

H. A. W. WOOD.
AUTOMATIC SHEET REGISTERING.

APPLICATION FILED JAN. 22, 1895. RENEWED SEPT. 15, 1909.

954,603.

Patented Apr. 12, 1910.

4 SHEETS—SHEET 1.

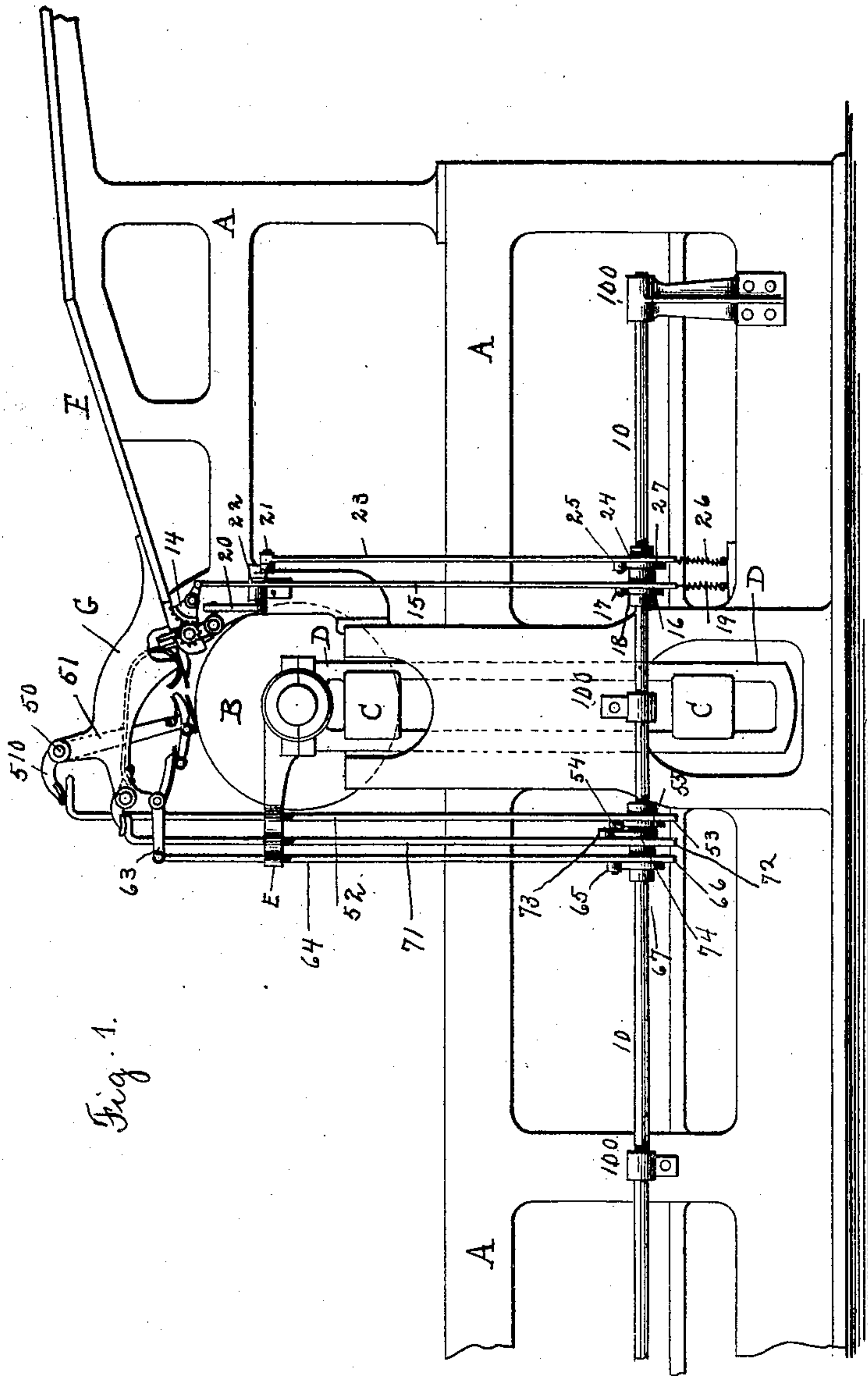


Fig. 1.

Witnesses.

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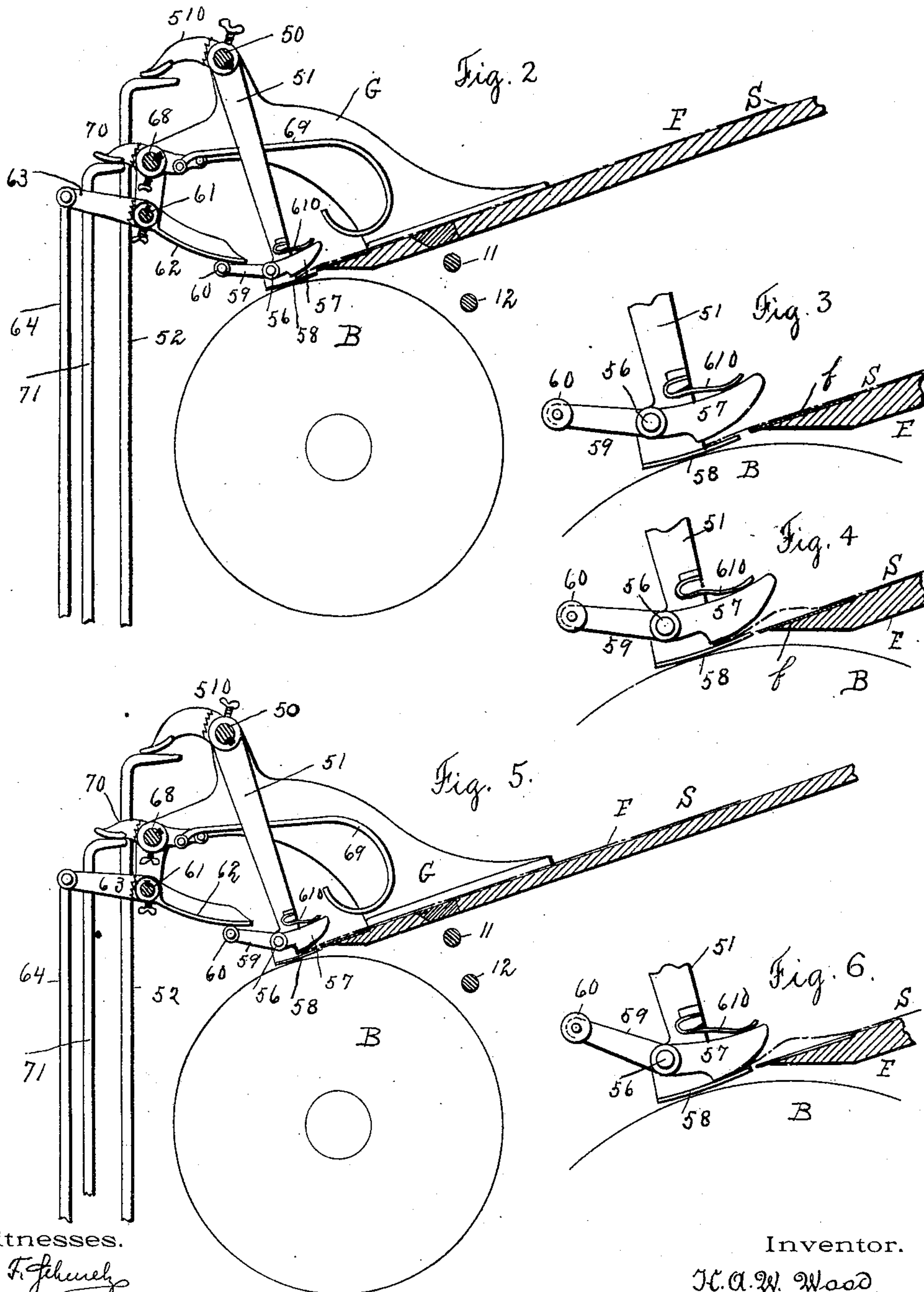
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4 SHEETS—SHEET 2.



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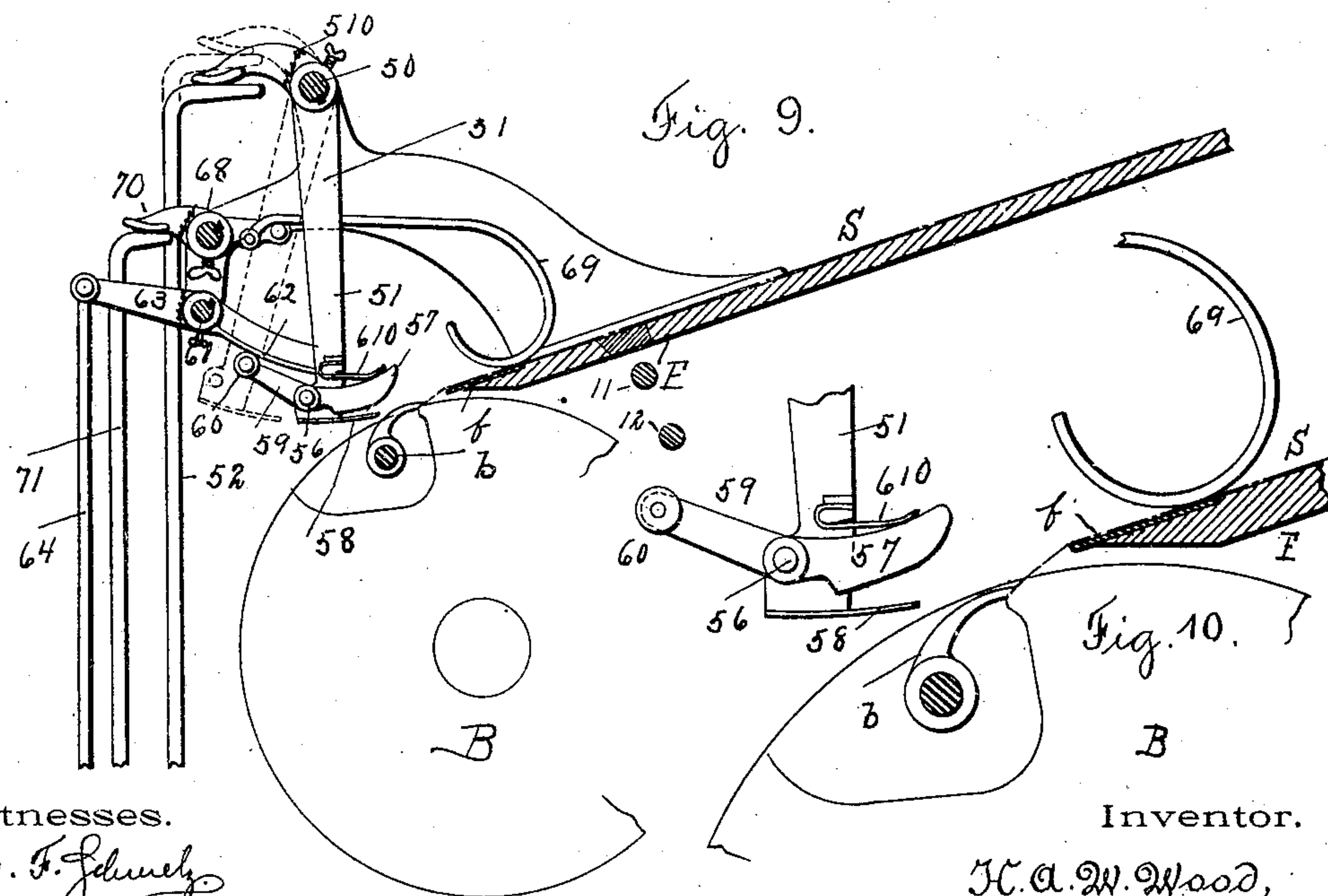
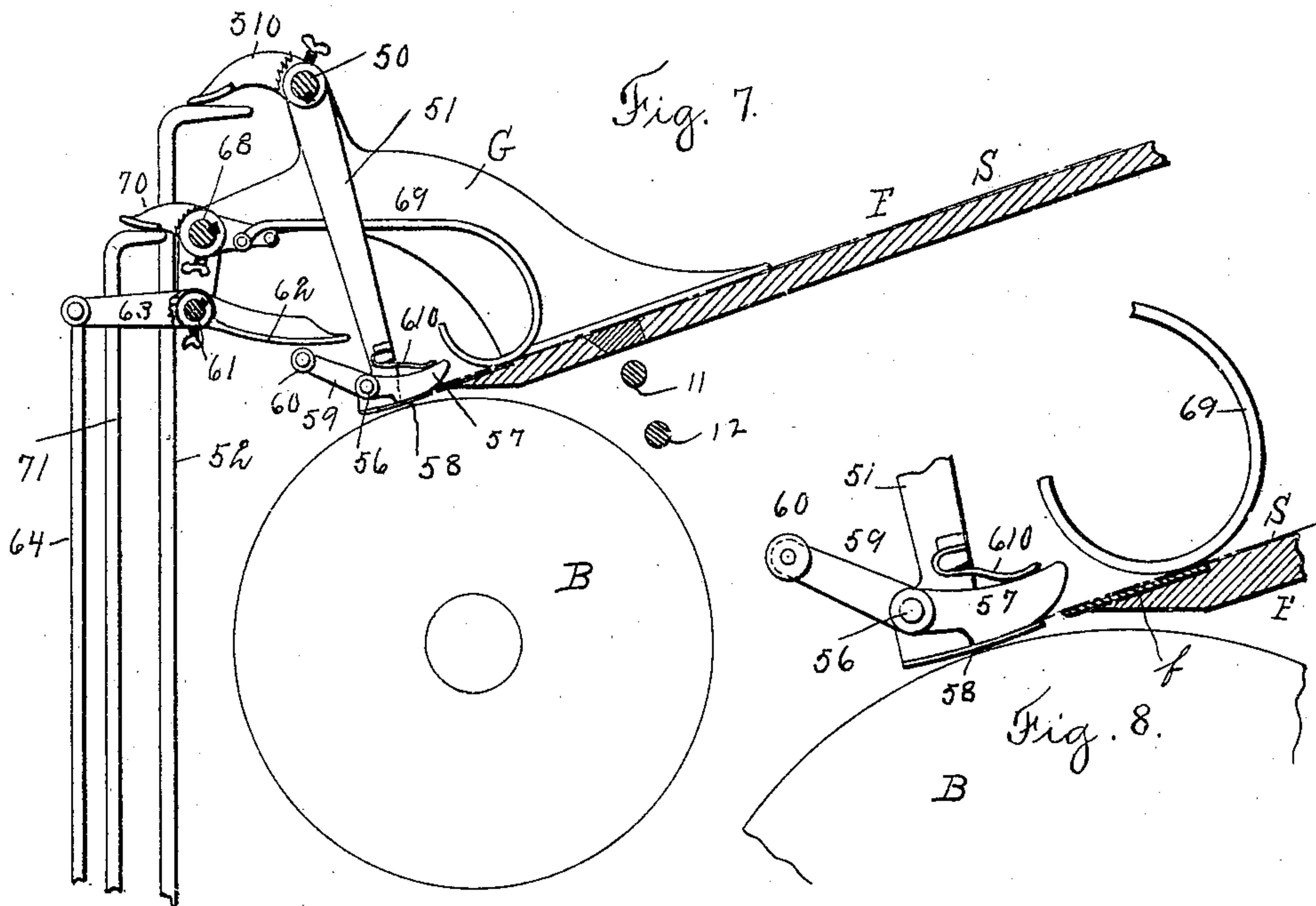
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4 SHEETS—SHEET 3.



Witnesses.
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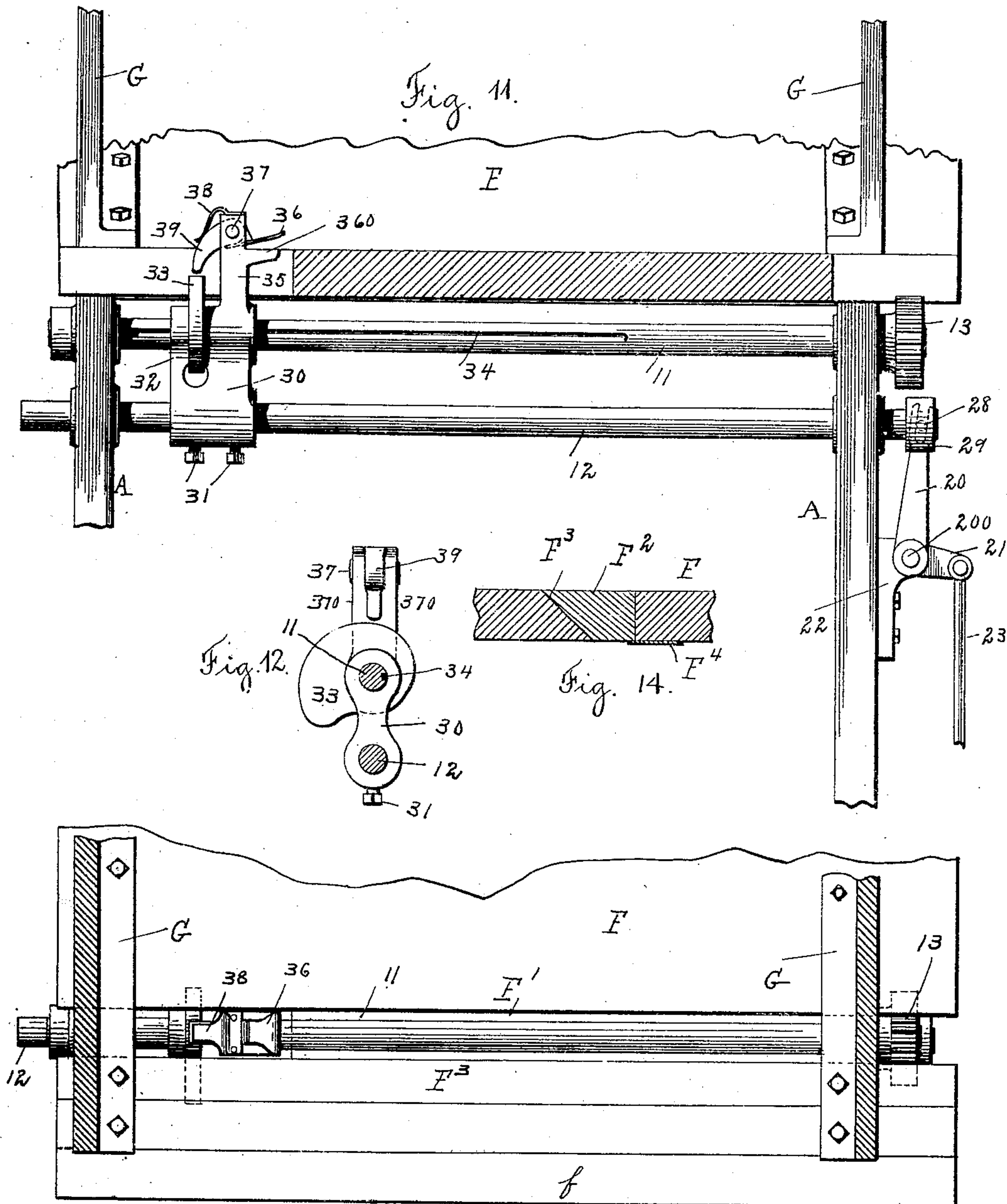
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4 SHEETS—SHEET 4.



Witnesses.
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Fig. 15—
 36 S open
 360 buckled
 — nipped
 — pulled forward
 — left in position

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UNITED STATES PATENT OFFICE.

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AUTOMATIC SHEET-REGISTERING.

954,603.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed January 22, 1895, Serial No. 535,784. Renewed September 15, 1909. Serial No. 517,920.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Automatic Sheet-Registering, of which the following is a specification.

The aim of this invention is to provide a new apparatus for automatically registering sheets placed in approximately the desired position, whereby they will be fed in register to a printing press, folding machine or other device.

I have shown in the accompanying drawings one way in which my invention may be carried out, and the application thereof to one of the ordinary forms of printing presses.

Referring to said drawings and in detail, Figure 1 is a side elevation of part of the frame-work of an ordinary printing press showing the application of my invention, Figs. 2 to 10 are diagrammatic views on an enlarged scale illustrating the parts and the operation thereof of the front registering mechanism, Fig. 11 is a transverse section of the feed-board showing the operation of the side registering mechanism, Fig. 12 is a side elevation of the side gripper, Fig. 13 is a plan view of the lower end of the feed-board, Fig. 14 is a section taken through the slot cut in the feed board and Fig. 15 is a diagram illustrating the action of the side registering mechanism, as hereinafter particularly described.

In practice to-day, when register work is wanted, and almost all good printing, either book or color work must be to register, it is necessary to employ a feeder competent to place each sheet exactly in position on the side and front guides of a press or other machine, and such feeders get high wages. Where perfecting presses are used, and such presses are arranged to register the sheets themselves, the cost of feeding is greatly reduced, because the feeder simply has to place sheets to guides without the necessity of registering them. Thus inexperienced boys are used who are paid relatively small wages. For many years experiments have been tried with so called automatic feeders, in which sheets are taken from a pile automatically and fed therefrom. So far as I am informed, such machines have not

proved successful in practice because of the impossibility and difficulty of exactly separating sheets from the pile.

I propose to provide an apparatus that will automatically register the sheet, provided the sheet is placed, approximately, as say within one quarter of an inch of its proper position. By this device, it will be only necessary to employ a cheap boy as a feeder, who can easily separate the sheets from the pile and place each sheet in approximately the proper position, but who will not have to feed the sheet to exact register. By my improved means, exact register work, such as is necessary, as aforesaid, for book and color printing, can be done by a low-priced feeder, the feeder simply placing the sheet in approximately the desired position, when my improved registering mechanism will bring the sheet to exact position so that as the same passes into the machine, it will be in exact register.

Referring to the drawings, I will now describe my invention so that a skilled printing press mechanic can understand the application of one form of my invention to an ordinary form of printing press.

In the drawings forming part of this specification, A designates the frame-work of a printing press, and B the impression cylinder which may be mounted in the usual framing D, which framing D is carried by brackets C. Extending from the framing is an arm E, which serves as a guide bracket for the rods that are used to actuate the front registering mechanism. The impression cylinder B has any of the usual grippers as *b*, which may be operated in any of the usual ways to carry the sheet around with the impression cylinder.

F represents a feed-board, which has a suitable nose as *f* at the end thereof. A transverse slot *F*¹ is cut through the board, and has a beveled edge *F*² at the front thereof, so that the sheets will not easily enter into said slot. Fillers or blocks of wood *F*² may be placed in the slot, if desired, as shown in Figs. 11 and 14, so that the board will present practically a smooth surface, and these fillers may be of various lengths to fill the entire slot, the exposed length of which depends upon the adjustment of the side registering mechanism, as hereafter described. The two parts of the feed-board are held together by the feet of the brackets

G which extend upwardly, and which are provided for the purpose of carrying the front edge registering mechanism hereafter described.

5 S represents a sheet which is supposed to be placed upon the feed-board and manipulated by my mechanism, as hereafter described.

10 A shaft as 10 is journaled in brackets extending from one side-frame, whereby said shaft is arranged parallel to said side-frame as shown, and may be driven from any of the moving parts of the machine and properly timed to operate the registering mechanism, as hereafter described.

15 I will first describe the mechanism that I may use to bring the side edge of the sheet into exact register after the sheet has been placed in approximately the desired position by the feeder. Two shafts 11 and 12 are journaled in said framing, and the shaft 12 is capable of a longitudinal or sliding movement in its bearings. On the end of the shaft 11 is arranged a pinion 13. Mesh-
20 ing and engaging with the pinion 13 is a pivoted segment 14 connected to which is a rod 15, the lower end of which is yoked as at 16, and which carries a roller 17 which bears on a cam 18 mounted on the shaft 10, and a spring 19 is used to keep the roller in constant engagement with the cam, this form of actuating mechanism being common in printing presses. The cam 18 is so arranged and proportioned, as hereafter de-
25 scribed, that it will impart an oscillating movement to the shaft 11.

30 An arm 20 is journaled on a short shaft 200, which shaft is arranged in a bearing 22 secured to the side frame, and extending
40 from the other end of the shaft 200 is an arm 21 connected to which is a rod 23 which is yoked at its lower end as at 24, and which carries a roller 25 which bears upon cam 27 arranged on shaft 10, and a spring 26 is
45 used to keep the roller 25 against the cam 27. The arm 20 engages a pin 28 carried by a collar 29 secured on the end of the shaft 12. By this mechanism, the shaft 12 will be given a slight reciprocating or sliding move-
50 ment in its bearings at the proper time to accomplish the function hereinafter described. The cam 27 is so proportioned that the shaft 12 will be moved from its normal position first a distance to the right of Fig.
55 11, and then to the left a greater distance, and so that thereafter the shaft will be given a slight movement back to its normal position. Mounted on said shafts 11 and 12 is a guide or piece 30. This piece 30 can be
60 adjusted back and forth on said shafts 11 and 12, and secured in an adjusted position by means of set-screws 31, by which the same can be readily clamped to the shaft 12. Extending up from the guide 30 is an
65 arm 32, and between the guide 30 and the

arm 32 a cam 33 is arranged. This cam 33 carries a key which fits in a slot or key-way 34 cut in the shaft 11, these parts being so arranged that no matter in what position the guide 30 is secured, the shaft 11 will control the cam 33. A post as 35 extends up
70 from the guide 30 through the slot F¹ of the feed-board. This post has an extending lip 360, which forms part of a side registering mechanism for the sheet.

75 A coacting lip 36 which is preferably made out of spring metal is secured to a horn 39 which is mounted on a short shaft 37, which is arranged in the ears, which form the upper end of the post 35. A
80 spring 38 is arranged to bear on the horn 39, and thus keep the spring lip 36 normally in a raised position. The horn 39 is arranged so that the same can be controlled by the oscillating cam 33. It will be seen
85 that the jaws 36 and 360 constitute a gripping device which has a gripping or registering edge, viz. the edge of the post 35 or the arms 370 which will bear against the edge of the sheet. It will be seen that the
90 reciprocating movement of the shaft 12 will impart a reciprocating movement to the gripping mechanism, and it will be seen that the gripping mechanism will be opened and closed by the oscillation of the cam 33.
95 These parts are arranged so that substantially the following operation takes place on the sheet. The sheet S is placed in approximately the desired position, the edge there-
100 of being placed between the jaws 36 and 360.

The following operations can be followed from the diagram of Fig. 15. The gripper, of course, will be open when the sheet is placed in approximately the desired position.
105 The gripping mechanism then moves toward the sheet so that the registering edge, which is the post 35, will be brought snugly against the edge of the sheet, and so that the sheet will be pushed slightly toward the
110 front side of the machine, or slightly buckled. The jaw 36 then closes and nips the sheet. Then the gripping mechanism moves to the left a distance preferably greater than its previous movement to the
115 right. This will carry the sheet a distance to the left, as in Fig. 11 greater than that which it was pushed to the right, and will smooth out the buckle of the sheet, if any such exists, and will bring the sheet to exact
120 register. After this has taken place, the gripping mechanism will open at the desired time, as hereinafter described, so that the sheet can be drawn into the printing press. This operation will bring the edge of the
125 sheet to exact register, for it does not matter how close or how far the side edge of the sheet is placed in the jaws, provided it is within approximately the desired position, so that the post 35 will engage the same on
130

its right-hand movement. The only difference that will occur from varying positions will be a variance in the buckle or right-hand movement of the sheet, which buckle or right-hand movement of the sheet is entirely smoothed out and counter-acted by the greater left-hand movement of the gripping device. The gripping device will move from its left hand position back to its normal position, or the position in which the sheet is placed in the same at the times when no sheet is in the gripping device, or between the time that elapses after a sheet has been drawn from the gripping device and before another is placed in position therein.

It will be seen that the entire gripping mechanism can be adjusted transversely of the feed-board, so that various widths of sheets can be fed and the same registering action take place.

I contemplate in some cases using two side gripping devices, but for most purposes, one gripping mechanism close to the front edge of the feed-board will be sufficient.

I will now describe the mechanism that I use to automatically bring the front edge of the sheet into the exact position. A shaft 50 is journaled in the brackets G, and on this shaft 50 are arranged two arms 51, and on the lower ends of these arms are arranged tongues 58, and the shaft 50 is kept normally in position toward the feed-board by any suitable spring device such, for example, as is shown in patent to Hawkins, No. 388,038, dated August 21, 1888. The arms 51 are also preferably made adjustable on the shaft 50, and may be secured in an adjusted position by means of suitable set screws.

I contemplate in some places keying the arms 51 to the shaft 50 so that they will be kept in exact position relatively to the feed-board, independently of their transverse adjustment.

On the end of the shaft 50, an arm or lever 510 is arranged, engaging which is a rod 52, the lower end of which is yoked as at 53, and which carries a roller 54, which bears upon a cam 55 arranged on the shaft 10, the cam 55 being so proportioned that the arms 51 will have the movements hereinafter particularly described. Each of the arms 51 carries a stud or short shaft 56, on which is journaled a jaw 57, which jaw 57 with the lip or tongue 58 will constitute a gripping mechanism, and in which gripping mechanism a registering edge, viz. the side of the arms 51 will be formed. The jaws 57 have extending arms 59 on which are arranged suitable rollers 60 mounted on suitable studs.

A transverse shaft 61 is journaled in the brackets G, and arranged on this shaft are arms 62 which have curved edges which are substantially circles struck about the center of the shaft 50. On the end of said shaft 61 is arranged a lever or arm 63, connected

to which is a rod 64, which is yoked at its lower end as at 66, and which carries a roller 65 which bears upon a cam 67 secured upon the shaft 10. By this mechanism, the jaws 57 can be opened and closed. Suitable springs, as 610 are preferably employed to keep the jaws 57 normally closed.

If desired, suitable spring arms as 69 may be employed to keep the sheet in position after the same has been registered, and until the same is taken by the grippers of the impression cylinder. These spring arms 69 may be arranged upon a shaft 68, on the end of which is arranged an arm or lever 70, which is engaged by a rod 71 which is yoked at its lower end as at 72, and which carries a roller 73 which bears on the cam 74 secured on the shaft 10. These spring arms may be made transversely adjustable upon their shafts, if so desired, and may be arranged substantially as shown in said Patent No. 388,038. It is not absolutely necessary to my invention to use such spring arms, but they may be employed to advantage upon large presses.

The levers or arms 62 are arranged so as to be capable of transverse adjustment upon their shaft 61, and said levers or arms are adapted to bear on the rollers 60. It will be seen that the vibrating movement of the arms 51 will not effect the action of the jaws 57, as the arms 62 are concentric with the shaft 50, but it will be seen that in no matter what position the arms 51 are, if the levers 62 are operated, the jaws 57 will be opened or closed, as desired. The operation of this mechanism can be followed from Sheets 2 and 3 of the drawings. In Fig. 2, the gripping device is shown as close up to the board, and a sheet placed approximately to the registering edges. This is also shown on an enlarged scale in Fig. 3. After the sheet is placed in approximately this position, the arms 51 are given a slight movement toward the feed-board. This will bring the registering edges of the arms 51 into close contact with the front edge of the sheet, and will move the sheet slightly backward, or will slightly buckle the same. While the arms 51 are in an extreme position to the right, as shown in Figs. 4 and 5, the jaws 57 will be closed upon the bottom edge of the sheet, as shown in Fig. 6. The arms 51 will then be moved away from the feed-board a distance greater than the movement toward the feed-board, the jaws 57 remaining closed. This will pull the sheet forward a distance greater than the same was pushed backward, and will smooth out the sheet, and will bring the front edge thereof into exact register. If spring arms are used, the same will then be turned after the front edge of the sheet has been brought into exact register, and will hold the sheet in exact position until the same is taken

by the grippers 6 of the impression cylinder.

As the sheet is taken by the grippers, the arms 51 swing to the left out of the way of said grippers, 6 as shown in Figs. 9 and 10, and of course the spring arms 69 will be raised to allow the sheet to freely pass into the machine. The grippers 57 will be raised at the proper time when the gripping device leaves the sheet or when the grippers in the impression cylinder take the sheet by means of the arms 62 being forced downward on the rollers 60 by the cam-actuated mechanism before described. If desired, the sheet may be pulled forward by the arms 51 into the impression cylinder, or the sheet may be taken from its registered position directly by the grippers. The gripping device is returned from its left hand position to its normal position after the sheet has been taken by the cylinder, and before another sheet is placed in approximate position. Thus a sheet placed in approximately the desired position will be accurately registered at its front edge so that it will be fed in exact position into the printing press. It will also be seen that from the arrangement above described, the arms 51 and the various actuating devices may be adjusted to accommodate any desired width of sheet.

I preferably use a plurality of front edge gripping devices, although so far as the scope of some of my claims is concerned, a single such mechanism may be used.

The front edge gripping and registering mechanism is preferably arranged to act just after the side registering mechanism, the side registering mechanism holding the sheet until the same is given its slight forward movement.

Of course the forward movement imparted to the sheet by the gripping mechanism, if so desired, could be continuous with the transfer of the sheet to the cylinder, and the dwell in registered position thereby omitted.

It is desirable to adjust the side registering gripper so as to come in approximately the same line as the line of feed movement of the front edge gripper on the same side of the machine as the side registering gripper so that if the sheet has to be slightly squared by the front grippers, the same will pivot or buckle around the point that is held by the side gripper, and so that the action of the front gripping mechanism will not disturb the side register.

So far as the scope of some of my claims is concerned, the front edge registering mechanism could be used separately, or in combination with other side edge registering mechanisms. So far as I am informed, it is broadly new to bring a sheet placed in approximately the desired position, automatically into exact register both on the front and side edges thereof in the way here-

inafter described and claimed. Also, so far as I am informed, it is broadly new to automatically register the front edge of a sheet placed in approximately the desired position in the way I have described.

I am aware that in some instances it has been proposed to bring the side edge of the sheet automatically into register, but my invention distinguishes therefrom in that the entire sheet is automatically registered. I also believe that the peculiar means automatically registering the front edge of the sheet, that is, bringing the registering edge snugly against the sheet, and then pulling the sheet forward a distance sufficient to smooth the same out, and to bring the same into exact register is broadly new with me.

A peculiar advantage of my device is that both the side and front edges of the sheet are pulled into register whereby the entire sheet is registered, and this is a much better and easier operation than where an edge of the sheet is poked or pushed into register, as in this latter operation, only the edge and not the sheet is brought into exact position.

While I have described and referred especially to gripping mechanisms for accomplishing the front and side registering, I do not wish to be limited to the use of gripping devices for accomplishing this purpose, for many other devices are known which are equivalent to devices for gripping. There are many other ways in which the broad features of my invention may be carried out, and I do not wish to be limited to the exact details and parts which I have shown and described, as I have only illustrated one way in which my invention may be carried out, and as the same may be worked out in many other forms and arrangements by skilled printing press designers.

Having thus fully described my invention, what I claim, and desire to secure by Letters-Patent is:—

1. The combination of a feed board with a registering mechanism arranged to automatically register the front edge of a sheet placed on said feed board in substantially the desired position, said mechanism consisting of a gripping device, means for moving the gripping device to engage the front edge of the sheet and push the same backward, means for then closing the gripping device, and means for moving the gripping device in the opposite direction with the sheet a greater distance than the same has been previously moved toward the sheet.

2. The combination of a feed-board with a registering mechanism arranged to automatically register the front edge of a sheet placed in approximately the desired position on said feed-board, said registering mechanism consisting of a gripping device, means for moving the gripping device toward the sheet to engage the front edge thereof, and

push the same backward, means for then closing the gripping device, and means for then moving the gripping device with the sheet in the opposite direction a greater distance than the same has moved toward the sheet, and for then leaving the sheet momentarily stationary in this registered position.

3. The combination of a feed-board with a registering mechanism arranged to automatically register the front edge of a sheet placed on said feed board in approximately the desired position, consisting of a gripping device, means for moving the gripping device toward the sheet to engage the front edge thereof and buckle the sheet backward, means for then closing the gripping device upon the sheet, means for then moving the gripping device in the opposite direction a greater distance, and means for releasing the gripping device after the sheet has been drawn forward a greater distance than the same was buckled backward, whereby said buckle is taken out, the sheet smoothed and brought into registered position.

4. The combination of a feed-board with a mechanism for automatically registering a sheet placed in approximately the desired position thereon, said mechanism consisting of a side gripping device, means for moving the side gripping device toward the sheet to engage and slightly buckle the edge thereof, means for then moving the gripping device in the opposite direction a greater distance to bring the side edge of the sheet to approximately the desired position, and to

smooth the side edge of the sheet, and a front gripping device arranged to then move toward the front edge of the sheet to engage the same and buckle the edge of the sheet, means for then closing the front gripping device upon the sheet, and means for then moving the front gripping device in the opposite direction a greater distance to bring the front edge of the sheet to exact position, and to smooth out the buckle on the front edge.

5. The combination of a feed-board, a registering device for registering the sheet laterally, consisting of a gripper, means for moving the gripper toward the sheet, closing the gripper, and then moving the same sidewise a greater distance than the first movement toward the sheet, and a mechanism for registering the sheet along its front edge, consisting of gripping devices, means for moving the gripping devices to engage the front edge of the sheet and push the same backward, means for then closing the gripping devices, and means for then moving the gripping devices in the opposite direction with the sheet a greater distance than the same has been previously moved toward the sheet.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

H. A. WISE WOOD.

Witnesses:

WM. J. DALY,
R. E. EMBLETON, Jr.