

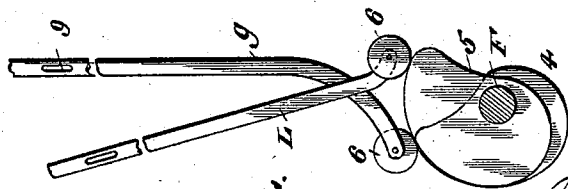
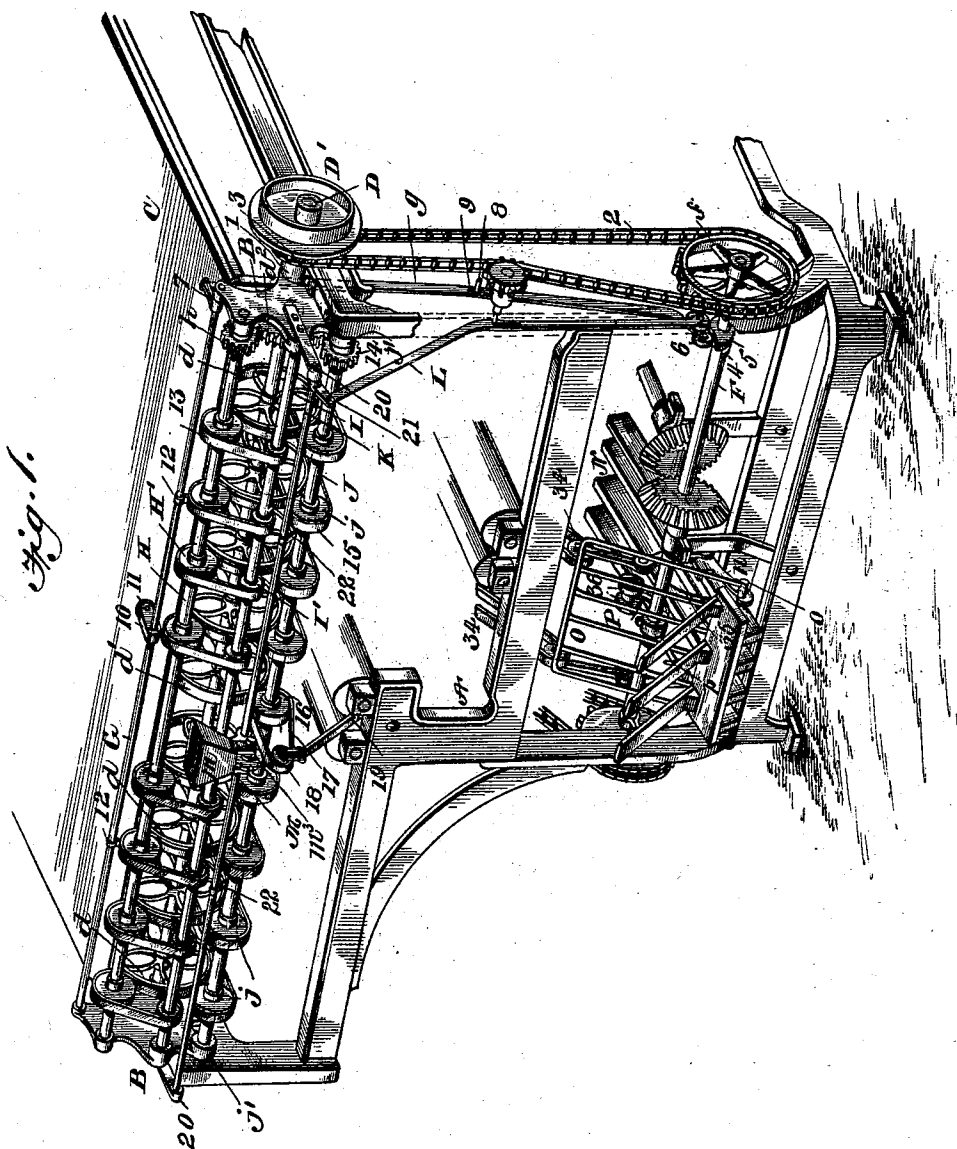
(No Model.)

3 Sheets—Sheet 1.

J. W. SKILLEN.  
PAPER FOLDING MACHINE.

No. 551,561.

Patented Dec. 17, 1895.



Witnesses  
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*D. W. Gould*

Inventor  
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By *Wm. H. T. Myers*,  
Attorney

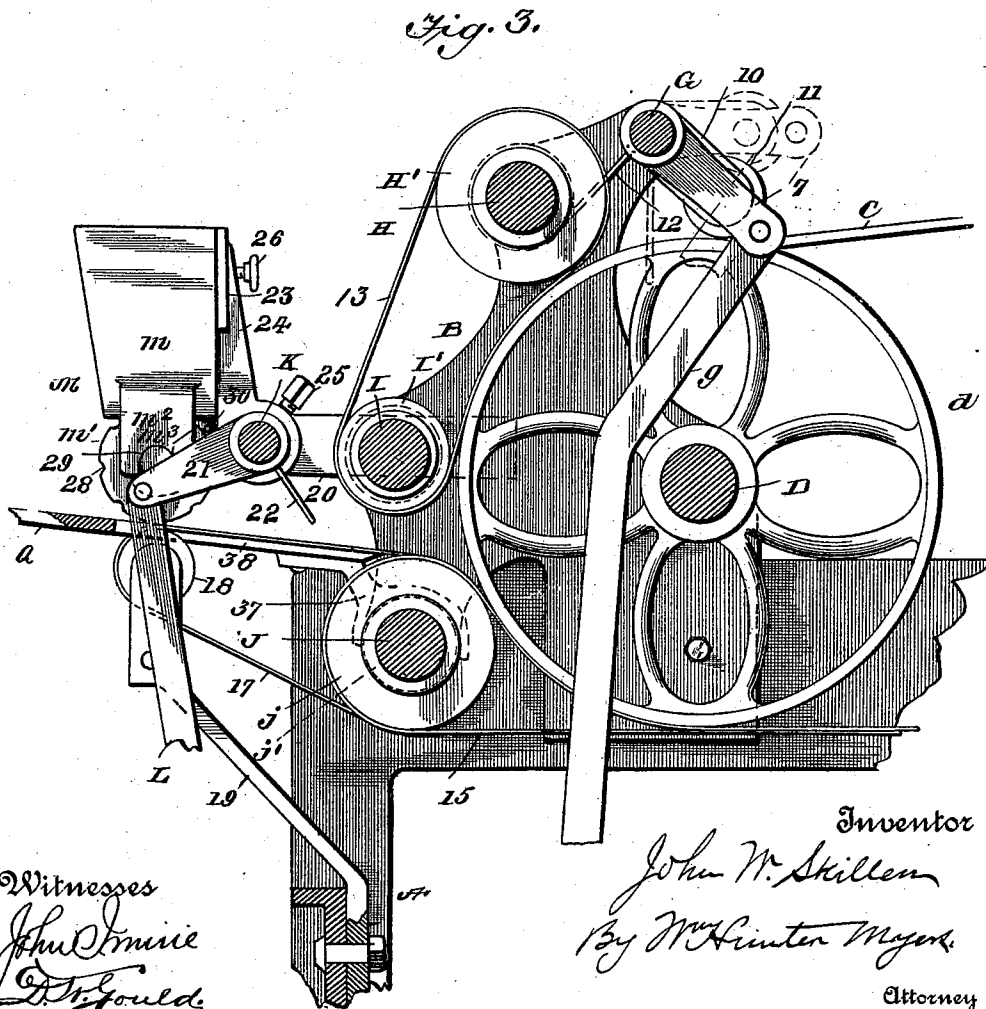
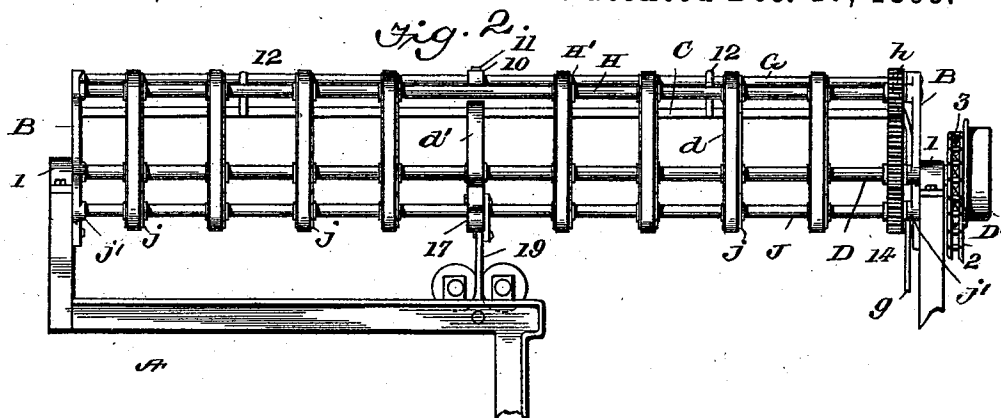
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3 Sheets—Sheet 2.

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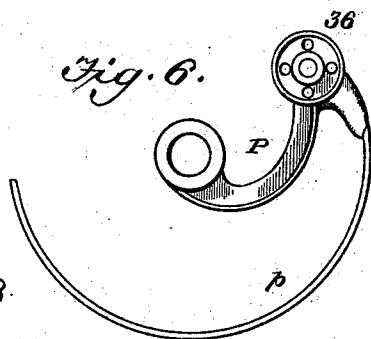
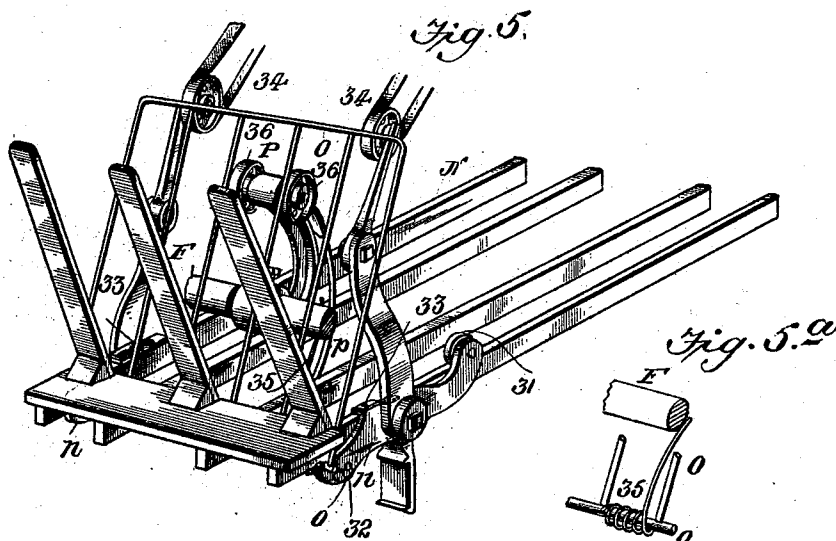
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J. W. SKILLEN.  
PAPER FOLDING MACHINE.

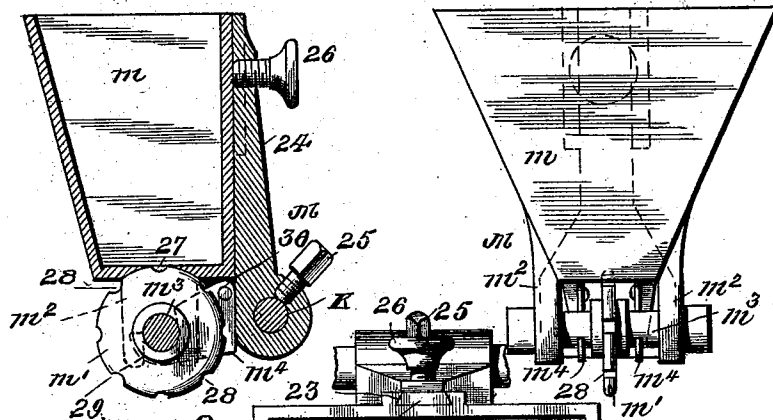
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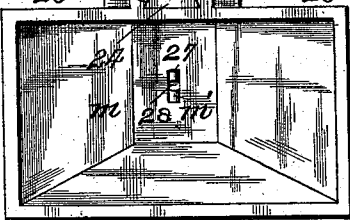


*Fig. 8.*

*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

JOHN W. SKILLEN, OF SIDNEY, OHIO.

## PAPER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 551,561, dated December 17, 1895.

Application filed April 1, 1895. Serial No. 544,074. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. SKILLEN, a citizen of the United States, residing at Sidney, in the county of Shelby and State of Ohio, have invented certain new and useful Improvements in Newspaper-Folding Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in newspaper-folding machines.

One object of my invention is to secure greater accuracy in feeding the sheets of paper straight into the machine, which I accomplish by the use of a single feed or drop roll arranged in line with the central portion of the sheets to be fed into the machine.

Another object of my invention is to so construct and arrange the machine that it may be readily adapted to fold either a single sheet or a double sheet, or a single sheet and a half-sheet insert, and also to paste the double sheet or insert.

Another object of my invention is to provide an improved delivery mechanism, consisting of means for imparting forward movement to the fly and for holding the folded papers upright on the rack during the backward movement of the fly.

Other objects are attained by the construction and operation of the pasting mechanism, &c.

The invention will first be described in connection with the accompanying drawings and then pointed out in the claims.

Figure 1 of the drawings is a perspective view of so much only of the machine as is necessary in illustrating my invention, the tapes being arranged for double feed. Fig. 2 is a front elevation of a portion of the machine, showing the tapes arranged for single feed. Fig. 3 is a side elevation of the machine as arranged for double feed with one side of the frame and the gear-wheels removed, the shafts being shown in section and the folding-rollers omitted. Fig. 4 is a detail view of the cams and levers that actuate the two rock-shafts. Fig. 5 is a perspective view of the mechanism for delivering the folded papers. Fig. 5<sup>a</sup> is a detail view showing the spring for returning the fly to its normal position. Fig. 6 is a side elevation of the fly-

cam provided with a paper-brace. Fig. 7 is a front elevation of the pasting device. Fig. 8 is a vertical transverse section of the same, showing the manner of attaching it to the supplemental rock-shaft. Fig. 9 is a top plan view of the pasting device.

Referring to the drawings, A represents the frame of the machine, to the front upper portion of which, on each side, are secured brackets B of the form shown in Figs. 1 and 3, and C is the main feed-board, supported in the usual manner.

In boxes 1 on top of the frame is journaled the driving-shaft D, provided with a driving-pulley D', a band or belt (not shown) connecting this pulley with any suitable source of power. This shaft also carries a series of large main pulleys *d*, against which the carrying-tapes bear, and also a central pulley *d'* having no tape connection, but serving to drive the drop-roll, as hereinafter mentioned.

A sprocket-chain 2 engages with a small sprocket-wheel 3 on shaft D and with a large sprocket-wheel *f* on a secondary shaft F journaled in the lower front portion of the frame, this latter shaft serving, through intermediate mechanism, to operate the folding-rollers, tappers, &c. Said shaft also carries two cams 4 and 5.

In the rear portion of brackets B, facing feed-board C, is mounted a rock-shaft G, operated by means of a lever *g*, on the lower end of which is a roll 6, bearing on cam 4 on shaft F, the upper end of said lever being pivoted to an arm 7, secured on one end of the rock-shaft, as seen in Figs. 1 and 3, a small pin 8 secured in the frame and taking in a slot 9 in the lever serving to hold the lever on the cam. Fixed centrally on this rock-shaft is a short arm 10, in which is journaled a feed or drop roll 11, which, when down in feeding position, bears on and is operated by the central pulley *d'* on shaft D; and on said rock-shaft, at an angle to the drop-roll, are adjustably secured two feed-guides 12, which assume a perpendicular position between the pulleys *d* as the drop-roll is swung up out of operative position, and thus serve to limit the feed of the sheet until the drop-roll again descends, when they swing backward and upward out of the way of the advancing sheet. When a plurality of drop-rolls are used it is often very

difficult to deliver the sheets straight into the machine, as the paper will be drawn toward the roll having the greatest frictional bearing on it; and the requisite adjustment of all the rolls involves considerable skill and labor. By using a central feed only I accomplish the desired result in a highly satisfactory manner, and at the same time avoid all the trouble and delay incident to the use of two or more drop-rolls.

In the upper front portion of the brackets B is journaled a shaft H, carrying a series of tape-pulleys H', this shaft being driven by a pinion *h* meshing with a gear-wheel *d*<sup>2</sup> on shaft D; and below this shaft and a short distance forward thereof is another shaft I, journaled in the brackets B, which shaft carries a series of smaller tape-pulleys I', over which and over the pulleys H' on shaft H pass short tapes 13, which bear against the large main pulleys *d* on shaft D.

In the lower front portion of the brackets B, beneath shaft I, is journaled a shaft J, which is driven by a pinion 14 meshing with the gear-wheel *d*<sup>2</sup> on shaft D. On this shaft J are secured a series of tape-pulleys *j*, over which pass the main carrying-tapes 15, which bear against the large main pulleys *d*; and on the center of this shaft is fixed another pulley 16, over which passes a short tape or band 17 leading to and over a small pulley 18 revolubly mounted on a standard 19 secured to the frame, this band serving to operate the paster-wheel, as hereinafter described.

In supports 20, secured to the brackets B, is mounted a rock-shaft K, on one end of which is fixed an arm 21, to which is pivoted the upper end of a lever L, the lower end of which carries a roll 6, bearing on cam 5 on shaft F, this lever being held in contact with the cam in the same manner as described relative to lever *g*. This rock-shaft carries the pasting device M and a pair of feed-guides 22, the latter being arranged in such manner that when the paster-wheel is in operation the feed-guides will be turned back out of the way of the ingoing sheet.

The pasting device M consists of a cup *m*, on the back of which are formed two undercut ribs 23, between which neatly fits a standard 24 having beveled edges, the lower end of the standard being designed to fit on the rock-shaft K and be adjustably held thereon by a set-screw 25. The cup is adjustable vertically on the standard by a thumb-screw 26. In a slot 27 in the bottom of the cup *m* works the paster-wheel *m'*, in the periphery of which are transverse grooves 28, in which the paste is carried from the cup. From the lower portion of the cup depend lugs *m*<sup>2</sup> in bifurcations 29, in the lower ends of which is journaled a short shaft *m*<sup>3</sup>, on which is loosely mounted the paster-wheel *m'*, said shaft being held in the bifurcations by means of hooks *m*<sup>4</sup>, pivoted at 30 to the cup, the rear ends of said hooks bearing against the standard 24 when the cup is secured thereon, whereby their forward ends

are held up under the shaft. When it is desired to remove the wheel for any purpose the cup is removed from the standard, when the hooks can be turned backward, thus permitting the shaft to be lifted free of the lugs.

N is the paper-rack, which works between upper and lower rollers 31 and 32 journaled in brackets *n* secured to the frame of the machine, each bracket carrying a leaf-spring 33, which springs have frictional contact with the side rails of the rack, as shown in Fig. 5.

O is the fly for taking the folded papers from the delivery-tapes 34 and placing them on the rack. Around the fly-shaft *o*, which is journaled in the forward ends of the brackets *n*, is a coil-spring 35, the free end of which extends upward and bears underneath the shaft F, this spring serving to impart backward movement to the fly.

P is the fly-cam, which is secured on the secondary shaft F and carries two rollers 36, adapted, in the revolution of the shaft, to come in contact with the fly from the rear and move it forward, the fly, after the cam has moved out of contact with it, being returned to its normal position by the spring 35, hereinbefore mentioned. This cam also carries a paper-brace *p*, which consists of a wire curved concentric to the hub of the cam and secured at one end to the cam, as shown in Fig. 6. This paper-brace *p*, at the time the cam moves out of contact with the fly, comes into contact with the papers on the rack and holds them upright thereon while the fly moves back to its normal position, receives another paper, and is again ready to be moved forward, as will be apparent from the drawings.

The machine as above described is adapted to fold and paste a double sheet, or a single sheet and a half-sheet insert or supplement. It will be noticed that there is an open space between the short tapes 13 and the main carrying-tapes 15, into which a whole sheet or half-sheet insert may be fed from an auxiliary feed-board Q placed at the front of the machine, as shown in Fig. 3. This board has secured to its inner end hooks 37 which engage with the journal-boxes *j'* of shaft J to support that end of the board, the outer end being preferably supported by hinged legs. (Not shown.) The inner end of the board is slotted centrally to a point forward of the position occupied by the paster-wheel while in operation, as at 38, to permit the operation of said wheel by the band 17. Thus a sheet fed from the main feed-board will be carried under the short tapes 13 and met by another sheet fed from the auxiliary feed-board, the two being carried rearward in the machine by the main carrying-tapes 15. The paster-wheel serves, in addition to applying the paste to the sheet fed from the auxiliary feed-board, as a feed-roll for that sheet, it being operated by frictional contact with the short tape or band 17 traveling on the pulleys 16 and 18; but in case it is not desired to paste the sheet the pasting apparatus may be removed from the rock-

shaft K and a drop-roll placed thereon. It will be understood that the feed-guides 22 operate in the same manner as those on the rock-shaft G.

5 To adapt the machine to fold a single sheet, it is only necessary to remove shaft I and rock-shaft K and pass the main carrying-tapes 15 over pulleys *j* on shaft J and over pulleys *H'* on shaft H, the tapes bearing against the main  
10 pulleys *d* on shaft D, as seen in Fig. 2.

When desired to paste a four-page sheet the pasting device may be attached to the tapper (not shown) over the first-fold rollers.

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

1. In a folding machine, a rock-shaft carrying feed-guides and a centrally-arranged drop-roll, means for operating said shaft, and  
20 a driving-shaft carrying a series of main pulleys against which the tapes bear and also a central pulley with which the drop-roll has frictional contact while in operation, whereby a sheet may be fed into the machine with a  
25 central grip only.

2. In a newspaper-folding machine, the combination, with the driving-shaft carrying a series of main pulleys, means for feeding sheets of paper over said pulleys, and the main tapes bearing against said pulleys, of a series of  
30 short tapes arranged at an angle to, above, and separate from the main tapes and bearing against the main pulleys, and means for feeding sheets of paper between the two sets  
35 of tapes, whereby one sheet may be fed over the main pulleys and under the short tapes and another sheet simultaneously fed between the two series of tapes and both sheets carried through the machine together.

40 3. In a newspaper-folding machine, the combination, with the driving-shaft carrying a series of main pulleys, means for feeding sheets of paper over said pulleys, and the main tapes bearing against said pulleys, of a series of  
45 short tapes arranged at an angle to, above, and separate from the main tapes and bearing against the main pulleys, a rock-shaft

mounted in the frame forward of the short tapes, and a pasting device carried by said rock-shaft, substantially as described and for  
50 the purposes stated.

4. In a newspaper-folding machine, the combination, with the main pulleys, the feed mechanism, the series of main tapes, and the series of short tapes, all arranged as described,  
55 of a rock-shaft mounted in the frame forward of the short tapes, a pasting device and feed-guides carried by the rock-shaft, and a traveling belt with which the paster-wheel has frictional contact when in operative position,  
60 substantially as described and for the purposes stated.

5. In a newspaper-folding machine, a pasting device consisting of a cup having a slot in its bottom, bifurcated lugs depending from  
65 its sides, a shaft in the bifurcations of the lugs, a paster-wheel loosely mounted on said shaft, and pivoted hooks for holding the shaft in the lugs, in combination with a cup-supporting standard against which said hooks  
70 bear, substantially as described.

6. In a newspaper-folding machine, the combination, with a paper-rack and a fly automatically actuated in the rearward direction,  
75 of a revoluble shaft, a cam carried by said shaft and adapted to operate against the fly to throw it in the forward direction, and a paper-brace carried by said cam.

7. In a newspaper-folding machine, the combination, with a paper-rack and a fly automatically operated in the rearward direction,  
80 of a revoluble shaft, a cam carried by said shaft and adapted to move the fly in the forward direction, and a paper-brace carried by the cam, said paper-brace consisting of a wire  
85 secured at one end to the cam and curved concentric with the cam-hub.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. SKILLEN.

Witnesses:

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J. F. STUDEVANT.