(No Model.) 2 Sheets—Sheet 1.

J. AIKEN.

PAPER FOLDING MACHINE.

No. 536,992. Patented Apr. 9, 1895.

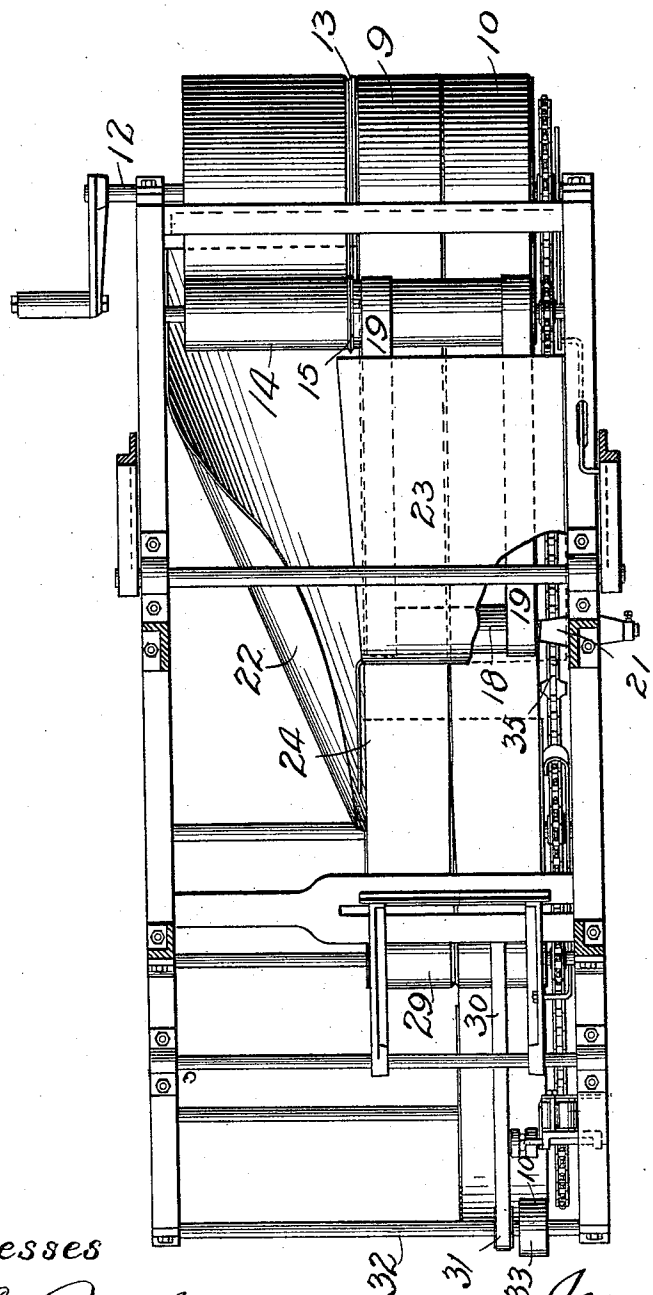

Fig. 1.

Witnesses
G. C. Purple
F. P. Lyon

Inventor
James Aiken
By Paul & Hawley Atty's.

(No Model.) 2 Sheets—Sheet 2.

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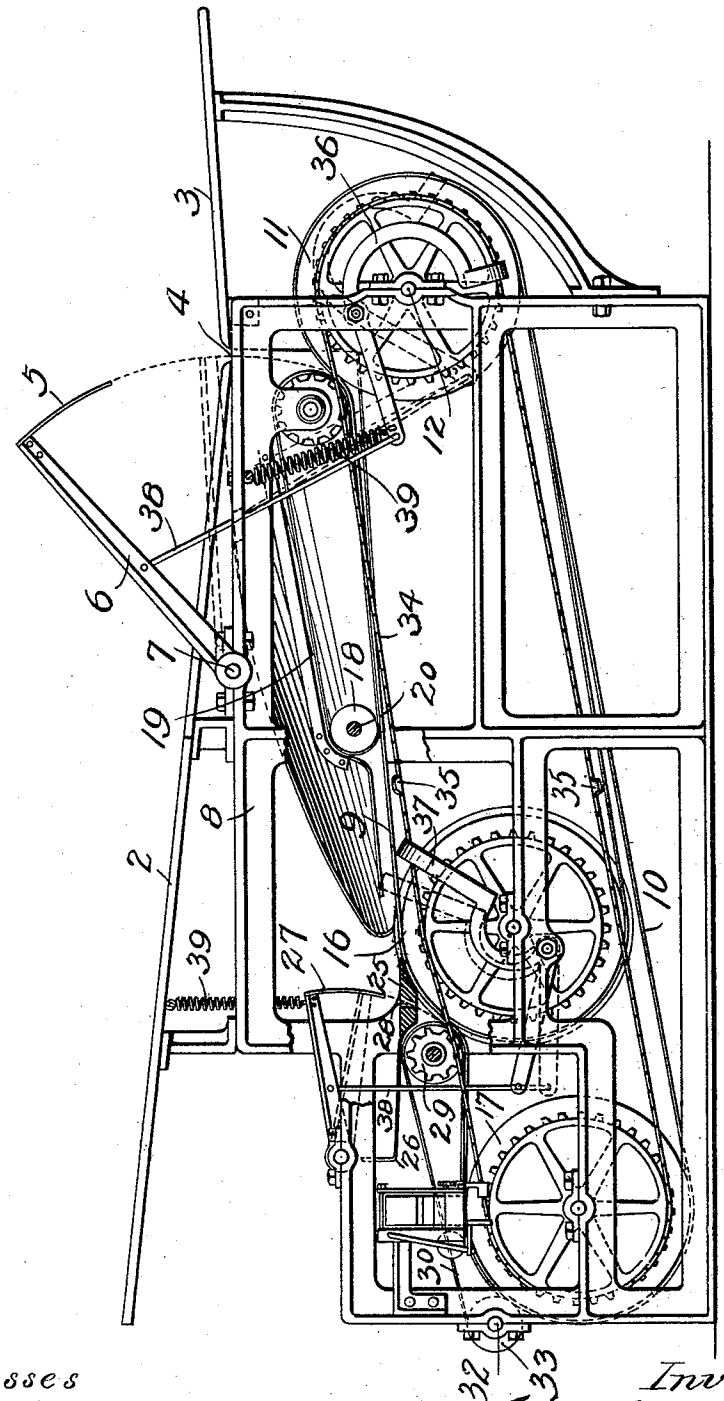

Fig. 2.

Witnesses
G. C. Purple
F. S. Lyon

Inventor
James Aiken
By Paul & Hawley Attys.

UNITED STATES PATENT OFFICE.

JAMES AIKEN, OF REDWOOD FALLS, MINNESOTA.

PAPER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,992, dated April 9, 1895.

Application filed August 26, 1893. Serial No. 484,082. (No model.)

To all whom it may concern:

Be it known that I, JAMES AIKEN, of Redwood Falls, Redwood county, State of Minnesota, have invented certain new and useful Improvements in Paper-Folders, of which the following is a specification.

My invention relates to means for automatically folding newspapers.

The object which I have in view is to provide a light running machine which may be rapidly operated by either hand, steam or electric power, especially the former, and which will be of a most economical construction and also thoroughly durable and strong.

My invention consists in general in the combination with a slotted table, of an endless apron operating beneath the same, a depressing-and-folding blade adapted to operate through the slot in said table and to carry the paper upon said apron and beneath a retaining belt arranged above said apron, a folding share or curved plate adapted to fold the outer portion of the newspaper over the other half, upon said apron.

My invention consists further in similar means for making a third fold in the paper; and my invention consists still further in various details of construction and in combinations all as hereinafter described and particularly pointed out in the claims, and will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of a paper folding machine embodying my invention, a portion of the guard plate being broken away to show the parts beneath the same. Fig. 2 is a side elevation of the machine, a portion of the frame being broken away.

The frame of the machine may be of any desired construction, and upon the top thereof I provide the feed table composed of the oppositely inclined long and short sections 2 and 3 respectively, between which is a long slot 4 through which the depressing and folding blade 5 is adapted to operate. This blade is carried upon the frame 6, the arms of which are secured upon the locking shaft 7 having bearings in the upper part of the frame 8 of the machine. The means for operating the blade will be explained hereinafter.

Beneath the slot 4 I provide an endless and continuously running apron preferably made in two sections or wide belts 9 and 10, as shown in Fig. 1. The apron extends about the large drum or roller 11, the shaft 12 of which has bearings in the frame and is preferably the power shaft of the machine. The apron covers but half of this drum, and midway therein I preferably provide a groove 13. Above the large drum is a smaller cylinder or roller 14 having a creasing rib 15 accommodated in the groove 13 in the large roll.

The roller and the drum are so arranged that the blade 5 upon being depressed will enter close between them to carry a folded newspaper into engagement therewith. The shorter portion or belt 9 of the apron extends back and passes around the second large drum 16, while the longer portion 10 simply passes over this drum and from thence around the third large drum 17.

Above the middle of the apron I provide a carrying roll 18 for two small belts 19 extending in close engagement with the apron and running at the same speed and also passing over the creasing roll 14. The carrying roll is arranged upon the shaft 20 which is provided with a single long bearing 21 adapted to hold the same parallel with the roll 14. The paper after being first folded and creased is carried back between the apron and the small belts 19 and during this movement the outer half of the paper engages the curved and inwardly inclined share or folding plate 22 and is thrown forward upon the apron and upon the guard plate 23 arranged above the belts 19. To prevent the twisting of the paper upon the apron as it leaves the share, I preferably provide the parallel finger 24 which extends from the guard plate 23 and over which the paper is folded and from which it finally frees itself. The double folded paper is thence carried forward and across the slotted plate or table 25, the paper passing over the same and being stopped by the limiting guard 26. At this instant the second folding blade 27 is depressed and the paper is forced down through the slot 28 in the table and between the second drum 16 and the roll 29.

A creasing rib and groove are arranged in the large roll or drum 16 and in the smaller roll 29, the groove being in the latter so that as the paper passes through between the same the outer part thereof is folded down so as to

practically loop down over the edge of the belt and so that a partial fold will be made to facilitate the final folding of the paper as it comes from the machine. To prevent the paper from falling off at such time I provide a small belt 30 which runs over the roll 29 and over a small pulley 31 upon the shaft 32, which shaft is driven by the friction pulley 33 engaging the apron 10 running upon the large drum 17. This friction pulley also serves to compress the folds of the paper.

The machine is driven from the shaft of the main drum 11 of the machine, the power being transmitted to the other parts through the sprocket wheels provided upon the shafts of the three drums, the middle drum being driven by the engagement of the upper side of the belt with the top of the sprocket wheel. The belt carries a series of lugs 35 which are adapted to engage the bell-crank levers 36 and 37 periodically, hook-like ends being preferably proAided upon the bell crank to straddle the belt, and the bell cranks being centered at some distance from the drum shafts. From the opposite arms of the bell cranks, rods 38 extend to the rocking frames of the two blades 5 and 27 respectively. Returning springs 39 are preferably employed in connection with each of the rocking frames, as shown. After the folded newspaper passes between the roll 29 and the pulley 31 it goes to the pasting mechanism of the machine where the labels are cut off and pasted upon the papers.

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

1. The combination, in a paper folding machine, of a slotted feed table, a folding blade to operate through said slot, an apron operating beneath said slot, the drums over which said apron operates, a roll between which and one of said drums the folded paper is delivered by said blade, means parallel with said apron for holding the folded paper thereon, and a curved share arranged to make the second fold in the paper, folding one half thereof upon the other half already upon the apron, substantially as described.

2. The combination, with means for making the first fold in a paper, of a traveling apron upon which the folded paper is delivered, a guard plate arranged above said apron, and a curved share arranged at the edge thereof and with which the outer half of the paper is adapted to engage and be thereby folded upon the other half upon the apron, substantially as described.

3. The combination, in a machine of the class described, of a slotted feed table, a swinging frame arranged to operate above the same and carry a folding blade adapted to operate through the slot in said table, a pair of rolls arranged beneath said slot a continuously running apron arranged beneath said table, over one of said rolls a second belt or apron on the other roll and operating upon said apron and between which the folded paper is delivered by said blade, a creasing rib upon one of said rolls, the other being grooved to receive said rib a guard plate arranged above the second belt or apron, a curved and inwardly inclined share arranged at the edge of said apron and by which the outer half of the folded paper is folded upon the apron to make the second fold therein, a second pair of rolls provided with creasing means, a second table and a second folding blade for folding the paper after leaving said share, and means for periodically operating said blade, substantially as described.

4. A machine of the character described, comprising a slotted table, a carrying apron arranged to move beneath the table, a swinging frame having a blade adapted to move downward through the table slot, adjacent parallel rollers arranged beneath the slot and in the path of the folding blade, the upper roller having a creasing rib thereon, the lower roller passing a groove therein to receive said rib a belt carried by the upper roller and held to move parallel with the carrying apron, a carrying roller 18, a folding share arranged behind the carrying roller and having a curved or inclined upper portion, a plate arranged between the upper fold of the share and the carrying belt, and a second folding table and swinging folding blade arranged above the carrying apron and in the path of the paper, substantially as described.

5. A machine of the character described, comprising a slotted table, a carrying apron held to run on suitable drums and to move beneath the table, a swinging folding blade adapted to swing downward through the table slot, a roller arranged parallel with one of the apron drums and above the apron, the meeting point of the apron and drums being in the path of the swinging blade, a rib produced centrally and circumferentially on the roller, and adapted to be received by a groove upon said drum a belt carried by the roller and held to move parallel with the apron, the belt approximating in width to half the width of the paper after the first fold is made, a carrying roller 18, a share or guide held at one edge of the belt and having a curved upper portion adapted to engage the edge of the paper and fold it over the top of the belt, and a plate arranged between the upper fold of the share and carrying belt, substantially as described.

6. A machine of the character described, comprising a slotted table, a carrying apron held to move longitudinally beneath the table and having suitable carrying drums, a swinging blade adapted to move downward through the table slot, a creasing roller arranged parallel with the upper drum of the apron, the drum and roller being placed in the path of the swinging blade and the roller having a central circumferential rib thereon, a suitable groove being provided upon said drum to receive said rib a belt carried at one end of the roller and held to move parallel with the up-

per strand of the apron, a carrying roller 18 held to press upon the lower strand of the belt and upon one fold of the paper, a curved or inclined share held near one edge of the belt and adapted to lap the paper thereon, a plate arranged between the upper fold of the share and the carrying belt, a second slotted table arranged behind the folding belt and adapted to receive a paper from the carrying apron, a second swinging blade held to move downward through the slot of the table, and a compressing roller or wheel arranged to press upon the apron and adapted to compress the folds of the paper, substantially as described.

7. The combination, with the carrying apron and one of its carrying drums, the drum being grooved to receive the rib of the creasing roller and mechanism for producing a first fold in the paper, of the roller arranged parallel with one of the drums and held to run upon the apron, a circumferential rib produced on the roller, mechanism for delivering a partially folded paper upon the apron between the roller and the carrying drum, and mechanism for making a second fold in the paper, substantially as described.

8. In a machine of the character described, the combination of the carrying apron, the belt 19, the share 22 having a curved top to lap one part of the paper onto the guard plate and said apron, and the guard plate 23 arranged between the upper strand of the belt and the top of the share or guide, substantially as described.

9. The combination, in a machine of the class described, of the slotted feed table, the three drums arranged beneath the same, a carrying apron arranged upon said drums, sprocket wheels arranged upon the shaft of said drums and a sprocket belt passing over the same, driving means, lugs upon said belt, a swinging frame, a folding blade carried thereon and adapted to operate through said slot, a roller arranged above the first drum and pressing upon said apron, and between which parts the paper is delivered by said blade, a bell crank lever pivoted upon the frame of the machine, one arm of said lever being adapted to be engaged by the lugs upon said belt, and a rod connecting the other arm with said swinging frame, substantially as described.

In testimony whereof I have hereunto set my hand this 11th day of August, 1893.

JAMES AIKEN.

In presence of—
A. H. BROCKLEHURST,
G. T. BOYD.