacent the folder rolls to strip the sheets from the rolls when released by the gripping jaws.

5. A paper interfolding machine comprising a pair of rotatably mounted folder rolls; a pair of cutter rolls rotatably mounted adjacent said folder rolls; double folder blades slidably mounted in spaced relation within the folder rolls to form a cutter slot therebetween; cutter blades mounted upon the cutter rolls adapted to enter said cutter slot to sever sheets of paper from continuous paper webs; piercing points formed upon the folder blades for engaging the severed ends of paper; gripping jaws operatively mounted within the folder rolls, said gripping jaws coöperating with the folder blades of the adjacent folder roll to interfold said severed ends within the next succeeding sheet of paper and grip the folded sheet and ends to carry the sheets to a point of delivery; stripping means mounted adjacent the folder rolls to strip the sheets from said rolls when released by the gripping jaws; and a conveyer arranged below said stripping means to receive and deliver the interfolded sheets.

6. A paper interfolding machine comprising a pair of proximate rotatably mounted folder rolls; a pair of diametrically opposed spaced double folder blades slidably mounted within said folder rolls; diametrically opposed gripping jaws operatively mounted within each folder roll and arranged to coöperate with the folder blades of the other folder roll to fold and grip a sheet of paper at the lateral median line thereof; a pair of cutter rolls rotatably mounted adjacent the folder rolls; power driven feed rollers arranged to feed a continuous paper web between each folder roll and the corresponding cutter roll; a pair of cutter blades mounted upon each cutter roll, said cutter blades being arranged to engage the spaced folder blades to sever sheets of paper from said continuous webs of paper; piercing points formed upon the folder blades to engage the severed ends of paper and means for actuating said folder blades to interfold said severed ends within the fold of the laterally folded sheet.

7. A paper interfolding machine comprising a pair of proximate rotatably mounted folder rolls; a pair of diametrically opposed spaced double folder blades slidably mounted within said folder rolls; diametrically opposed gripping jaws operatively mounted within each folder roll and arranged to cooperate with the folder blades of the other folder roll to fold and grip a sheet of paper at the lateral median line thereof; a pair of

cutter rolls rotatably mounted adjacent the folder rolls; power driven feed rollers arranged to feed a continuous paper web between each folder roll and the corresponding cutter roll; a pair of cutter blades mounted upon each cutter roll, said cutter blades being arranged to engage the spaced folder blades to sever sheets of paper from said continuous webs of paper; piercing points formed upon the folder blades to engage the severed ends of paper and means for actuating said folder blades to interfold said severed ends within the fold of the laterally folded sheet; and means for withdrawing said folder blades to release the severed ends from the piercing points.

In witness whereof I hereunto set my signature.

WILLIAM T. LAZAR. [L. S.]