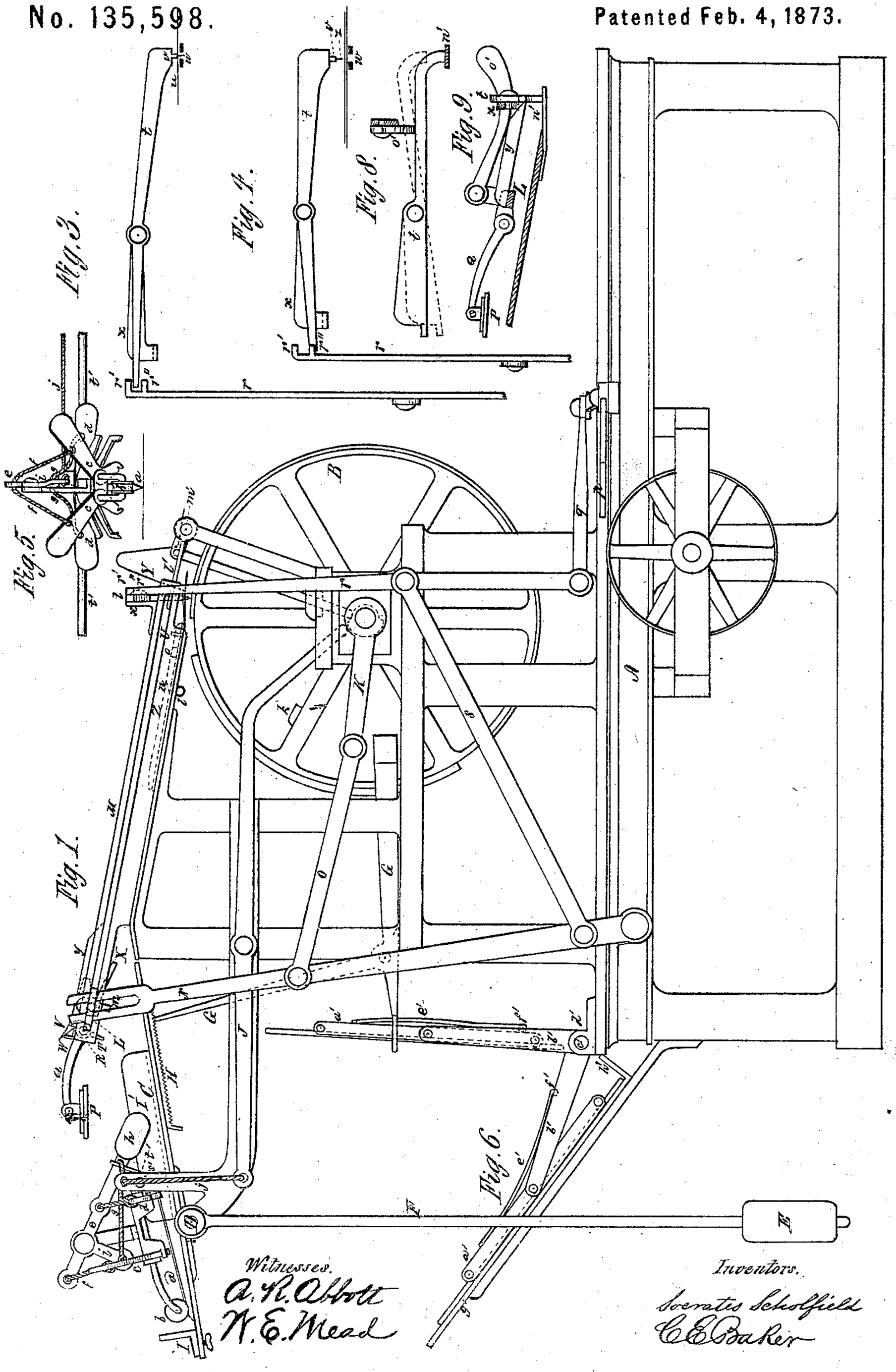
2 Sheets--Sheet 1.

S. SCHOLFIELD & C. E. BAKER.

Paper Feeding-Machines.

No. 135,598. Patented Feb. 4, 1873.



2 Sheets--Sheet 2.

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Fig. 2.

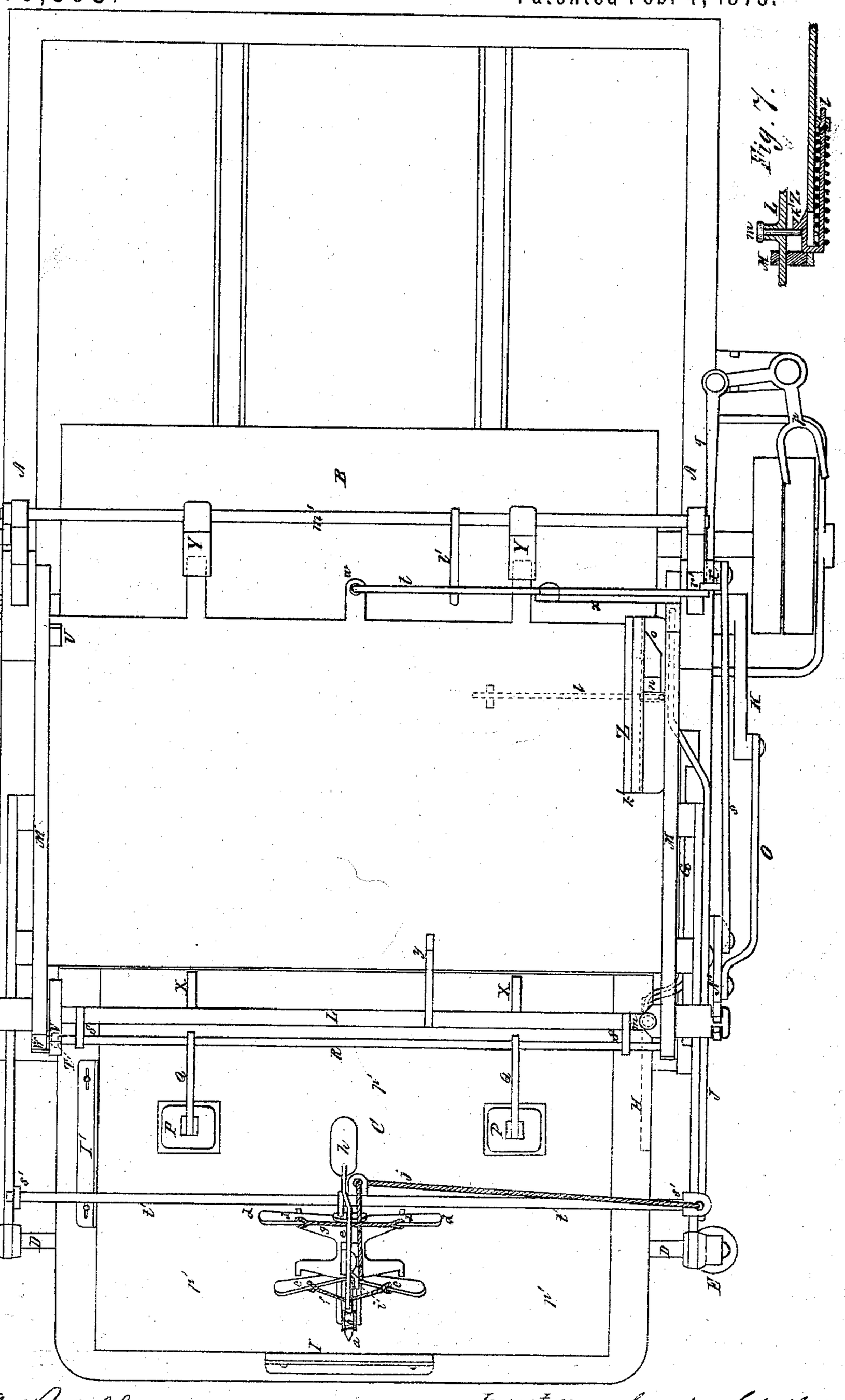

Fig. 1.

Witnesses.
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Inventors.
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UNITED STATES PATENT OFFICE.

SOCRATES SCHOLFIELD, OF PROVIDENCE, RHODE ISLAND, AND CHARLES E. BAKER, OF MONT CLAIR, NEW JERSEY.

IMPROVEMENT IN PAPER-FEEDING MACHINES.

Specification forming part of Letters Patent No. **135,598**, dated February 4, 1873.

To all whom it may concern:

Be it known that we, SOCRATES SCHOLFIELD, of Providence, in the county of Providence and State of Rhode Island, and CHARLES E. BAKER, of Mont Clair, in the county of Essex and State of New Jersey, have invented an Improvement in Feeding Paper to Printing-Presses and other Machines, of which the following is a specification:

The nature of our invention consists in an improved device for properly securing the uniform separation of the top sheet of a pile of paper from the sheet immediately below it, so that one sheet, and only one, can be drawn at a time. It also consists in devices arranged to operate with the moving sheet of paper in such a manner that, upon its passage to the rotating gripers of the cylinder, it may be carried beyond the proper point of register, to be returned thereto by a backward action. It also consists in a device for adjusting the sheet of paper from the side, the primary movement of which shall operate to raise the edge of the sheet, the extreme limit of the continued movement being also used to define the proper point of register in that direction. It also consists in certain indicating devices to be used with a stop-motion, in order to control the action of the machine when the paper is not properly presented to the gripers. It also consists in an improved fly, arranged to rock slightly upon bearings or hinged joints, so as to strike fair upon the top of the increasing pile of paper.

Figure 1 is a side view of a revolving-cylinder printing-press with our feeding apparatus attached. Fig. 2 is a top view of the same. Fig. 3 is a side view of the indicating-lever of the stop-motion. Fig. 4 is a similar view, showing its position when indicating the presence of two or more sheets. Fig. 5 is a front view of the pressure-finger which serves to hold back the lower sheet. Fig. 6 is a view of the fly, showing its position when depositing the sheet of paper upon the fly-board. Fig. 7 shows a sectional view of the guide which places the paper in register sidewise. Figs. 8 and 9 are a side and end view of a magnetic indicating-lever for the stop-motion.

A is the frame of the press; B, the revolving cylinder; C, the feed-board, balanced upon the shaft D, and held in an inclined position by means of the weight E, made adjustable on the rod F, which is keyed to the shaft D. The pawl-lever G operates in combination with the notched bar H to hold the feed-board firmly in its assumed positions, and continually follows it up as the paper is withdrawn. I I′ are two adjustable guides for placing the paper correctly upon the board. The pressure-finger *a* rests at one end upon the top sheet of paper, and is to be firmly held by means of the roller *b* and gripers *c* and *d*, the jaws of which are connected to the weighted rocking lever *e* by means of the chains or cords *f* and *g*, the whole being attached to the rod *t′*, turning on the bearings *s′ s′*. When the weight *h* on the lever *e* is raised, the closed griper *d* is thrown open, and the open griper *c* at the same time closed upon the finger, the chains or cords *f* and *g* being made of such length that one of the gripers will become entirely closed upon the finger before the other has commenced to open. Connection is made from the arm *i* to the lever J by means of the chain or cord *j*. The outer end of the lever J is bent as shown, and engages with the spur *k* upon one of the arms of the revolving cylinder B. K K are two cranks placed at opposite ends of the cylinder-shaft. The carriage L moves back and forth in the slotted guides M M, and is operated by means of the forked levers N N, which are connected to the cranks K K by the links O O. The friction-pads P P are hinged upon the arms Q Q attached to the shaft R, which turns loosely in the bearings S S. The pads P P are raised from the paper by means of the dog T which strikes against the stop U, and are then held in an elevated position by the spring-catch V, which is to be raised out of catch by striking the guide W, thus allowing the pads to drop upon the sheet of paper to be moved. The spurs X X strike against the springs Y Y, forcing them back, in order that they may react upon the forward edge of the paper and place in correct register. The guide Z, which may be held back by a spring placed upon the rod *l*, is forced up against the edge of the paper by means of the vertical sliding pin *m*, which rises up the incline *n*, and, by dropping behind the incline *o*, operates upon the return of the carriage to cause the guide

to be thrown forward, carrying the paper into correct register. The belt-shipper *p* is connected by the link *q* to the vibrating lever *r*, which receives its motion from the lever N through the link *s*. The upper end of the lever *r* is bent at right angles for a short distance, and strikes against the outer end of the lever *t*, when in the position shown in Figs. 1 and 2, thus causing the shipper to be moved from the tight to the loose pulley, but which passes over it without moving the shipper, when in the position shown in Fig. 3, the difference in elevation being caused by the interposition of a sheet of paper, *u*, which prevents the pin *v* from dropping into the hole *w*. The lever *t* is supported by the arm *x*, and may be raised to allow the paper to pass under the pin *v* by means of the inclined lifter or cam *y* attached to the carriage L. The spur Z attached to the pin V of the lever *t* is used to indicate the presence of two or more sheets by means of their additional resistance to puncture, the lever in this case assuming the position indicated in Fig. 4, its outer end engaging with the spur *r''* of the vibrating lever *r* to stop the machine. The vibrating lever stop-motion above described was patented by Socrates Scholfield, in Patent No. 77,923, dated May 12, 1868, being therein fully described and claimed. We therefore make no claim to such vibrating stop-motion in its general application, but only in combination with the operative mechanism of a self-feeding printing-press. The fly *a'* is supported by the arms *b' b'* attached to the shaft *c'*, and is made capable of a slight rocking motion upon the bearings *d' d'*. The spring *e'* throws the upper side of the fly forward until its lower side strikes the pin *f'*, which constitutes its normal position, but when the fly is thrown over, as represented in Fig. 6, the spring *e'* will be forced back, allowing the fly to adjust itself squarely upon the pile of paper, being free to again assume its normal position as soon as raised therefrom. The fly-board *g'* is so inclined that the paper deposited thereon will slide against the back piece or gage *h'* as soon as the fly *a'* is raised from the board.

In setting the press in operation the pile of paper is first to be deposited upon the feed-board C against the guides I and I', the guide I' being so set as to throw the pile beyond the proper line of register. After placing the paper the pawl-lever G is to be thrown back in order to allow the feed-board to settle to its appropriate level. Then as the paper is being withdrawn from the pile the feed-board will gradually rise, the pawl-lever G taking up and holding such movement, so that the board may always present a fixed resistance to downward pressure, yet perfectly free to move upward as the load becomes lighter. As the cranks K K commence to turn the carriage L will be thrown back far enough to raise the spring-catch V, allowing the pads P P to drop upon the top sheet of paper, and as the cranks continue their motion the friction of the pads upon the upper surface of the paper causes the top sheet of the pile to advance with their movement. Upon the instant the top sheet commences to move it will be penetrated by the pointed finger *a*, which will then rest upon the next sheet below, thus effectually preventing the forward movement of more than one sheet at a time. The top sheet now passes along the finger *a* upon which it is placed and under the roller *b*, which may be made to revolve by any suitable means, in order that the paper may pass this point without liability of tearing, and after the back edge of the sheet has passed the line of the open griper C, the action of the spur *k* upon the curved end of the lever J will serve to depress its opposite end, from which connection is made by means of the chain or cord *j* to the arm *i* of the weighted rocking lever *e*, causing the griper *c* to close upon the finger, and the griper *d* to open, thus allowing the paper to be drawn therefrom without at any time relieving the under sheet from the pressure of the finger. After the paper has been thus drawn from the pressure-finger *a* the gripers are made to assume their former positions by the downward action of the weight *h*, the griper *d* being closed and the griper *c* opened, as clearly shown in Fig. 5, and so remaining until another sheet shall have been drawn past the open gripper *c*. The hole made in the paper by the finger *a* should be within two or three inches of the back edge of the sheet, in order that such finger may be made of moderate length. As the carriage L moves down with the paper to meet the gripers of the revolving cylinder B the spurs X X press back the springs Y Y so as to allow the forward edge of the paper to pass beyond the proper point of register. Then as the cranks K K pass the center, giving the carriage a motion in the opposite direction, the springs Y Y will follow up such movement to the full extent of their action, operating against the lower edge of the paper to force it back to exact register in the direction of that side, the action of the springs being arranged to cease at the proper point. As the carriage reaches its lowest point in bringing the paper down to the gripers the dog T strikes against the stop U, raising the pads P P a few inches from the paper, to be thus held during the return of the carriage by the spring-catch V. As the carriage continues to move back the sliding pin *m*, which has dropped down back of the incline *o*, strikes such incline, causing the guide Z to be moved forward against the edge of the paper to the extent of the motion imparted by such pin, which should be to the proper point of register in that direction. In order to properly move the sheet sidewise we preferably curve up or raise the edge subject to the action of the guide, so that the paper may not have a tendency to bend up from the board upon which it is to be moved. This may be accomplished either by beveling the face of the guide Z, as shown in section in Fig. 7, the edge of the

paper being thus first raised to the bottom of the angular groove *k'*, and then forced to its proper position, or by means of any separate attachment operating to raise the edge of the sheet at the proper moment. As the carriage L continues its motion the lifting-cam *y*, which serves to hold the lever *t* out of the way of the paper as it is being brought down to meet the gripers, will be removed from under the lever, allowing its heavier end to drop onto the paper. Now, if two or more sheets of paper have been accidentally drawn down to the gripers the spur *z*, below the pin *v*, will fail to penetrate them, and the lever *t* will assume the position shown in Fig. 4, where its outer end will then be struck by the projecting stud *r''* of the vibrating lever *r*, the remaining movement of which will be immediately expended in moving the shipper *p* from the tight to the loose pulley, thus stopping the press. But if only one sheet has been taken down to the gripers, then the spur *z* will penetrate it to its junction with the pin *v*, and the end of the lever *t* will pass between the projecting studs *r'* and *r''* of the vibrating lever *r*, as shown in Fig. 3, and the machine will continue in operation; and in case no paper whatever has been brought down to the gripers by the action of the pads the spur *z* and pin *v* will drop into the hole *w*, causing the outer end of the lever *t* to be so elevated as to be struck by the projecting stud *r'*, thus stopping the machine, as before described, for two or more sheets. As the carriage is afterward thrown back to its first position the pads P P are caused to drop upon the paper as before. The lever *t* is to be raised from the paper, just before it is taken by the gripers of the revolving cylinder, by means of the lifting-arm *l'* secured to the rocking shaft *m'*, to which the registering-guides Y Y are also attached. Instead of the springs Y Y, used to move the sheet of paper back to the registering-point, any suitable device, operated by means of cams or otherwise, may be employed.

Another mode of obtaining an indication for use in the stop-motion of a self-feeding printing-press is shown in Figs. 8 and 9, where the lever *t* is made a permanent magnet, its outer end being weighted so that it may tend to disengage itself from the armature *n'*, being arranged to maintain its position when its face is brought in contact with its armature, but dropping away whenever a sheet of paper has been interposed. In this case we use the weighted arm *o'* hinged to the carriage L in order to drop the face of the magnet upon its armature as soon as the lifting-cam *y* has ceased to support it; and in case there should be no paper found, the outer end of the lever *t* will obstruct the vibrating lever *r*, stopping the machine; but if there should be a sheet of paper over the armature, then the weight of the outer end of the lever, being greater than the magnetic attraction, it will immediately fall away, allowing the vibrating lever to pass without obstruction.

We secure a sheet of paper, *p'*, or strips of the same, upon the surface of the feed-board C, so as to be under the action of the pads P P, in order that the lower sheet of the pile may encounter exactly the same resistance to removal as the sheets which have preceded it, so that no change of adjustment may be rendered necessary in withdrawing the lower sheets on account of their tendency to slide more easily on a smooth wooden or metallic surface.

We claim as our invention—

1. The combination of the pressure-finger *a*, bearing-roller *b* or an equivalent, and gripers *c* and *d*, operating substantially as described.

2. The combination of the friction-pads P P, carriage L, spurs X X, and registering-springs Y Y, operating to first draw the sheet beyond the proper point of register to be returned thereto by the reaction of the springs, substantially as described.

3. The registering-guide Z, arranged with an inclined or lifting face for first raising the edge of the sheet and then forcing it to the proper point, substantially as described.

4. The combination, with the operative mechanism of a self-feeding printing-press, of either the lifting device *l'* or holding device *y* with the indicating-lever *t*, vibrating lever *r*, and shipper *p* or its equivalent, operating substantially as described.

5. The spur *z*, used for the purpose of indicating the distinction between one and two sheets by their varying resistance to puncture.

6. The rocking fly *a'* operating to strike fair upon the top of the increasing pile of paper, substantially as described.

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