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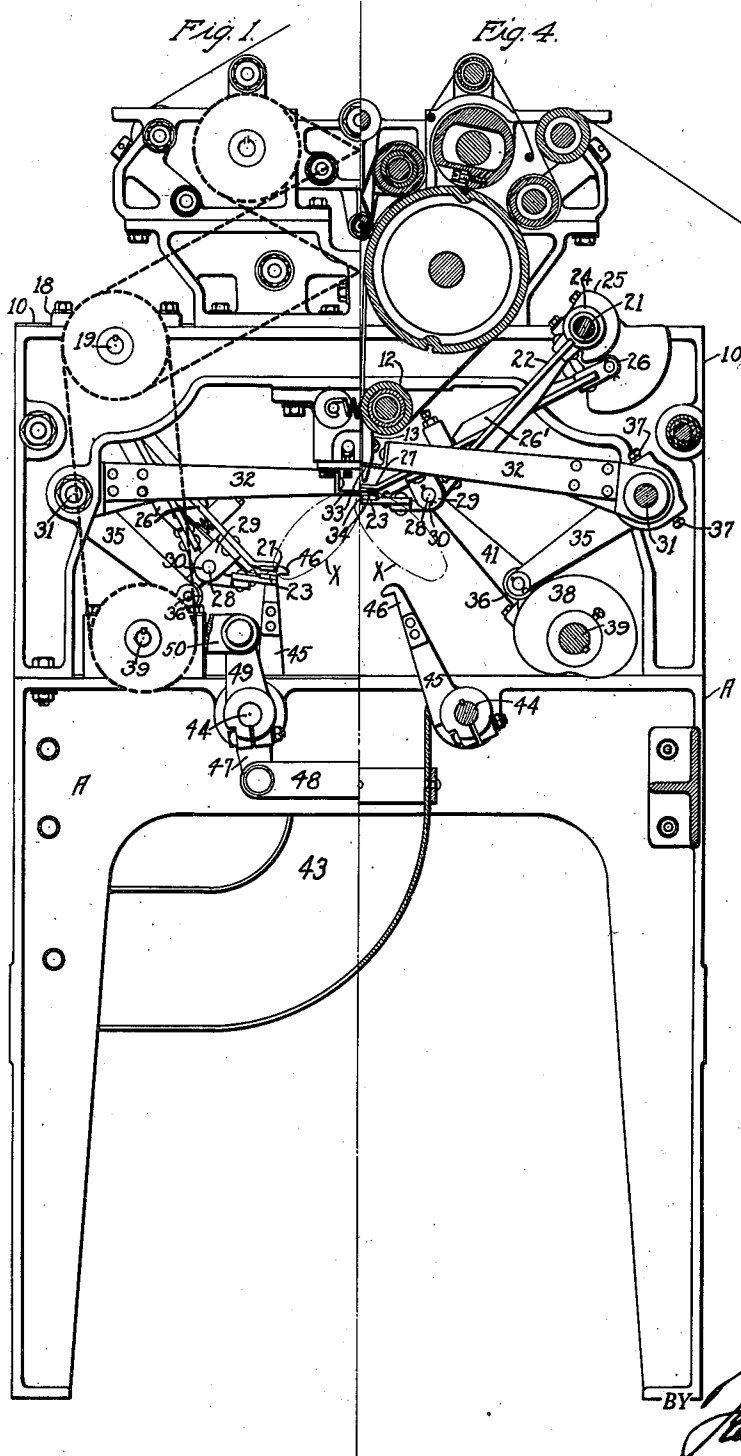
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J. A. NICHOL

PAPER INTERFOLDING MACHINE

Filed Sept. 26, 1922

4 Sheets-Sheet 1



INVENTOR.

James A. Nichol

BY

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Nov. 25, 1924.

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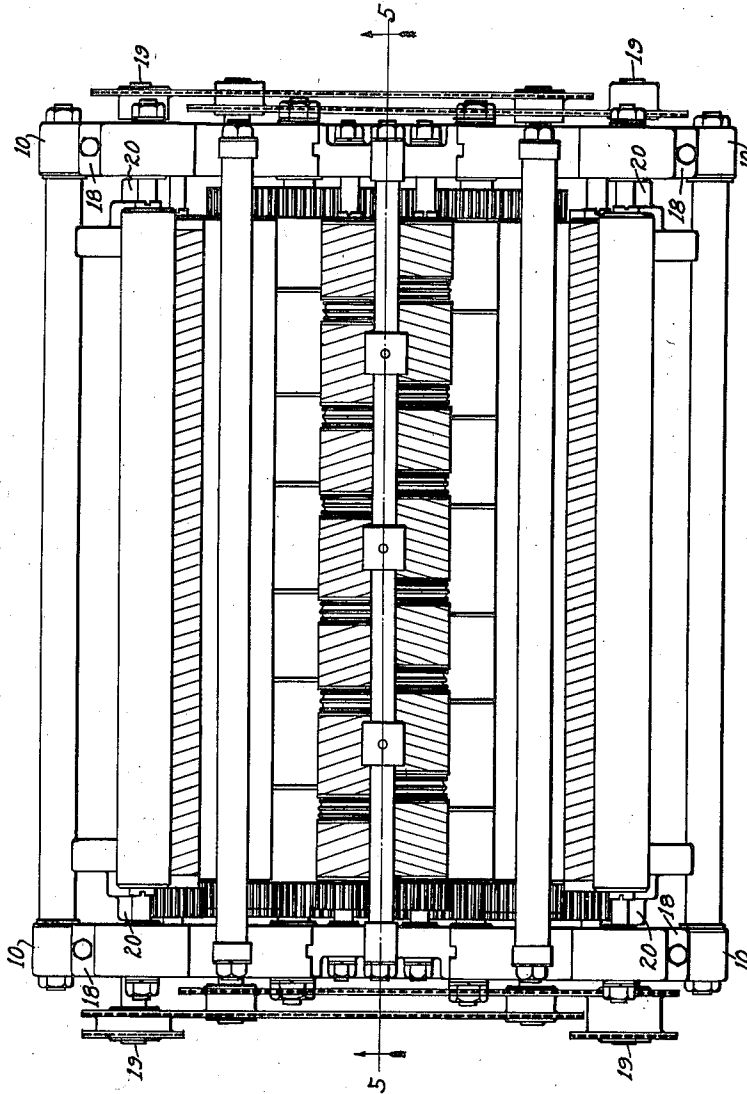
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Fig. 2.



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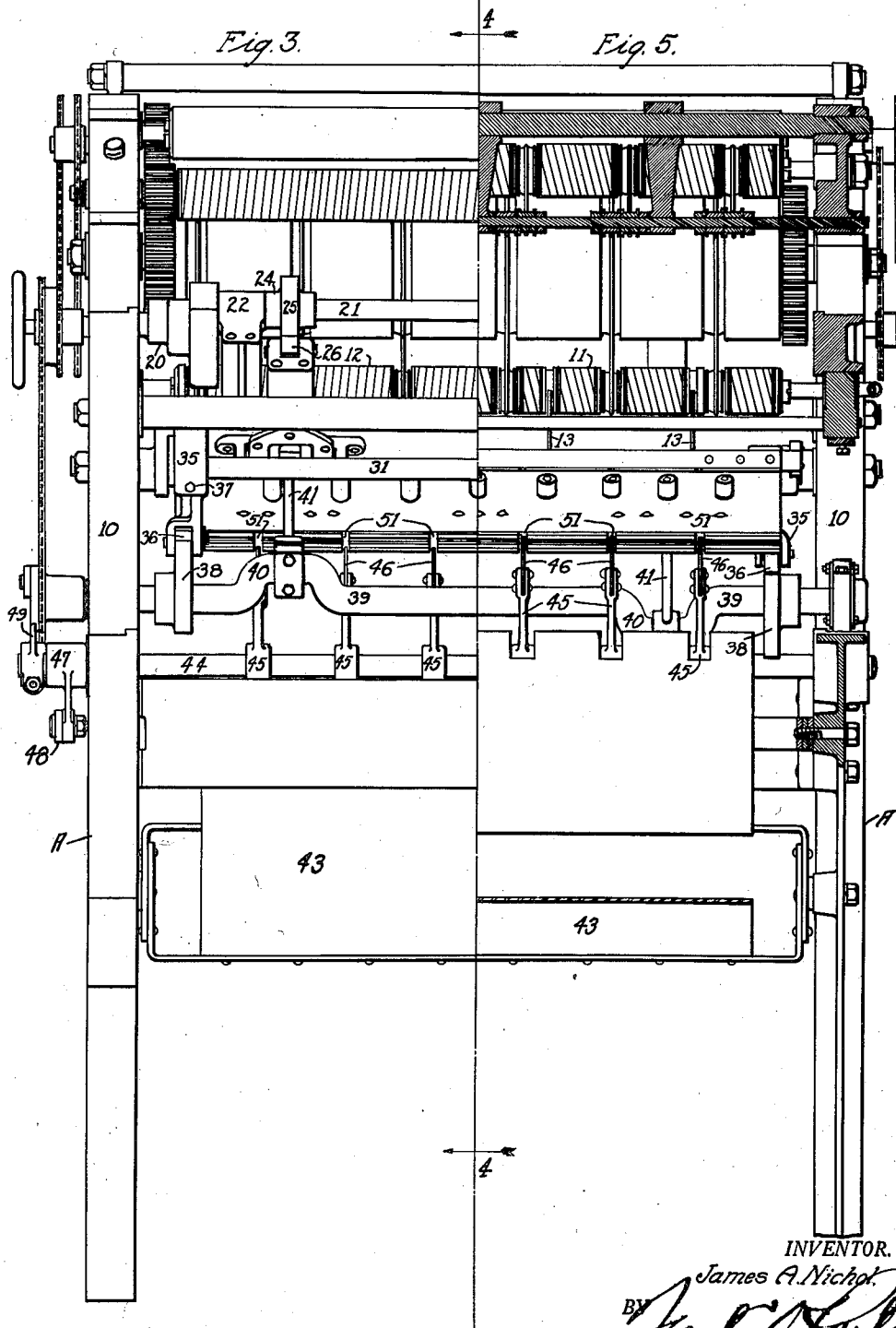
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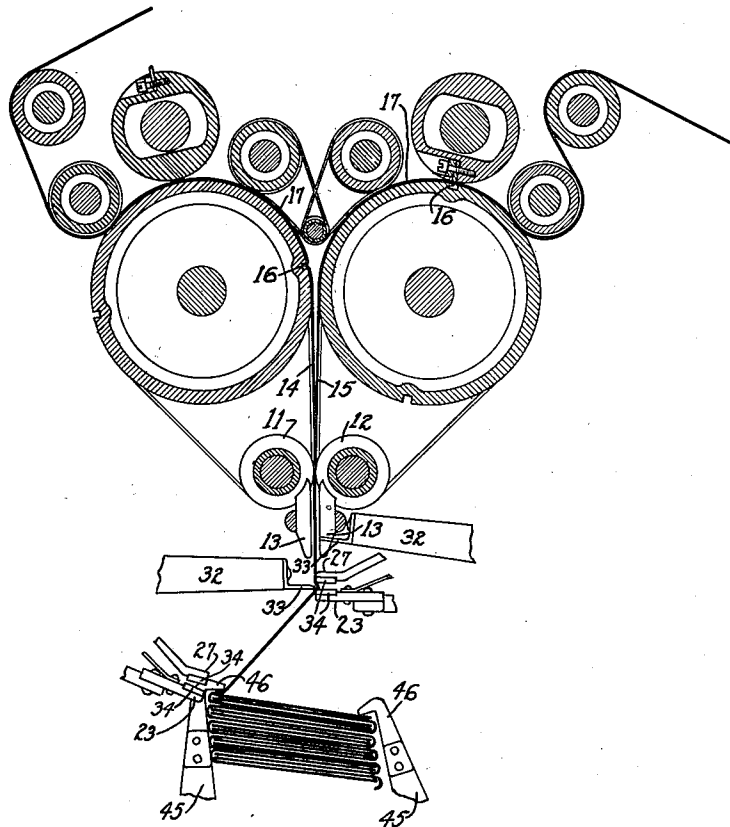
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Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES A. NICHOL, OF GREEN BAY, WISCONSIN, ASSIGNOR OF ONE-HALF TO JOSEPH L. HOSLETT AND ONE-SIXTH TO JOHN T. NEUGENT, BOTH OF GREEN BAY, WISCONSIN.

PAPER-INTERFOLDING MACHINE.

Application filed September 26, 1922. Serial No. 590,614.

To all whom it may concern:

Be it known that I, JAMES A. NICHOL, a citizen of the United States, residing at Green Bay, in the county of Brown and State of Wisconsin, have invented certain new and useful Improvements in Paper-Interfolding Machines, of which the following is a specification.

The invention relates to a folding machine, and more particularly to the class of sheet paper interfolding machines.

The primary object of the invention is the provision of a machine of this character wherein separable sheets or sections of paper in strip form can be fed into the said machine for the interfolding of the sheets or sections and subsequently stacked in a chute for the delivery of the sheets or sections severed from each other in their interfolded relation to one another.

Another object of the invention is the provision of a machine of this character, wherein two webs of strip paper which have been previously cross-cut or slitted by a separate machine of any standard type, can be fed into position in that the cross-cuts or slits in one strip will be centrally with relation to the cross-cuts or slits in the other strip and vice versa, so that on the folding of the two strips the same will be severed at the cross-cuts or slits to separate the sheets or sections and folded one within the other during the operation of the machine.

A further object of the invention is the provision of a machine of this character, wherein the interfolded sheets will be automatically extracted from the folding mechanism and stacked into a chute for the delivery of the interfolded sheets of paper from the machine, the folding and extracting mechanisms being of novel form, and are operable synchronously with one another, when the machine is in action.

A still further object of the invention is the provision of a machine of this character, which is comparatively simple in construction, thoroughly reliable and efficient in operation, possessing but few parts, thereby avoiding complications when making repairs, should the same be required in the continued use of the machine, strong, durable, readily and easily operated, and inexpensive to manufacture and install.

With these and other objects in view the invention consists in the features of con-

struction, combination and arrangement of parts as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1, is a side elevation of the machine constructed in accordance with the invention.

Figure 2, is a top plan view thereof.

Figure 3, an end elevation.

Figure 4, is a vertical longitudinal sectional view on the line 4—4 of Figure 3.

Figure 5, is a sectional view on the line 5—5 of Figure 2.

Figure 6, is a detail view showing diagrammatically the path of movements of the folded paper during the operation of the folding mechanism of the machine.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, A, designates generally the main body of the machine, and includes the spaced vertically disposed parallel side frames 10, having journaled centrally therein slightly below the top edges of the same closely arranged reversely rotatable feed rollers 11 and 12, respectively, while immediately beneath the latter are opposed guide bars 13, forming a suitable throat for the passage for the double webs 14 and 15, of strip paper, which have been previously transversely weakened, cross-cut or slitted at predetermined intervals, the cross-cuts or slits in the web 14, being medially with respect to the cross-cuts or slits in the web 15, or in other words, the cross-cuts or slits 16, in one strip of paper are located centrally of the sheets or sections 17, between the cross-cuts or slits in the other strip of paper, for a purpose presently described.

Provided at the upper edges of the side frames 10, near the corners thereof are bearings or journal boxes 18, in which are arranged stub journals 19, having on their inner ends eccentric arms 20, each carrying a crank-pin or rod 21, extending crosswise between the side frames of the body, and upon these pins or rods 21, are fixed the limbs or arms 22, of the lower folding jaws 23, of the paper folding mechanism, these jaws being disposed and working opposite each other in the body of the machine.

The limbs or arms 22, are formed with

hubs 24, which surround the pins or rods 21, and each hub is provided with a cam projection 25, against which works a roller 26, mounted on the outer end of each limb 5 or arm 26' of an upper gripping jaw 27, which is yieldably connected at 28, to the folding jaw 23, adjacent thereto, the said jaw 23, being formed with a fulcrum 29, engaged in a seat 30, formed in the gripping jaw 27, so as to permit slight rocking movement of the latter with respect to the folding jaw 23, when the same is moved in an elliptical course, in a manner presently described and for the purpose hereinafter set forth.

Journalled in the side frames 10, of the body A, and below the bearings or boxes 13, are rocking shafts 31, having swiveled thereon arms 32, which are formed at their inner free ends with tucking blades 33, each co-operating with and acting between the jaws 23 and 27, opposite the same for initially tucking the double webs of paper therebetween when feeding across these jaws and said blade from the feed rollers 11 and 12, on passing through the throat formed by the guide bars 13, in the body of the machine.

The jaws 23 and 27, are lined with fibre strips 34, so as to frictionally hold the paper when tucked between the same by the tucking blades 33, which will be hereinafter more fully described.

Mounted on the shafts 31, are rider levers 35, having rollers 36, at their free ends, and these levers are capable of adjustment on said shafts through the medium of set screws 37, while the rollers 36, are adapted to work against cams 38, fixed on crank shafts 39, the cranks 40, of which have coupled thereto actuator links 41, and to the latter are pivoted or trunnioned at 28, the limbs or arms 26', of the upper tucking jaws 27, and through these links and the cranks 45 the major movement is imparted to the jaws 23 and 27, as the shafts 39, each constitutes the major axis, while the crank pin or rod 21, is the minor axis for said jaws. The crank shafts 39, are suitably journaled in the side frames 10, below the rocking shafts 31.

In the lower portion of the body A, of the machine centrally thereof is a chute 43, which at its upper open end receives the interfolded sheets of paper from the folding mechanism and delivers the same from the said machine at the desired locality in front of the same.

At opposite sides of the upper open end of the chute 43, and journaled in the side frames 10, are rocking shafts 44, carrying upstanding oscillating levers 45, which at their upper free ends have fitted thereto extractor hooks 46, to engage the folded sheets of paper between the jaws 23 and 27, and

extract the same therefrom at the limit of the lowermost stroke of said jaws and stack the interfolded sheets at the upper open end of the chute 43, to be in alignment therewith so as to be received therein, as will be apparent.

On the shafts 44, are rocker arms 47, which have pivoted thereto a connecting rod 48, for the oscillation thereof in unison, while fixed to one of these shafts 44, is a crank arm 49, having pivoted thereto an operating lever 50, which is connected at the upper portion of the machine in any suitable manner with driving and timing train of gear mechanism for the feeding and interfolding operations of the said machine.

It is of course to be understood that the jaws 23 and 27, and the tucking blade 33, at one side of the body of the machine are timed to operate exactly opposite to those on the adjoining side of said machine, thereby effecting the interfolding of the double webs of paper continuous during the working of the machine.

The jaws 23 and 27, at their rear edges are cut into so as to form slots 51, therein to accommodate the extractor hooks 46, and serve as a clearance therefor, whereby the same will engage the interfolded sheets of paper in the jaws and extract them when the latter are at the lowest points of movement in the elliptical paths as indicated at X, in the drawings. The elliptical movement of the jaws 23, is accomplished by the crank pins 21, rotating around the center of shaft 19, and are connected for this movement through the crank discs or eccentric arms 20, this movement being the minor axis of the ellipse. The major axis is formed by crank 40, rotating around the center of crank shaft 39.

In the operation of the machine, the double strips of paper, which have been previously cross-cut or slitted by any standard type of device mounted at the top of the body A, are advanced between the feed rollers 12, and carried downwardly so as to pass through the throat formed by the guide bars 13, to be positioned between a pair of the jaws 23 and 27, and one of the tucking blades 33, on an arm 32, opposite said jaws, the gripping jaw 27, at this time being in open relation to the folding jaw 23, so that the webs of papers can be tucked between these jaws by the tucking blade, which is effected by the said jaws being caused to approach the latter. On the continued elliptical movement of the jaws 23 and 27, in the course of the path X, the blade 33, retreats from between said jaws, and the gripping jaw 27, closes relative to the folding jaw 23, until the latter has reached its lowest point of movement whereupon the gripping jaw again opens and the extracting hook 46, now being in po-

sition to engage the folded paper, that is to say, the interfolded sheets or sections, so that on the upward movement of the jaws the arm 45, carrying said hook will have moved across the path X, and the latter extracted the interfolded paper from the jaws, whereupon the interfolded paper will be dropped into the chute 43.

The foregoing explanation has reference to the mechanism on one side of the machine, while the similar mechanism on the other side of the machine repeats this operation, but as will be understood is oppositely timed thereto.

It will be apparent that the cam 38, on each side of the machine is so formed that when the cross-cut or slit 16, in each web comes in direct alignment with the tucking blade 33, when in its uppermost position, that the said blade then follows the cross-cut or slit until it meets the jaws 23 and 27, whereupon the cam so changes to cause the blade to follow at the same speed of movement of the jaws, thereby clearing the latter to return quickly to uppermost position again.

What is claimed is:

1. A machine of the character described, comprising paper interfolding mechanisms, each having oppositely timed folding and gripping jaws, means for moving each mechanism on major and minor axes to effect an elliptical path of movement thereof, means for tucking paper webs between the jaws at one point of movement thereof, means for opening and closing the gripping jaws relative to the folding jaws at predetermined intervals, and mechanism for removing the folded paper from between the jaws.

2. A machine of the character described, comprising paper interfolding mechanisms, each having oppositely timed folding and gripping jaws, means for moving each mechanism on major and minor axes to effect an elliptical path of movement thereof, means for tucking paper webs between the jaws at one point of movement thereof, means for opening and closing the gripping jaws relative to the folding jaws at predetermined intervals, mechanism for removing the folded paper from between the jaws, and means for receiving the folded sheets when extracted by the last mentioned mechanism.

3. A machine of the character described, comprising paper interfolding mechanisms,

each having oppositely timed folding and gripping jaws, means for moving each mechanism on major and minor axes to effect an elliptical path of movement thereof, means for tucking paper webs between the jaws at one point of movement thereof, means for opening and closing the gripping jaws relative to the folding jaws at predetermined intervals, mechanism for removing the folded paper from between the jaws, means for receiving the folded sheets of paper when extracted by the last-mentioned mechanism, and mechanism for feeding double webs of paper between the interfolding mechanisms.

4. A machine of the character described, comprising paper interfolding mechanisms, each having oppositely timed folding and gripping jaws, means for moving each mechanism on major and minor axes to effect an elliptical path of movement thereof, means for tucking paper webs between the jaws at one point of movement thereof, means for opening and closing the gripping jaws relative to the folding jaws at predetermined intervals, mechanism for removing the folded paper from between the jaws, means for receiving the folded sheets of paper when extracted by the last-mentioned mechanism, mechanism for feeding double webs of paper between the interfolding mechanisms, and means for guiding the paper advanced by the feeding mechanism.

5. A machine of the character described, comprising paper interfolding mechanisms, each having oppositely timed folding and gripping jaws, means for moving each mechanism on major and minor axes to effect an elliptical path of movement thereof, means for tucking paper webs between the jaws at one point of movement thereof, means for opening and closing the gripping jaws relative to the folding jaws at predetermined intervals, mechanism for removing the folded paper from between the jaws, means for receiving the folded sheets of paper when extracted by the last-named mechanism, mechanism for feeding double webs of paper between the interfolding mechanisms, means for guiding the paper advanced by the feeding mechanism, and means for driving the timing mechanisms for the jaws and tucking means.

In testimony whereof I affix my signature.

JAMES A. NICHOL.