April 7, 1931. A. PARKER 1,800,101

MACHINE FOR PERFORATING SHEETS OF PAPER AND FASTENING THE SAME TOGETHER

Filed Nov. 17, 1928 2 Sheets-Sheet 1

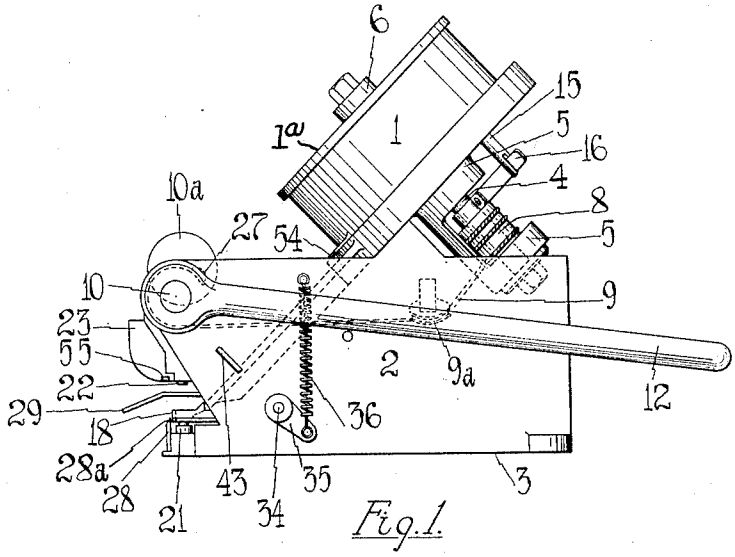


Fig. 1.

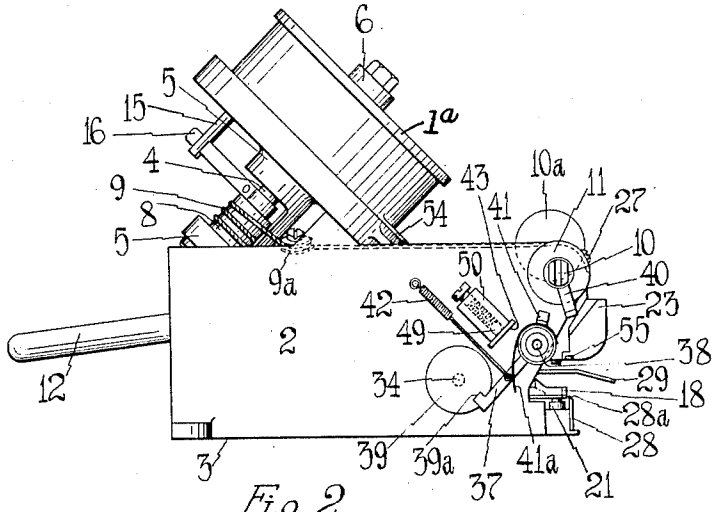


Fig. 2.

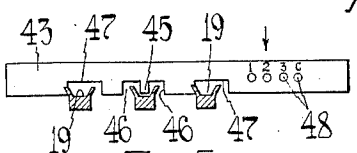


Fig. 5.

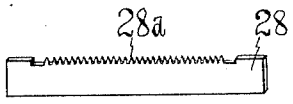


Fig. 6.

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MACHINE FOR PERFORATING SHEETS OF PAPER AND FASTENING THE SAME TOGETHER

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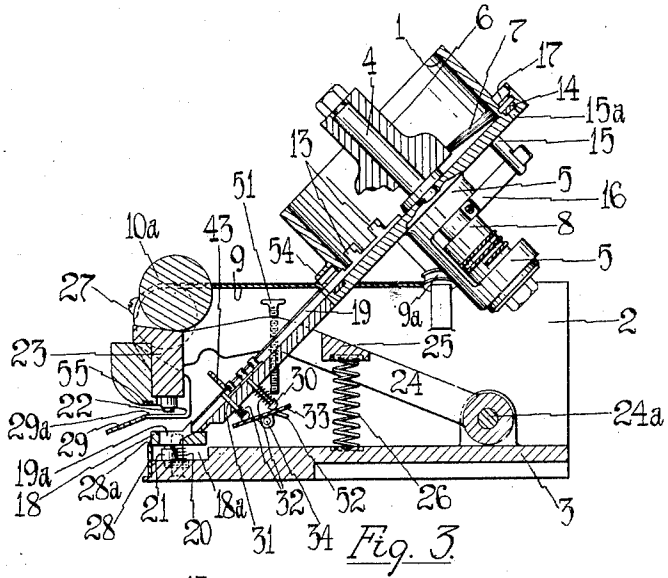


Fig. 3.

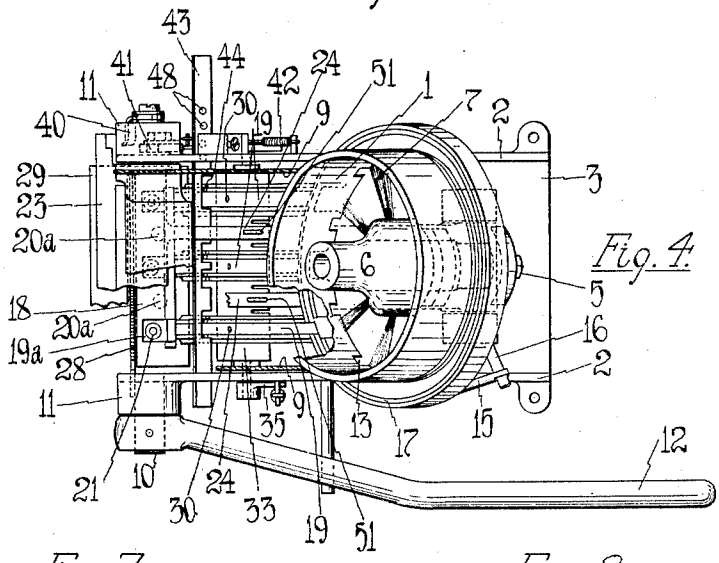


Fig. 4.

Fig. 7.

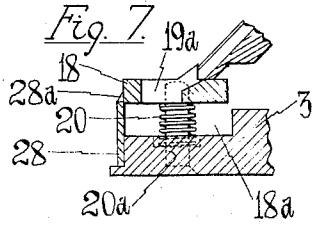
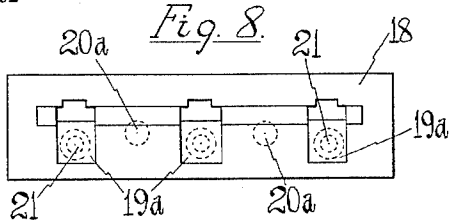


Fig. 8.



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UNITED STATES PATENT OFFICE

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MACHINE FOR PERFORATING SHEETS OF PAPER AND FASTENING THE SAME TOGETHER

Application filed November 17, 1928, Serial No. 320,122, and in New Zealand November 29, 1927.

This invention relates to machines for perforating, and at the same time securing together several thicknesses of paper, fastenings being passed through and clinched in the paper, near the edges thereof, while the perforations are made near the latter, in order to provide for the removal of the secured together edges to facilitate the separation of the thicknesses of paper, or the opening out of the latter from a folded form.

Machines for perforating sheets of paper and for securing same together have been made in various forms, and the object of this invention is to provide an improved construction of machine, by means of which thicknesses of paper, may be securely fastened together at their edges and at the same time be perforated near the latter, during the one and the same operation, which also provides for a supply of the fasteners used for securing the thicknesses together being maintained in pre-determined numbers, regulatable at will.

The improved machine comprises a sloping holder for the paper fasteners; means for agitating the contents of the holder, movable and fixed dies for forcing the fasteners through the paper and clinching them therein; raceways for leading the fasteners from the holder to between the dies. a shutter for controlling the delivery of fasteners from the raceways, means for controlling and regulating the passage of fasteners down the raceways; and means operable from the movable die actuating means for effecting the agitation of the fasteners in their holder.

The means for controlling the delivery of the fasteners from the raceways in order to provide for the securing of the paper edges at one or more points, consists of a shutter adjustable across the raceways, and containing openings disposed so that one, two or three raceways may be opened at anyone time, whereby a single, or two or three fasteners can be passed at a time to between the dies for insertion in the paper.

The means for controlling and regulating the passage of the fasteners down the raceways, so that not more than a single fastener can escape at any one time from each raceway, comprises pins, a lower and an upper pin to each raceway, actuated from a rocking plate so that upon the lower pin releasing a fastener for delivery to between the dies, the remainder of the fasteners in the same raceway are held by the upper pin until such time as the lower pin is again inserted in the raceway, when the fasteners in the raceway gravitate down to the lower pin.

The raceways are kept filled with fasteners, from the holder, to ensure a regular supply of fasteners to between the dies as required, by means of an agitator, operating in the holder, to pass fasteners from the latter, to an annular channel from which said fasteners are passed to the raceways, said agitator being operated from the die actuating means so that each time the machine is used to perforate and to fasten thicknesses of paper together, the agitator is given motion, thereby ensuring a regular supply of fasteners to the raceways.

The above and other features comprised in the invention will however be more particularly described with the aid of the accompanying drawings, which illustrate a machine suitable for inserting eyelets in and also for perforating thicknesses of paper.

Figures 1 and 2 being side views of the machine taken from opposite sides,

Figure 3 a longitudinal sectional elevation with part of the agitator removed,

Figure 4 a plan view (with parts removed to facilitate illustration),

Figure 5 a cross-sectional elevation of the raceways and showing the shutter operating across same,

Figure 6 a detail view in perspective of the paper perforator,

Figure 7 a cross-sectional view of the guide block and its mounting and

Figure 8 a plan view of the guide block.

The machine comprises a holder 1 for paper fasteners such as eyelets, supported between the side plates 2, rising from a base plate 3, so that its bottom slopes downwards towards the front of the machine, said holder being provided with a cover 1*a* removable at will.

A spindle 4 passing through the holder 1

and operable in bearings 5 below the latter has keyed thereon within said holder, an agitator, 6 fitted with brushes 7 adapted to sweep against the inner surface of the wall of the holder 1, upon the spindle 4 being rotated, while the portion of the latter between the bearings 5 has keyed thereon a drum 8.

A cord 9 passed one or more times around the drum 8, is led around guide pulleys 9*a* one on each side plate 2, the ends of said cord being passed one end above and one end below the opposite ends of a horizontal spindle 10 supported by bearings 11 on the side plates 2, across the front of the machine, the ends of said cord 9 being secured to said spindle 10 by screws 27.

A hand lever 12 fixed on one end of the spindle 10 is provided to enable the latter to be given partial turning movement in either direction, turning movement of said spindle in either direction, winding in one end of the cord 9 and unwinding the other end thereof whereby the spindle 4 and agitator 6 with the brushes 7, are caused to be rotated within the holder 1.

The wall of the holder 1 contains openings 13 which lead into an annular channel 17 surrounding said holder, the bottom of the channel 17 having recessed therein a ring 14 to which is connected by a pin 15 the outer end of an arm 16 keyed on the spindle 4, the pin 15 passing through a curved slot 15*a* in the base of the holder 1 so that when the agitator 6 is given turning movement in the holder 1 the ring 14 is also given turning movement in the channel 17.

Inclining downwards from the lower or front portion of the annular channel 17 to a guide block 18 at the front of the machine are raceways 19, the internal cross dimension of each of which is such that eyelets can pass down the same only in single file.

The guide block 18 is kept pressed up against the lower ends of the raceways 19 and out of the recess 18*a* by springs 20 in compression between the base plate 3 and said block 18, pins 20*a* around which the springs 20 are placed being secured to the base plate 3, and being entered in the guide block 18 to act as guides for the latter during upwards and downwards movement thereof. A blade 28 with a serrated upper cutting edge 28*a* is secured to the base plate 3 at the outer edge of the guide block 18, the latter when forced down, passing below the serrations 28*a*.

The raceways 19 lead to openings 19*a* in the guide block 18, lower dies 21 secured to the base plate 3, being located immediately below said openings 19*a*, while upper dies 22 one directly over each lower die 21, are carried by a die block 23, mounted across the outer ends of arms 24 pivoted to the base plate 3 at 24*a*, and connected by a cross bar 25, between which and said base plate 3 a spring 26, in compression acts to maintain the die block 23 normally up against the intermediate eccentric portion 10*a*, which is mounted on the horizontal cross spindle 10.

A rest plate 29 for the thicknesses of paper or other material to be perforated and secured together is formed of spring material and as attached to the die block 23, by portions 29*a* at its ends, said plate 29 not extending over the blade 28 or the lower dies 21.

The means for controlling and regulating the passage of eyelets down the raceways 19 to the openings 19*a* in the guide block 18 comprises pins 30, 31 passing upwards through the raceways 19 there being an upper pin 30 and a lower pin 31 to each race 19, the pins 30, 31 having thereon springs 32 adapted to be compressed between their heads and the raceways 19 the former bearing on a rocking plate 33 mounted between the side plates 2.

The spindle 34 on which the plate 33 is secured extends through the side plates 2 and has secured on one end outside the adjacent side plate 2 an arm 35 between the outer end of which and a pin on said side plate 2 a tension spring 36 acts to normally tend to move the rocking plate 33 from the position shown in the drawing, said plate 33 being maintained in the position shown against the action of the spring 36 by the engagement of the pawl 37 keyed on the shaft 38, in the notch 39*a* of the disc 39 keyed on the opposite end of the spindle 34, to the arm 35, and also outside the adjacent side plate 2.

The disc 39 is adapted to be freed of the pawl 37 to enable the plate 33 to move under the action of the spring 36, by an arm 40 fixed on the end of the horizontal spindle 10 engaging (and afterwards clearing) a further short arm 41 on the shaft 38 whereby partial turning movement is given the latter and to withdraw the pawl 37 from the notch 39ª of the disc 39, against the action of a tension spring 42 acting between said pawl 37 and a pin on the side plate 2.

The arm 41 is mounted on the shaft 38 so that when moved by the arm 40 as the hand lever 12 is brought to the front of the machine, it, the arm 41 imparts turning movement to the shaft 38, said arm 41 however being free to turn in the reverse direction on the shaft 38, without affecting the latter, and against the action of the spring 41*a*.

Means for cutting "off" the supply or "feed" of eyelets down the raceways 19, comprises a shutter 43 operable horizontally through the side plates 2 and also through slots 44 in the sides of said raceways, said shutter 43 having a tongue 45 and openings 46 one at each side of the latter for use in conjunction with the centre raceway 19, and two longer openings 47 for use one each in conjunction with a side raceway 19.

Recesses or depressions 48 are provided in

the shutter 43 for the purpose of being engaged by a regulatable spring pressed ball 49 held in a casing 50 on a side plate 2, so as to maintain the shutter 43 in a selected position.

In the drawing the shutter 43 is shown with the tongue 45 in the centre raceway 19 and with the openings 47 extending across the side raceways 19, and in this position eyelets can not pass down the centre raceway 19, but are able to pass down the two side raceways 19. If the shutter 43 be moved from right to left a distance equal to the distance between two of the recesses or depressions 48, the tongue 45 will be moved out of the centre raceway 19 to open same, while the openings 47 will still allow eyelets to pass down the two side raceways 19, so that all three raceways 19 will be open for the passage of eyelets down same. If the shutter be given additional movement in the same direction the additional movement being also equal to the distance between two of the recesses or depressions 48, it will be seen that all of the openings 46 and 47 will clear the raceways 19, and the latter will all be closed by the shutter 43 to the passage of eyelets down same. With the shutter 43 in the position shown movement of the latter from left to right, a distance equal to the distance between two of the recesses or depressions 48 will have the effect of moving the tongue 45 out of the centre raceway 19 and at the same time of closing the side raceways 19, thereby leaving the centre raceway 19 open for the passage of eyelets down same.

Thus it will be seen that with the check ball 49 engaged in the recess or depression 48 marked "1" on the shutter 43, the latter will open only the centre raceway 19, and with the ball 49 engaged in recess or depression 48 marked "2" the two side raceways 19 only will be opened, and with the ball 49 engaged in recess or depression 48 marked "3" all three raceways 19 will be opened while with the ball 49 engaged in recess or depression 48 marked "*c*" all three raceways will be closed, so that the operator is enabled to allow one, two or three eyelets to pass to the dies as he desires, or is enabled to cut "off" the feed of eyelets altogether.

Screws 51 adjustable through the arms 24 are provided to engage downwardly bent portions 52 of the plate 33, as said arms are moved downwards, for the purpose of bringing said plate 33 and the pins 30 31 to the positions shown in the drawing as will be hereinafter described.

To operate the machine the procedure is as follows:—The eyelets are placed in the holder 1, and the shutter 43 adjusted to close all of the raceways 19. The hand lever 12 is then worked from back to front of the machine and vice versa to rotate through the cord 9, the agitator 6 and the ring 14, the brushes 7 feeding the eyelets through the openings 13 in the holder 1, into the annular channel 17 and onto the ring 14, the latter agitating the eyelets so that they feed down to the raceways 19, guard plates 54 preventing said eyelets jumping from the raceways 19 as they enter same.

When the raceways 19 are fully charged the shutter 43 is adjusted to allow eyelets from one, two or three raceways 19 to pass to between the dies 21, 22 according to requirements, there being a pair of dies for each raceway.

The thicknesses of paper or other material to be fastened together and perforated are inserted between the rest plate 29 and the upper dies 22 and the hand lever 12 swung from the back to the front of the machine, the rocking plate 33 being at this time in the position shown in the drawing with the lower pins 31 projecting up one into each raceway 19, the upper pins 30 all being withdrawn from the latter.

During the first portion of the forward movement of the hand lever 12, the arm 40, on the horizontal spindle 10 engages the arm 41 on the shaft 38 and turns the latter to withdraw the pawl 37 from the notch 39*a* in the disc 39, immediately following which the spring 36 acts on the arm 35 to rock the plate 33 on its spindle 34 so that the lower pins 31 will withdraw from the raceways 19 and the upper pins 30 will extend thereinto to engage in the second lowermost eyelets, the lowermost of which in each raceway 19 at the time in use upon being released by the pins 31 gravitate down the raceways 19 onto the lower dies 21 in the openings 19*a* in the guide block 18, the upper pins 30 preventing more than one eyelet escaping at a time from each raceway.

Continued forward movement of the hand lever 12 brings the eccentric portion 10*a* of the horizontal spindle 10 into action on the top of the upper die block 23 forcing the same, and the rest plate 29 down into contact with the guide block 18, the latter owing to its support by the springs 20 yielding until it contacts with the base 3 in which position it is below the serrated edge 28*a* of the blade 28, whereupon the rest plate 29 yields under the action of the downwardly moving die block 23 and the eyelets on the lower dies 21 are clinched between the latter and the upper dies 22 and through the paper or other material, the serrated edge 28*a* of the blade 28 at the same time piercing the paper or other material and forming a line of perforations therein, a strip of soft material 55 being provided on the die block 23, immediately over the blade 28 to prevent damage to the serrated edge or teeth thereof.

During the latter portion of the forward movement of the hand lever 12 the screws

51 in the arms 24 engage the downturned portions 52 of the plate 33 and force the latter against the action of the spring 36 back to its original position as shown in the drawing, the disc 39 being turned so that the pawl 37 will snap into the notch 39*a* under the action of the spring 42 and so lock the plate 33 until the next time the hand lever 12, is swung forward.

The return of the plate 33 to its original position has the effect of re-inserting the pins 31 in the raceways 19 and of withdrawing the pins 30, which have in the meantime been keeping the eyelets remaining in the raceways from sliding down the latter, the withdrawal of said pins 30 allowing the eyelets to move down against the pins 31, in readiness for the lowermost eyelets to be released for the next paper securing or sealing operation.

The hand lever 12 is now returned from the front to the back of the machine, and the secured together thicknesses of paper or other material withdrawn from between the rest plate 29 and the upper dies 22 immediately the latter clear said paper upon the die block 23 being raised by the arms 24 under the action of the spring 26, as the latter returns said arms and die block to their original positions.

During the return of the hand lever 12 from the front to the rear of the machine, the arm 40, which is now on the reverse side of the arm 41 to that shown in the drawing engages the latter, said arm 41 however merely turning idly on the shaft 38, until cleared by the arm 40, whereupon the springs 41*a* returns the arm 41 to the position shown in the drawing, in readiness for causing the withdrawal of the pawl 37 from the disc 39 upon the next forward stroke of the hand lever 12.

As each stroke of the hand lever 12 causes the operation of the agitator 6 and the ring 14 eyelets are fed at each operation of the machine, to the raceways 19 in order to keep same full.

What I do claim and desire to obtain by Letters Patent of the United States of America is:—

1. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners, movable and fixed dies for clinching the fasteners in the paper, means for actuating the said movable die; raceways leading from the holder to between the dies, an adjustable shutter for controlling the passage of fasteners down the raceways; means for controlling and regulating the delivery of fasteners from the raceways, a perforating blade on which the paper is pressed, and means operable from the movable die actuating means for effecting the agitation of the fasteners in order to deliver same to the raceways.

2. In a paper fastening and perforating machine having upper and lower dies for clinching the paper fasteners, a spring supported guide block with openings therein mounted over the lower dies, a block carrying the upper dies, a strip of soft material on said block, and a plate with a serrated upper edge fixed below said strip of soft material.

3. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners; movable and fixed dies for clinching the fasteners in the paper; means for actuating the said movable dies; an agitator in the holder for agitating the fasteners; a ring around the said agitator; raceways leading from the holder to points between the dies; an adjustable shutter for controlling the passage of fasteners down the race-ways; means for controlling and regulating the delivery of the fasteners from the race-ways; a perforating blade against which the paper is adapted to be pressed; and a common means for actuating the fastener-agitating means and the movable die, the said common means comprising a spindle and a cord, the agitator and the ring being adapted to be given rotary motion through the cord.

4. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners, the said holder having openings in its wall; an annular channel about the said holder into which the said openings lead; movable and fixed dies for clinching the fasteners in the paper; means for actuating the said movable die; race-ways leading from the said annular channel to points between the dies; means in the said holder and means in the said annular channel for feeding fasteners to the said race-ways; an adjustable shutter for controlling the passage of fasteners down the said race-ways; means for controlling and regulating the delivery of fasteners from the race-ways; a perforating blade against which the paper is adapted to be pressed; and means operable from the movable die-actuating means for energizing the means in the holder and the means in the said annular channel to cause them to deliver fasteners into the race-ways.

5. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners; the said holder having openings in its wall; an annular channel member about the said holder and into which the said openings lead; an agitator fitted with projections in the said holder and a ring in the said channel; movable and fixed dies for clinching the fasteners in the paper; means for actuating the said movable die; race-ways leading from the said annular channel to points between the dies, and an adjustable shutter for controlling the passage of fasteners down the said race-ways; means for controlling and regulating the delivery of fasteners from the raceways; a perforating blade

against which the paper is adapted to be pressed; and common means for actuating the said die actuating means, the said agitator and the said ring for imparting motion thereto.

6. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners; a rotary agitator in the holder fitted with brushes for agitating the fasteners; an annular channel member mounted about the said holder and in communication therewith; a rotatable ring in the said channel; a spindle extending through the said holder on which the said agitator is keyed; movable and fixed dies for clinching the fasteners in the paper; an arm and a drum keyed on the said spindle externally of and below the holder; the said holder having a slot therein; a pin on the said arm and extending through the slot into the said ring; a cord wound around the said drum, a spindle for actuating the upper dies, the ends of the cord being wound in opposite directions around the said spindle; means for imparting motion to the said spindle; an adjustable shutter for controlling the passage of fasteners down the race-ways; means for controlling and regulating the delivery of fasteners from the race-ways; and a perforating blade against which the paper is adapted to be pressed as an incident of downward motion of the movable dies.

7. A paper fastening and perforating machine, comprising a sloping holder for paper fasteners; movable and fixed dies for clinching the fasteners in the paper; a block on which the movable dies are carried, pivoted arms on which the said block is mounted; an operating spindle, means for imparting rotary motion thereto; an eccentric portion on the said operating spindle, the said pivoted arms and the said block being spring-biased for maintaining contact with the said eccentric portion; race-ways leading from the holder to points between the dies; and an adjustable shutter for controlling the passage of fasteners down the race-ways; means for controlling and regulating the delivery of fasteners from the race-ways; a perforating blade against which the paper is pressed as an incident to movement of the movable die, and means operable from the said spindle for effecting agitation of the fasteners whereby to deliver them to the race-ways.

8. In a paper fastening and perforating machine, a fastener-delivering race-way; a rocking plate; a spring connected to the said rocking plate; upper and lower spring-actuated pins entering through holes in the said race-way and bearing on the said rocking plate; the said spring tending to move the plate in one direction to allow one pin to withdraw from and to insert the other pin into the race-way substantially at right angles thereto; and downwardly movable arms having projections thereon for moving the plate in the opposite direction to exchange the positions of the pins.

9. In a paper fastening and perforating machine provided with a fastener-delivering race-way; a spindle; an arm keyed on the said spindle; a tension spring to which the said arm is connected; a rocking plate mounted on the said spindle; upper and lower spring pressed pins mounted on the said plate and located in holes in the said race-ways, the said plate when actuated being adapted to cause one pin to extend into the race-way substantially at right angles thereto and to allow the other pin to withdraw from its hole; movable and fixed dies on the said machine; a second spindle for actuating the said movable dies; an arm on the said second spindle; a notched disk on the said first-mentioned spindle; a pawl having an arm adapted for operation by contact between its arm and the arm on the said second-mentioned spindle for normally locking the said disk; a shaft on which the said pawl is mounted, movement of the arm on the said second-mentioned spindle against the pawl-arm tending to release the disk and to permit the rocking plate to be moved by the aforesaid tensioned spring to change the positions of the pins.

In testimony whereof I affix my signature.

ALEXANDER PARKER.