

C. A. STURTEVANT.

SIDE REGISTER FOR SHEET FOLDING OR OTHER MACHINES.

APPLICATION FILED MAR. 2, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

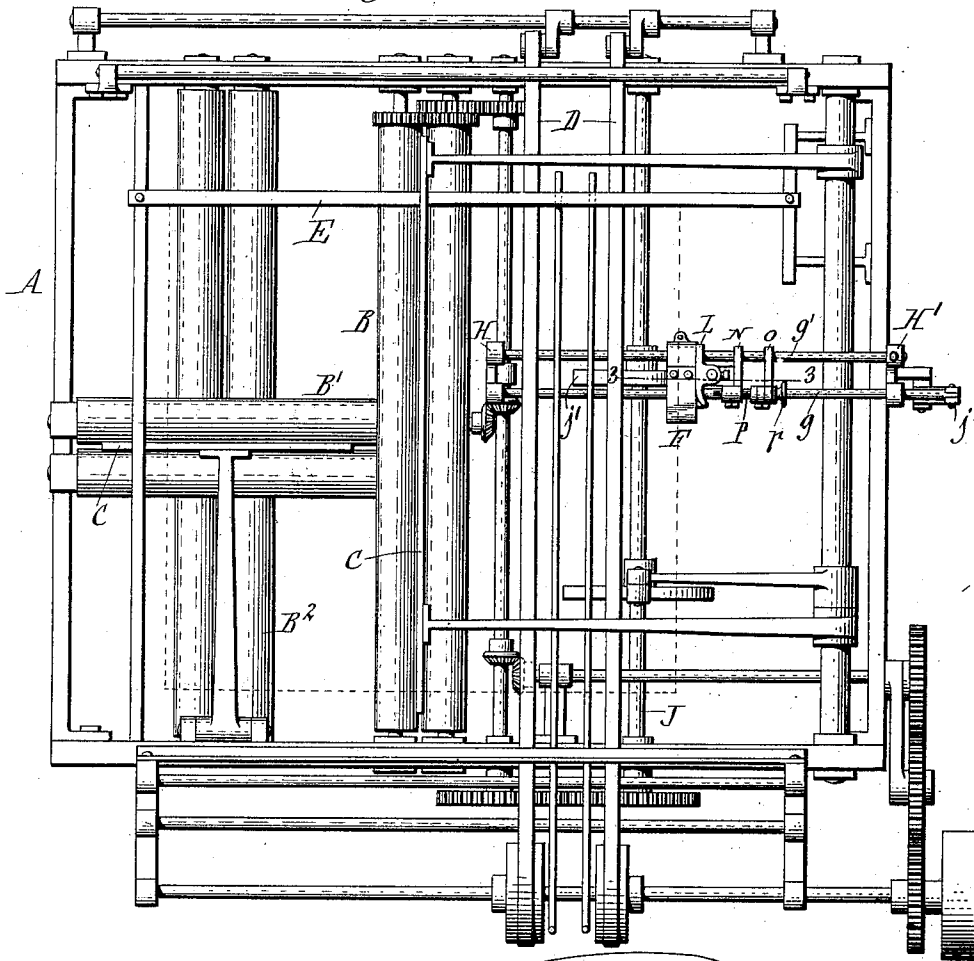
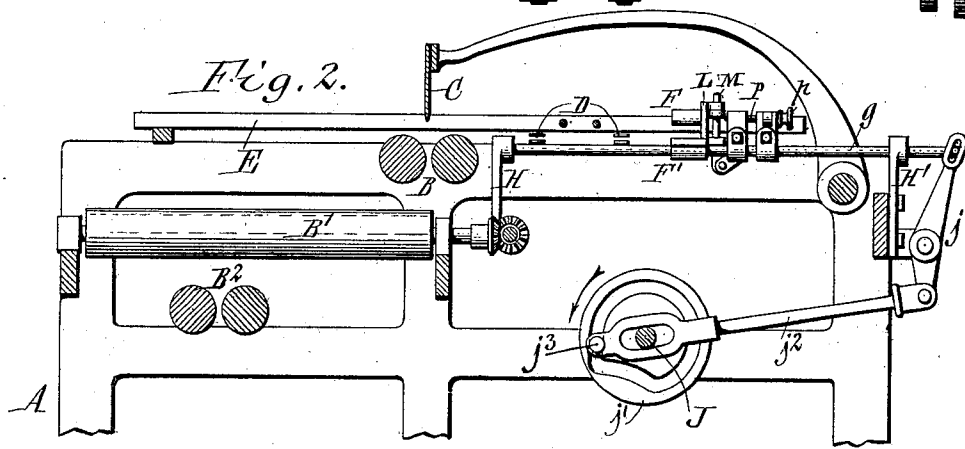


Fig. 2.



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Witnesses.

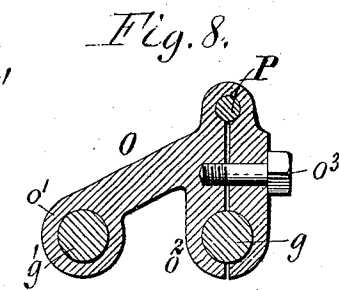
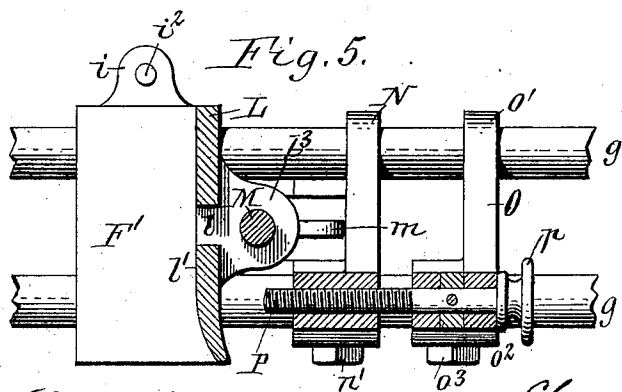
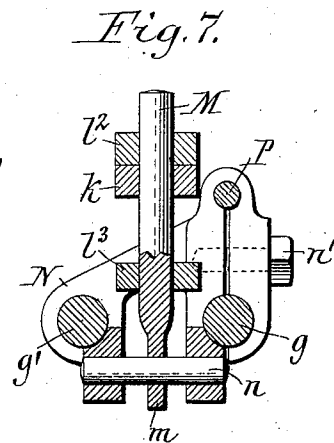
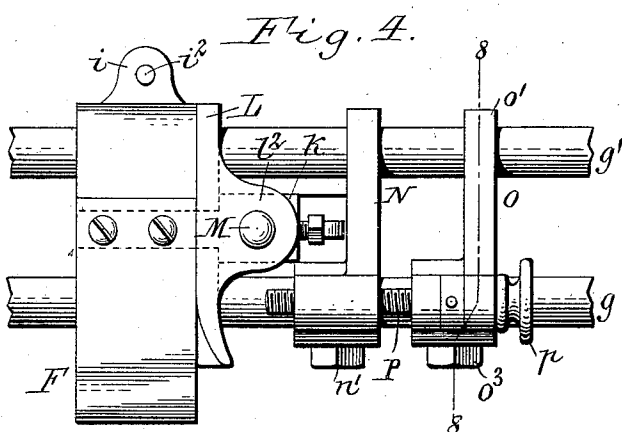
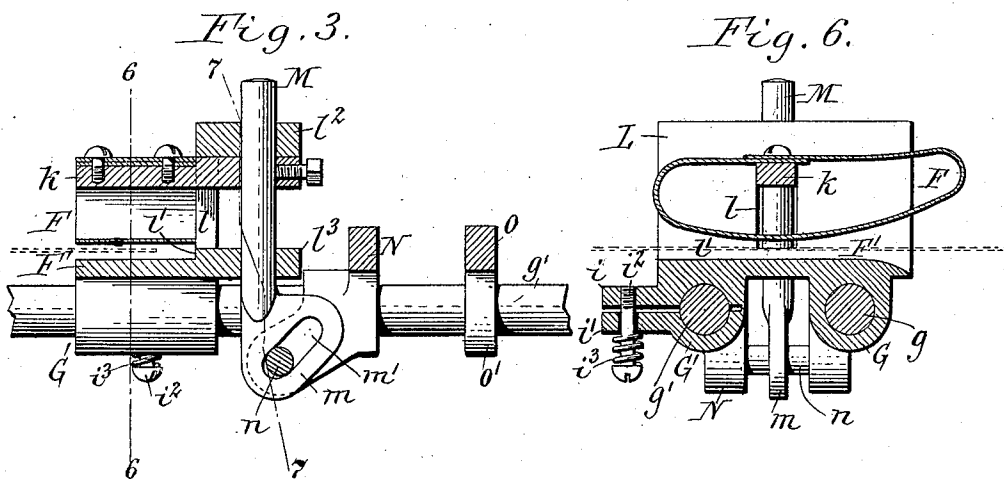
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2 SHEETS—SHEET 2.



Louis W. Gratz
Robert Weitknecht.

Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES A. STURTEVANT, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO
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SIDE-REGISTER FOR SHEET-FOLDING OR OTHER MACHINES.

SPECIFICATION forming part of Letters Patent No. 753,933, dated March 8, 1904.

Application filed March 2, 1903. Serial No. 145,795. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. STURTEVANT, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented new and useful Improvements in Side-Registers for Sheet-Folding or other Machines, of which the following is a specification.

This invention relates to side - registers whereby sheets of paper are placed in correct lateral register preparatory to being operated upon by a sheet folding, feeding, printing, or other machine.

The purpose of this invention is to provide a side-register of improved construction which will accurately and reliably side-register the sheets, which consists of comparatively few parts, and which can be readily adjusted for registering sheets of different sizes.

In the accompanying drawings, consisting of two sheets, Figure 1 is a top plan view of a sheet-folding machine provided with my improved side-register. Fig. 2 is a fragmentary sectional elevation of the same. Fig. 3 is a fragmentary transverse section, on an enlarged scale, of the side-register in line 3 3, Fig. 1. Fig. 4 is a top plan view of the same. Fig. 5 is a horizontal section of the same, the section being taken below the upper gripper-jaw and through the adjusting-screw. Figs. 6 and 7 are vertical transverse sections in lines 6 6 and 7 7, Fig. 3. Fig. 8 is a similar section in line 8 8, Fig. 4.

Like letters of reference indicate like parts in the several figures of the drawings.

The essential parts of the folding-machine shown in the drawings consist of the main frame A, which may be of any suitable construction; a plurality of horizontal imposition or folding rollers B B' B², which are arranged in pairs and between which the sheets are fed by blades C for producing the folds in the same successively in a well-known manner; feed-plates D, whereby the sheet to be folded is carried over the first pair of folding-rollers B, and E a front guide against which the sheet strikes with its front edge and its forward movement is arrested.

After the front edge of the sheet strikes the

front guide the same is moved laterally into a correctly - registered position by my improved side-registering mechanism preparatory to being folded by the first pair of rollers B.

This side - registering mechanism is constructed as follows: F F' represent the upper and lower jaws of the side-register gripper. These jaws are arranged lengthwise along the side of the path of the sheet to be folded, so that the sheet as it is carried forward by the tapes D passes with its side between the jaws of the gripper. The lower jaw consists of a rigid plate having a rounded front end to direct the sheet over the same. On the under side of this jaw are formed a pair of sleeves G G', which are mounted, respectively, on an actuating-rod *g* and a guide-rod *g'*. These rods are arranged parallel transversely in the machine below the tapes D and are supported at their inner and outer ends in brackets H H', secured to the main frame. The guide-rod *g'* is rigidly secured to the brackets H H'; but the actuating-rod *g* is capable of moving lengthwise in the same. The lower jaw is frictionally connected with the guide-rod *g'*, so that the same and the parts connected therewith will be held in position while the gripper-actuating mechanism opens and closes the jaws. This frictional connection may be constructed in various ways, that shown in the drawings consisting of two opposing ears *i i'*, formed, respectively, on the split parts of the sleeve *g'*; a tension-screw *i²*, connected with one of said ears, and a spring *i³*, interposed between the head of the screw and the other ear, as shown in Fig. 6. The other sleeve, G, of the lower gripper-jaw is mounted loosely on the actuating-rod *g*, and the latter slides through the same, while the lower jaw is held frictionally on the guide-rod against lateral movement with the actuating-rod. The upper jaw of the gripper is preferably constructed of a strip of spring-steel or other material, which is bent substantially into the form of an oval or elliptical loop and arranged lengthwise over the lower jaw. The ends of this loop terminate centrally on the upper part of the loop and are

secured to a vertically-reciprocating carrier or arm *k*.

Projecting upwardly from the outer side of the lower gripper-jaw and along the outer side of the upper jaw is a vertical wall or plate *L*, having a vertical slot *l*, which receives the outer part of the upper-jaw carrier *k* and serves as a guide for the latter. The inner side or face *l'* of the vertical wall *L* between the upper and the lower gripper-jaws constitutes the side guide or gage which engages with the side edge of the sheet and which determines the registering position of the same. The outer end of the carrier *k* is secured to the upper end of a vertical shipper-rod *M*, which latter is capable of sliding vertically in perforated lugs *l² l³*, arranged on the outer side of the wall *L* above and below the carrier. At the lower end of the shipper-rod is arranged a head *m*, having a cam-slot *m'*, which inclines from its outer end toward its inner end, as shown in Fig. 3. This slot receives a horizontal pin *n*, carried on the lower part of a cross-head *N*, which is mounted at its front and rear ends on the actuating-rod *g* and the guide-rod *g'*, respectively. The rear end of this cross-head slides on the guide-rod while the front end thereof is clamped on the actuating-rod, so as to move therewith, by a screw *n'*, which draws the split parts of the cross-head *N* against opposite sides of the actuating-rod.

An intermittent reciprocating movement may be imparted to the actuating-rod *g* by any suitable means. As shown in the drawings, this movement is derived from a continuously-rotating shaft *J* and transmitted to the actuating-rod by a vertical rock-lever *j*, pivoted on the main frame and connected with its upper arm to the outer end of the actuating-rod, a cam *j'*, mounted on the shaft *J*, and a connecting-rod *j²*, which is connected at one end with the lower arm of the rock-lever *j*, while its opposite end is provided with a roller *j³*, which engages with the cam-groove of the cam *j'*. The cam *j'* makes one rotation for every sheet that is fed to the machine and is so timed that the actuating-rod moves forward to the end of its forward stroke after the sheet has been fed between the jaws of the gripper, then moves backward to the end of the stroke in this direction, then moves forward a short distance, and then remains at rest while the respective sheet is being carried away and the next following sheet is fed to the gripper, when this cycle of operations is repeated.

While the sheet to be registered is being fed between the gripper-jaws the parts of the gripper occupy the position shown in Fig. 3, in which position the upper jaw is raised from the lower jaw by the shipper-rod, the carrier *k* bears against the upper guide-lug *l²* of the gage-wall, and the cam-pin *n* engages with the lower front part of the cam-slot *m'*.

After the sheet has been fed between the gripper-jaws the actuating-rod moves forward to the end of its stroke in this direction, during which time the gripper moves positively with the actuating-rod, and its frictional connection with the guide-rod *g'* slips on the latter. During this forward movement of the gripper the parts thereof remain in the position shown in Fig. 3 and the registering face *l'* is engaged with the side edge of the sheet to be registered. During the first part of the subsequent backward movement of the actuating-rod the gripper does not move with the same, but is held frictionally in place on the guide-rod *g'*. While the gripper is thus held stationary the pin *n*, moving with the actuating-rod, engages with the outer side of the inclined slot *m'* and moves the shipper-rod *M* downwardly, thereby bringing the upper jaw against the sheet and gripping or clamping the same against the lower jaw. This downward movement of the upper jaw and connecting parts continues until the pressure against the sheet is sufficient to overcome the friction between the lower gripper-jaw and the guide-rod, and thereafter the gripper carrying the sheet moves laterally outward with the actuating-rod to the end of the backward or outward stroke of the rod. When the gripper reaches this position, the sheet has been properly registered and is in condition to be subsequently folded or otherwise operated upon. The gripper is now held frictionally at rest on the guide-rod during a short part of the following forward movement of the actuating-rod, and while thus held the pin *n*, moving with this rod, engages with the inner side of the cam-slot *m'* and raises the shipper-rod, together with the upper gripper-jaw, thereby releasing the sheet from the gripper. After the gripper has been thus opened the same remains stationary until the registered sheet has been carried away and the next sheet to be registered has been fed between the gripper-jaws, when the registering operation is repeated, as before described.

By making the upper gripper-jaw in the form of a spring-loop the same bears against the sheet to be registered with a yielding pressure, and owing to the elliptical form of the loop the same gradually increases its bearing-surface upon straightening out under pressure, whereby the gripper adapts itself to varying thicknesses of sheets and the operation of the same is gentle and noiseless.

By tightening or loosening the screw *i²* the frictional connection between the gripper and the guide-rod may be adjusted for varying the firmness with which the gripper-jaws grasp the sheet before moving with the actuating-rod to suit the size of the sheet, the kind of paper, and other conditions. Upon loosening the screw *i²* the gripper will move with the actuating-rod while grasping the sheet loosely; but when the screw *i²* is tightened the upper

jaw must exert a greater pressure against the lower jaw before overcoming the friction between the lower gripper-jaw and the guide-rod and moving with the actuating-rod.

5 For the purpose of adjusting the gripper to different widths of sheets the same may be shifted lengthwise on the actuating-rod according to the size of the respective sheet. This is effected by loosening the clamping-
10 screw n' , which permits of shifting the cross-head N lengthwise on the actuating-rod, together with the gripper, to the required position, after which the screw is again tightened for clamping the cross-head on the actuating-
15 rod.

In order to permit of quickly and accurately adjusting the gripper for different sizes of sheets, the gripper is first adjusted coarsely or approximately to the desired position, and
20 then the fine adjustment for bringing the gripper to the exact position is effected by a fine or micrometer adjusting device, which is preferably constructed as follows: O represents a cross-head arranged on the outer side
25 of the cross-head N and having a sleeve o' , which is mounted loosely on the guide-rod g' , and a split sleeve o'' , which is secured to the actuating-rod g by a clamping-screw o''' , connecting the split parts of the last-mentioned
30 sleeve. P represents an adjusting-screw working in a screw-threaded opening in the upper part of the inner cross-head N and journaled in the upper part of the outer cross-head O, but incapable of longitudinal movement in the latter. The outer end of the adjusting-screw P is provided with a head or
35 finger piece p for turning the same. When it is desired to shift the gripper for registering a different size of sheet, the screws n' and o'''
40 are first loosened and the cross-heads N O, together with the gripper, are adjusted on the actuating and guide rods g g' for bringing the gripper and inner cross-head N to approximately the position which the same should
45 occupy for properly registering the sheet, after which the outer cross-head is fastened on the actuating-rod by tightening the clamping-screw o''' . Upon now turning the adjusting-screw P in the proper direction the inner
50 cross-head N, together with the gripper, may be accurately adjusted for bringing the side-registering face to the required position, after which the inner cross-head is fastened on the actuating-rod g by tightening the clamping-
55 screw n' .

I claim as my invention—

1. In a side-register, the combination of a horizontally-reciprocating lower gripper-jaw, an upper gripper-jaw which is movable horizontally with the lower jaw and also movable vertically independent of the lower jaw, a transversely-reciprocating actuating-rod, and a cam device which is interposed between said rod and the upper jaw, and which is constructed to open and close and also move the grip-
65

per-jaws transversely upon reciprocating said rod, substantially as set forth.

2. In a side-register, the combination of a horizontally-reciprocating lower gripper-jaw, a horizontal rod on which said jaw is guided, 70 a vertically-reciprocating upper gripper-jaw which is movable toward and from the lower jaw, a vertical shipper-rod guided on the lower jaw and connected with the upper jaw, a head arranged on the shipper-rod and provided 75 with a cam-slot, and a horizontally-reciprocating actuating-rod carrying a pin which engages with said cam-slot, substantially as set forth.

3. In a side-register, the combination of a 80 horizontally-reciprocating lower gripper-jaw, a horizontal rod on which said jaw is guided, a vertically-reciprocating upper gripper-jaw which is movable toward and from the lower jaw, a vertical shipper-rod guided on the lower 85 jaw and connected with the upper jaw, a head arranged on the shipper-rod and provided with a cam-slot, a horizontally-reciprocating rod arranged parallel with said guide-rod, a cross-head sliding on said guide-rod and secured to the actuating-rod, and a pin carried by said 90 cross-head and engaging with said cam-slot, substantially as set forth.

4. In a side-register, the combination of a horizontally-reciprocating lower gripper-jaw, 95 a horizontal rod on which said jaw is guided, a vertically-reciprocating upper gripper-jaw which is movable toward and from the lower jaw, a vertical shipper-rod guided on the lower jaw and connected with the upper jaw, a head 100 arranged on the shipper-rod and provided with a cam-slot, a horizontally-reciprocating rod arranged parallel with the guide-rod, an inner cross-head sliding on said guide-rod and adjustably secured to the reciprocating rod, a pin 105 carried by said inner cross-head and engaging with said cam-slot, an outer cross-head sliding on said guide-rod and adjustably secured to the reciprocating rod, and an adjusting-screw connecting said cross-heads, substantially as 110 set forth.

5. In a side-register, the combination of a horizontal guide-rod, a lower gripper-jaw having a split sleeve whereby said jaw slides on said rod, an adjusting-screw connecting the 115 split parts of said sleeve, a vertically-movable upper jaw guided on the lower jaw, and means whereby said jaws are actuated, substantially as set forth.

6. In a side-register, the combination of a 120 horizontal guide-rod, a lower gripper-jaw having a split sleeve whereby said jaw slides on said rod, an adjusting-screw connected with one part of the split sleeve, a spring interposed between the head of said screw and the 125 other part of the split sleeve, a vertically-movable upper jaw guided on the lower jaw, and means whereby said jaws are actuated, substantially as set forth.

7. In a side-register, the combination of a 130

lower inflexible gripper-jaw, and an upper gripper-jaw movable toward and from the lower jaw and comprising a support and a flexible strip bent to form a loop having a convex under side and secured at opposite ends to said support, substantially as set forth.

8. In a side-register, the combination of a lower rigid gripper-jaw, an upright wall arranged on said jaw and having a vertical slot, a vertically-reciprocating rod guided in said

lugs, a carrier arranged in said slot and secured to said rod, and an upper gripper-jaw consisting of a loop of spring metal which is secured on its upper side to said carrier, substantially as set forth.

Witness my hand this 24th day of October, 1901.

CHARLES A. STURTEVANT.

Witnesses:

H. B. ACKLAND,

A. W. HILSINGER.