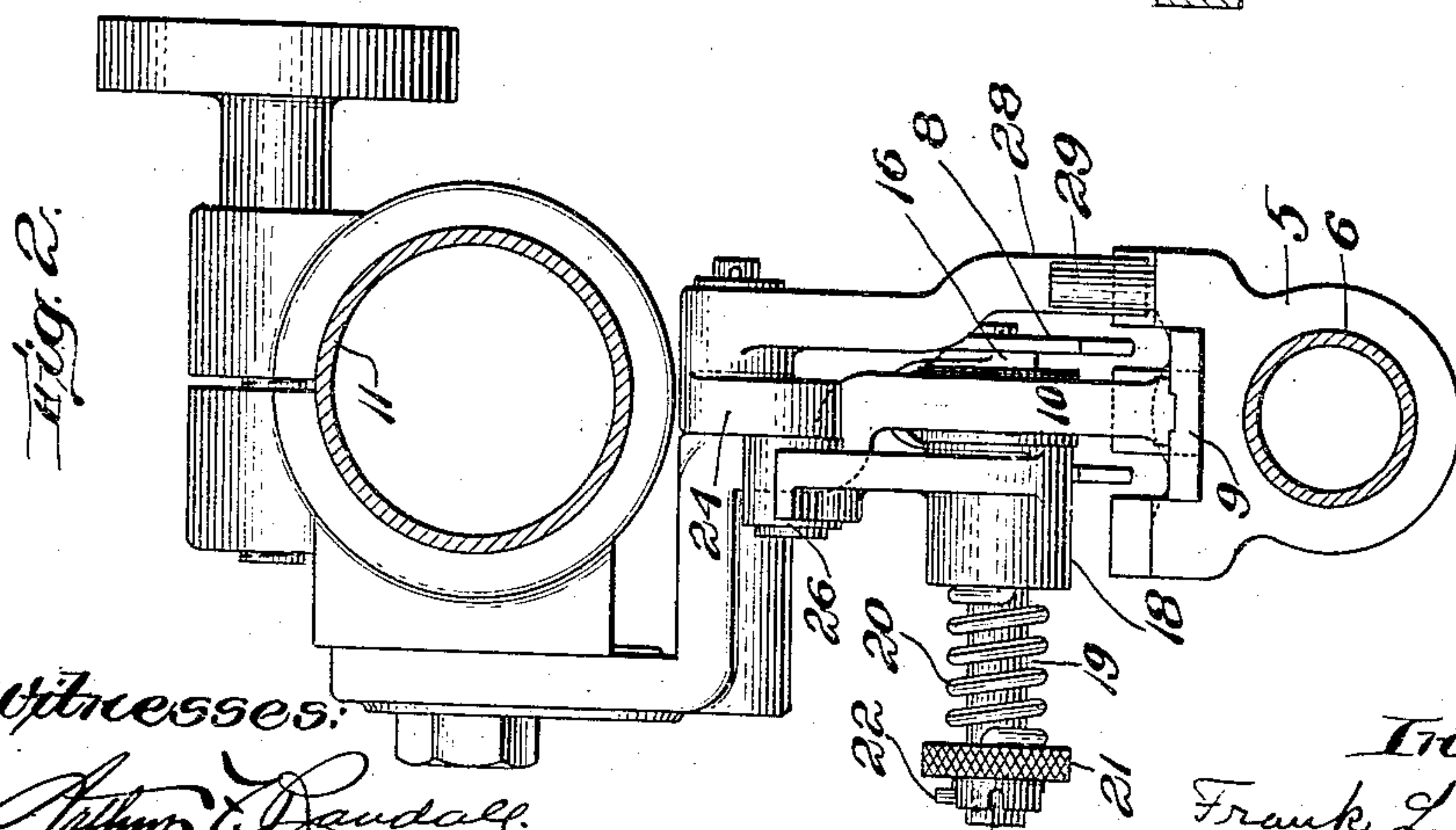
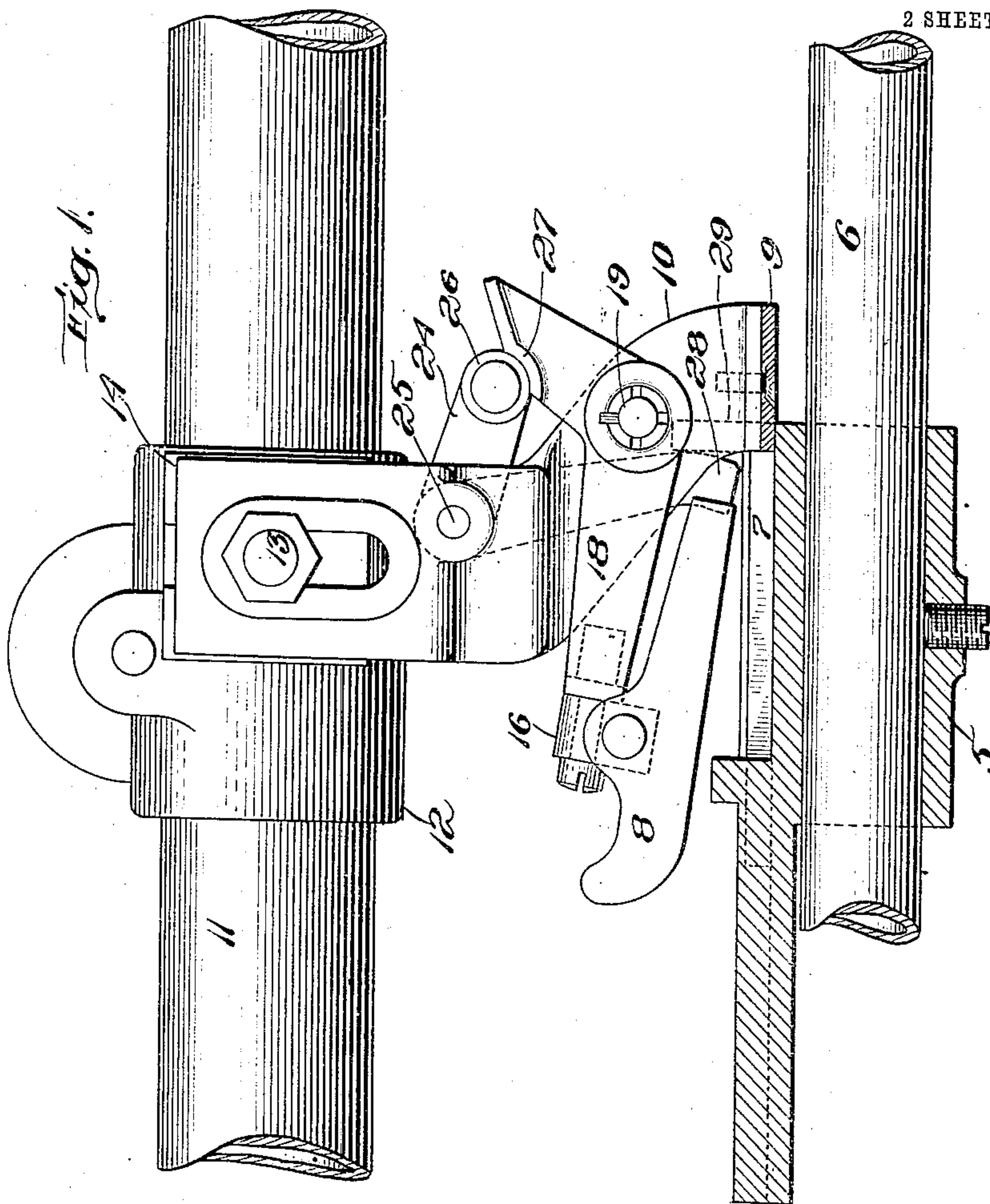


F. L. CROSS.
REGISTERING MECHANISM.
APPLICATION FILED JUNE 6, 1907

912,544.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.



Witnesses:
Arthur C. Raudall
A. C. Richardson.

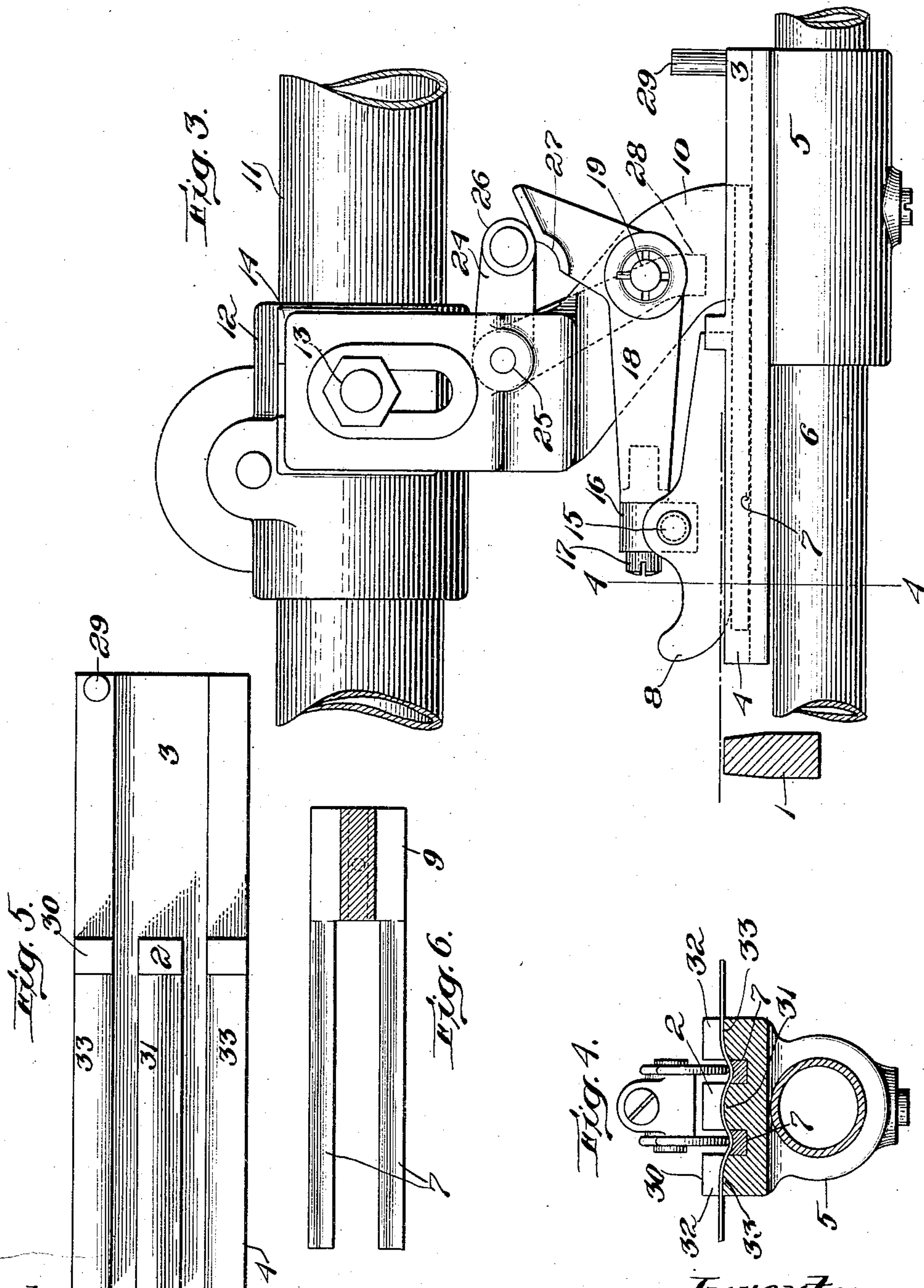
Inventor:
Frank L. Cross
by
Phillips Van Orman & Fish
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2 SHEETS—SHEET 2.



Witnesses:
A. C. Richardson,
N. D. McPhail

Inventor:
Frank L. Cross
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UNITED STATES PATENT OFFICE.

FRANK L. CROSS, OF MYSTIC, CONNECTICUT, ASSIGNOR TO CROSS PAPER FEEDER COMPANY,
A CORPORATION OF MAINE.

REGISTERING MECHANISM.

No. 912,544.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed June 6, 1907. Serial No. 377,551.

To all whom it may concern:

Be it known that I, FRANK L. CROSS, a citizen of the United States, residing at Mystic, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Registering Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to mechanism for securing the proper and accurate side register of sheets of paper which are automatically fed into position at the front gages of printing presses or into position to be operated upon by other mechanisms.

The primary object of the invention is to provide a mechanism by which accurate side register of the sheets may be secured under the varying conditions which occur during the feeding of successive sheets of the same size and character and which may be used without variation in the adjustment of the gripping force exerted on the paper in feeding different thicknesses and grades of paper.

In a mechanism operating in accordance with the primary features of my invention the sheet is brought into register against a gage by a reciprocating gripper consisting of two sets of gripping jaws arranged to grip the sheet on adjacent parallel lines so that the edge of that narrow strip of the sheet which lies between the gripping lines is stiffened and strengthened sufficiently to prevent crumpling when drawn forcibly against that part of the gage which lies between the gripping lines. By thus gripping the edge of the sheet on lines which are but a short distance apart the edge of the sheet between the two sets of gripping jaws is stiffened to such an extent that a heavy gripping force may be applied by the gripping jaws sufficient to draw the larger and thinner sheets against the gage under the most adverse conditions without causing a crumpling of the edge of the sheet when it is forced out from between the jaws of the gripper by engagement with the gage. The edge of the sheet between the gripping lines may be further stiffened and strengthened by providing a surface between the two sets of gripping jaws over which the sheet is bent and stretched by the action of the

jaws in gripping the sheet. In this case that portion of the sheet between the gripping lines is stretched and put under tension so that the edge of the sheet will offer greater resistance to crumpling and this forms a further feature of my invention. The gage in addition to the part which extends into the path of that part of the edge of the sheet which lies between the gripping lines may be and preferably is provided with short sheet engaging portions on opposite sides of the gripper.

In embodying the broader features of the invention in a simple and efficient construction I have employed certain further features of invention which will be more particularly set forth in the claims.

The various features of the invention will be understood from the mechanism shown in the drawings and the following detailed description of such mechanism.

In these drawings Figure 1 is a side elevation partly in section of a side register mechanism embodying my invention in the form in which I prefer to use it. Fig. 2 is an end elevation looking toward the left in Fig. 1. Fig. 3 is an elevation similar to Fig. 1, the parts being shown in a different position. Fig. 4 is a sectional view on line 4-4 Fig. 3, the clamping plates being shown in elevation. Fig. 5 is a plan view of the support on which the side gage is formed; and Fig. 6 is a detail plan view of the fingers forming a part of the gripping devices.

In the drawings a mechanism is shown which is especially designed for securing the side register of sheets which are automatically fed to the front gages of a printing press. The mechanism for feeding the sheets may be of any suitable construction such for instance as is illustrated in Patent No. 812,260 granted to me February 13, 1906. The sheets as they are fed into position at the front gages may be supported by any suitably constructed support such for instance as a series of bars indicated in said patent and one of which is indicated at 1 in Fig. 3 of the drawings. After the sheet has been brought against the front gages it is moved laterally to secure the proper side register by means of a reciprocating gripper which seizes the sheet and draws it laterally against a gage by which the side register is determined. This gripper comprises two

sets of gripping jaws arranged to grip the sheet on adjacent parallel lines and the gage is provided with an abutment arranged between the two sets of gripping devices so that the edge of that portion of the sheet which lies between the two sets of gripping devices and which is stiffened and strengthened by the engagement of these gripping devices with the surfaces of the sheet is brought against the abutment by the movement of the gripper after which the gripping jaws slide over the surfaces of the sheet which is forced from between the jaws by the engagement of the gage with its edge.

In the construction shown the abutment 2 which acts against the edge of the sheet between the two sets of gripping jaws, is formed on a plate 3 arranged below the path of the sheet and provided with a portion 4 which extends forward from in front of the abutment and underlies the sheet as it is fed to the front gages. The plate 3 is provided with a boss 5 by which the plate is adjustably secured upon a transverse bar 6.

The gripper which coöperates with the abutment 2 in securing the side register of the sheet, consists of two parallel adjacent fingers 7 arranged to pass under the sheet and two coöperating gripping plates 8 arranged to pass over the sheet and so mounted that they may be moved toward and away from the fingers 7. The fingers 7 are formed on a plate 9 which is secured to the lower end of a bracket 10 and this bracket is connected with a reciprocating bar 11 by means of an adjustable collar 12. The bracket is secured to the collar by means of a clamping bolt 13 which passes through a slot in the upper part of the bracket and serves to clamp the bracket to the face of a lug 14 on the collar 12. By means of this bolt and slot connection the vertical position of the gripper may be adjusted to bring it into proper relation with the sheet when supported upon the sheet support. The gripping plates 8 consist of thin metal plates which are loosely pivoted upon studs 15 which project from the opposite sides of a block 16. The block 16 is mounted so that it may turn freely upon a stud 17 secured in the outer end of an arm or lever 18 pivoted upon the bracket 10. By thus loosely mounting the clamping plates on the block 16 and also mounting the block so that it may turn upon the stud 17, the clamping plates are allowed to adjust themselves to the surface of the sheet and maintain an effective gripping pressure upon the paper along their entire engaging surfaces.

The lever 18 is mounted upon a fixed stud 19 which projects laterally from the bracket 10 and the lever is forced in a direction to bring the gripping plates 8 against the sheet by means of a coiled spring 20 mounted upon the stud and having its ends connected with the hub of the lever 18 and with an adjusting

collar 21 respectively. The collar 21 is held in position upon the stud by means of a pin 22 which engages notches 23 formed in the hub of the collar and the tension of the spring may be adjusted by pressing the collar 21 inward and turning it until the pin 20 comes into register with the desired recess 23.

During the forward movement of the gripper the gripping plates are held away from the fingers 7 so that they will pass over the top of the sheet without engaging it by means of a latched arm 24 pivoted at 25 to the bracket 10 and provided with a roll 26 adapted to engage a recess 27 formed in the rear arm of the lever 18. The latch arm 24 forms one arm of a bellcrank lever, the other arm 28 of which extends downward into position to play between a pin 29 at the rear of the plate 3 and a lug 30 arranged in line with the abutment 2 of the gage. During the advance stroke of the gripper the parts are in the position indicated in Fig. 1, the gripper plates being held in their raised position by the engagement of the roll 26 with the recess 27. As the gripper completes its forward movement the arm 28 engages the rear side of the lug 30 rocking the arm 24 of the bellcrank lever and carrying the roller 26 out of the recess 27 so that the gripping plates 8 are brought down upon the sheet by the spring 20. By the action of the gripping plates and coöperating fingers 7 the edge of the sheet is gripped along parallel lines extending at right angles to the edge of the sheet and a narrow strip of the sheet is firmly clamped along its edges. The free edge of this narrow strip is thus held taut and stiffened so that it will effectively resist a lateral pressure in the plane of the sheet. As the gripper is retracted the stiffened edge of the sheet between the gripping plates 8 and fingers 7 is brought against the abutment 2 which exerts a pressure against the edge of the sheet in the plane of the sheet and arrests the lateral movement of the sheet, the gripping jaws formed by the fingers and gripping plates sliding along the opposite surfaces of the sheet and holding the edge taut until the gripping jaws free themselves from the sheet. With the gripping jaws and abutment 2 thus arranged the edge of the sheet which extends across the narrow space between the adjacent sets of gripping jaws is so strengthened and stiffened that the edge of the thinnest sheets upon which automatic feeders are adapted to operate offer sufficient resistance to crumpling to free the sheet from gripping jaws which exert a comparatively heavy pressure upon the paper. The edge of the sheet between the two sets of gripping jaws may be further stiffened and strengthened by providing the surface between said sets of jaws over which the sheet is stretched when the jaws grip the sheet. This surface may be fixed or movable and in the construction

shown the plate 3 is provided with a fixed surface 31 extending forward from the front face of the abutment 2 and arranged in a plane above the plane of the fingers 7. This surface 31 is preferably curved so that it presents a convex surface to the under side of the sheet and the upper surfaces of the fingers 7 are curved to present concave surfaces as indicated in Fig. 4. With the sets of gripping jaws thus arranged on opposite sides of a sheet engaging surface which is out of the plane of the gripping jaws, the sheet is stretched over the surface when the jaws engage the opposite surfaces of the sheet and thus that portion of the sheet which lies between the two sets of gripping jaws is put under tension so that its edge offers a greater resistance to crumpling when subjected to a pressure in the plane of the sheet.

In addition to the abutment 2, the gage in the construction shown is provided with abutments 32 arranged on opposite sides of the gripping jaws and having their front faces in the same plane with the face of the abutment 2. One of the abutments 32 is formed by the front face of the lug 30 before referred to and the other abutment is formed by the front face of a similar lug projecting from the upper face of the plate 3. The plate 3 is also provided with surfaces 33 which project forward from the front faces of the abutments 32 and are arranged to engage the under surface of the sheet out of the plane of the fingers 7. Thus the gripping plates 8 in gripping the sheet against the fingers 7 not only stretch that portion of the sheet between the fingers and plate over the surface 31 but also bend the sheet down over the surfaces 33 so that two buckles or transverse bends are formed in the sheet which serve to stiffen those portions of the edge of the sheet which are brought against the abutments 32.

While I prefer to employ the specific construction and arrangement shown and described in practicing my invention, it will be understood that some of the features of the invention may be embodied in registering mechanisms without employing all the features and that the specific form and construction of the parts may be varied without departing from the broader principles of the invention.

Without attempting to point out in detail the various constructions in which the invention may be embodied, what I claim is:—

1. A sheet registering mechanism having in combination a reciprocating gripper provided with two sets of gripping jaws arranged to grip the edge of the sheet on adjacent parallel lines and stiffen said edge between said lines, and a gage provided with an abutment between said lines, substantially as described.

2. A sheet registering mechanism having in combination a reciprocating gripper provided with two sets of gripping jaws arranged to grip the edge of the sheet on adjacent parallel lines, a surface between said lines over which the sheet is stretched by the gripping jaws, and a gage provided with an abutment between said lines, substantially as described.

3. A sheet registering mechanism having in combination a reciprocating gripper provided with two sets of gripping jaws arranged to grip the edge of the sheet on adjacent parallel lines, a parallel surface between the said sets of jaws and out of the plane of said lines, and a gage having an abutment between said lines, substantially as described.

4. A sheet registering mechanism having in combination a reciprocating gripper comprising two parallel fingers arranged to pass under the sheet at right angles to its edge and two cooperating gripping plates, a bearing surface between said fingers and out of the plane thereof, a gage having an abutment between said fingers and plates, and means for moving said plates towards and away from said fingers, substantially as described.

5. A sheet registering mechanism having in combination a reciprocating gripper comprising two parallel fingers arranged to pass under the sheet at right angles to its edge and an arm carrying two gripping plates cooperating with said fingers, a gage having an abutment between said fingers and plates, means for holding the arm with the plates away from the fingers during the advance of the gripper, and means for operating the arm to cause the plates to grip the sheet during the return of the gripper, substantially as described.

6. A sheet registering mechanism having in combination a reciprocating gripper comprising two parallel fingers arranged to pass under the sheet at right angles to its edge, two cooperating gripping plates, a bearing surface between said fingers and out of the plane thereof, a gage having an abutment between said fingers and plates, abutments on the opposite sides of said plates, and bearing surfaces in front of said abutments and out of the plane of said fingers, substantially as described.

7. A sheet registering mechanism having in combination a reciprocating gripper comprising two parallel fingers arranged to pass under the sheet at right angles to its edge, and two cooperating gripping plates, a block on which said gripping plates are pivoted, an arm on which said block is pivoted, and means for raising and lowering said arm, substantially as described.

8. A sheet registering mechanism having in combination, a bracket 10, parallel 130

10 fingers 7 projecting therefrom and arranged to pass under the sheet, an arm 18 pivoted on said bracket, gripping plates 8 carried by said arm, a plate 3 arranged below the path of the sheets, an abutment 2 on said plate arranged between the gripping plates 8 and the bearing surface 31, said plate extending forward from the abutment 2 and out of the plane of the fingers 7, substantially as described.

9. A sheet registering mechanism, having, in combination, a gripper provided with two sets of gripping jaws arranged to grip the edge of the sheet on adjacent lines and

stiffen said edge between said lines, a gage 15 provided with an abutment between said lines, and means for relatively actuating the gripper and abutment to bring the edge of the sheet between the gripping lines and the abutment into engagement, substantially 20 as described.

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

FRANK L. CROSS.

Witnesses:

IRA L. FISH,

ANNIE C. RICHARDSON.