

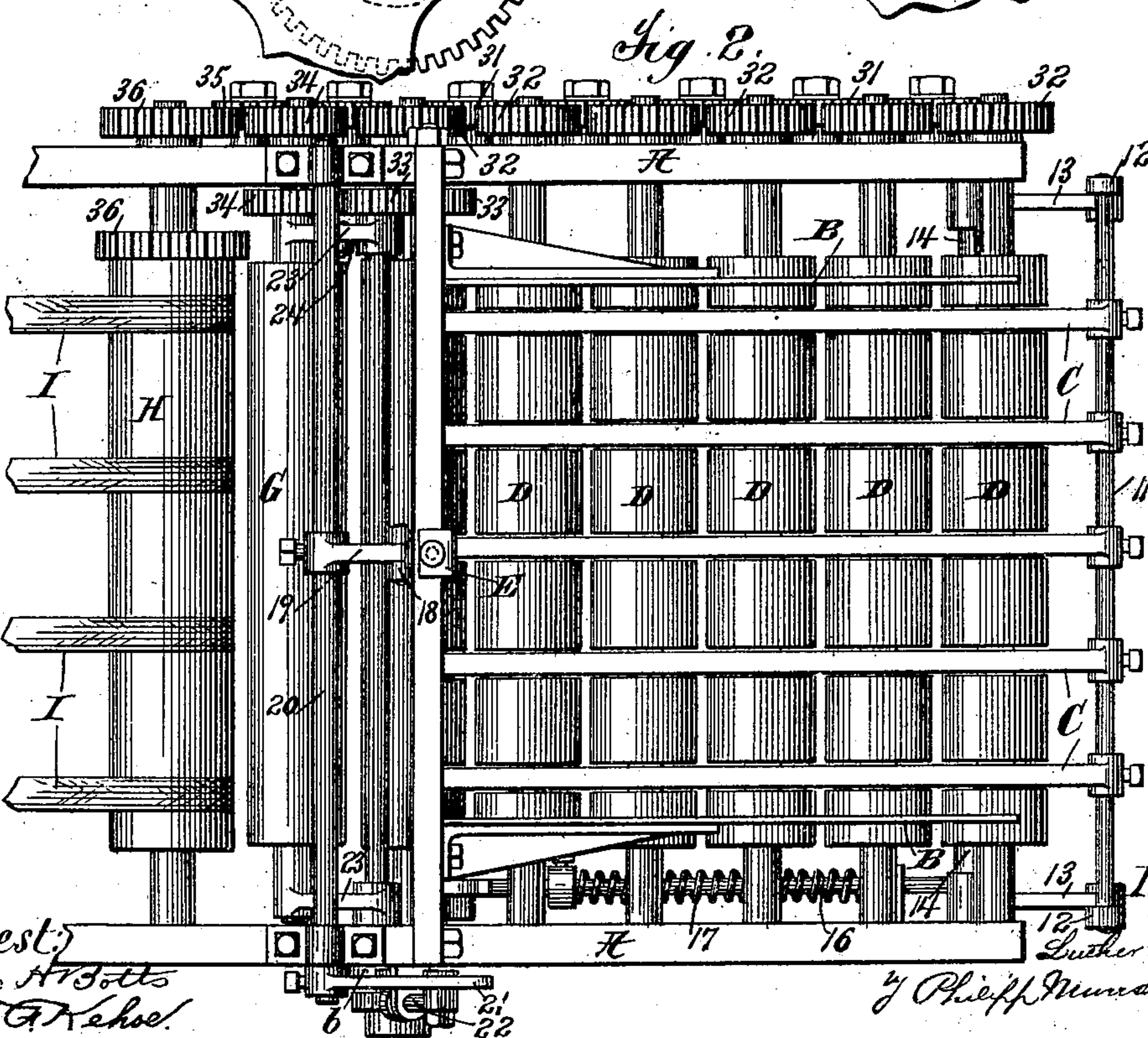
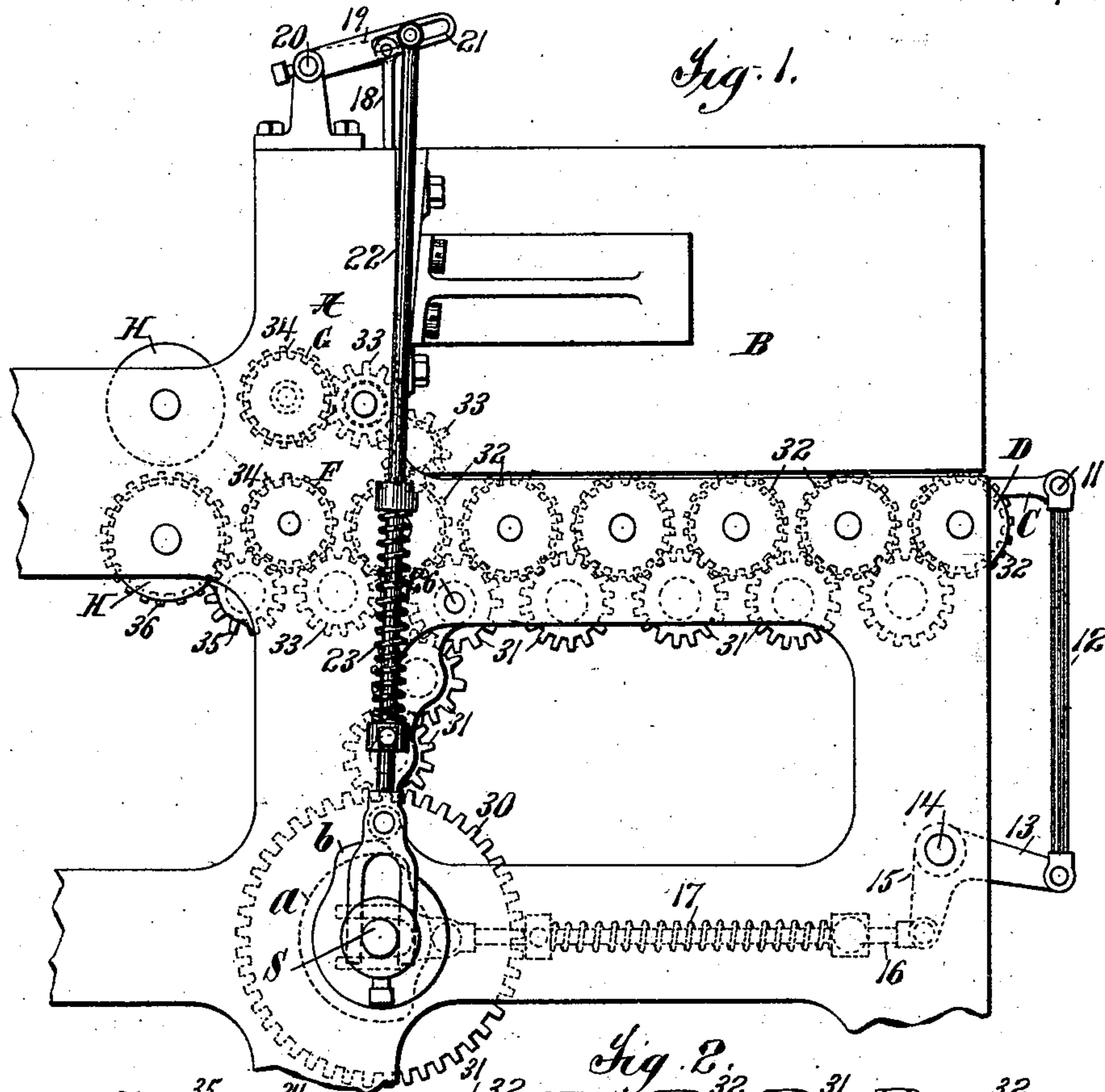
(No Model.)

3 Sheets—Sheet 1.

L. C. CROWELL.
SHEET FEEDING MACHINE.

No. 549,111.

Patented Nov. 5, 1895.



Attest:
Geo. H. Felt
T. G. Kehoe

Inventor
Luther C. Crowell
by Phieff, Munson & Phelps
Attys

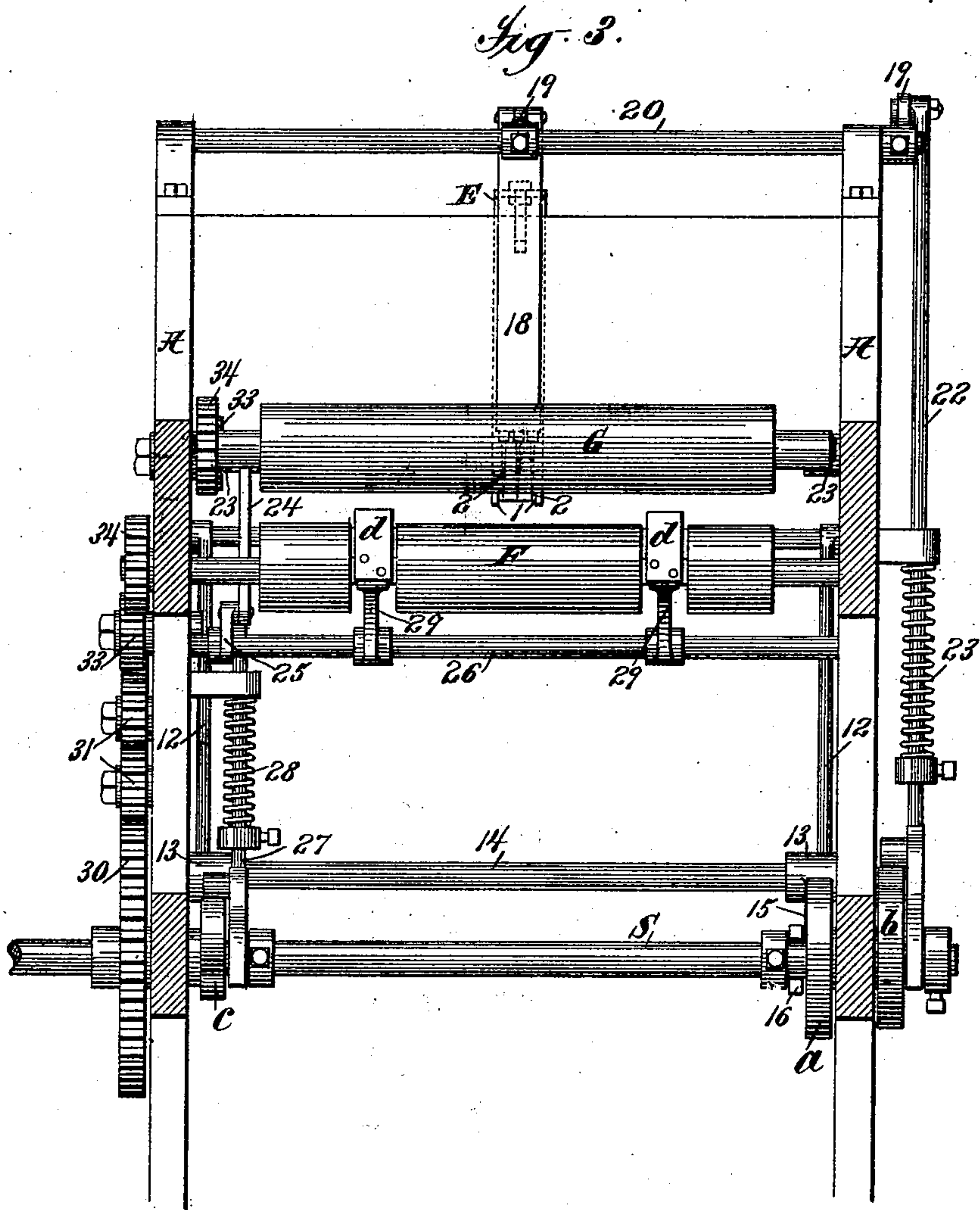
(No Model.)

3 Sheets—Sheet 2.

L. C. CROWELL.
SHEET FEEDING MACHINE.

No. 549,111.

Patented Nov. 5, 1895.



Attest:
Geo. H. Batts
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Inventor:
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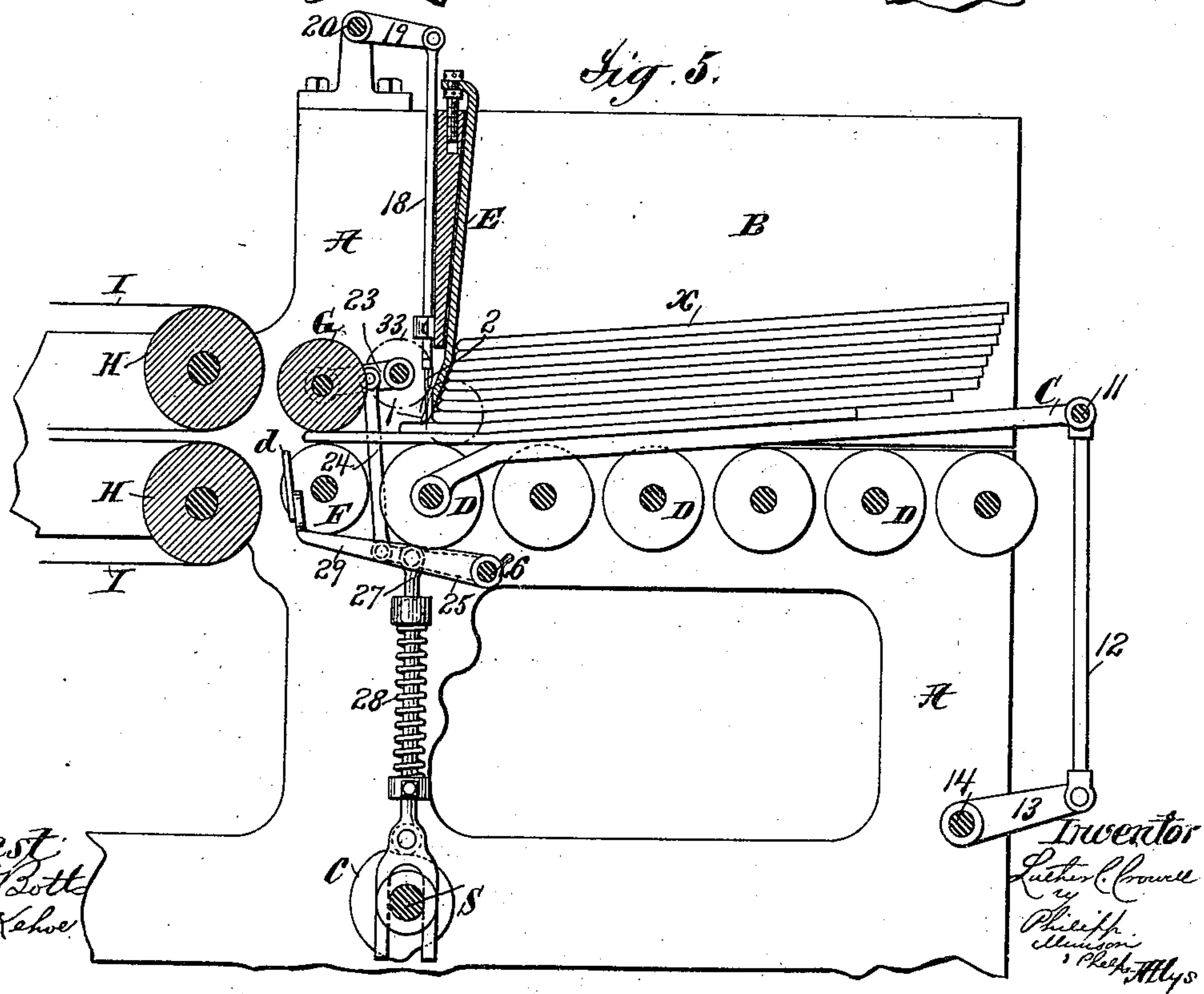
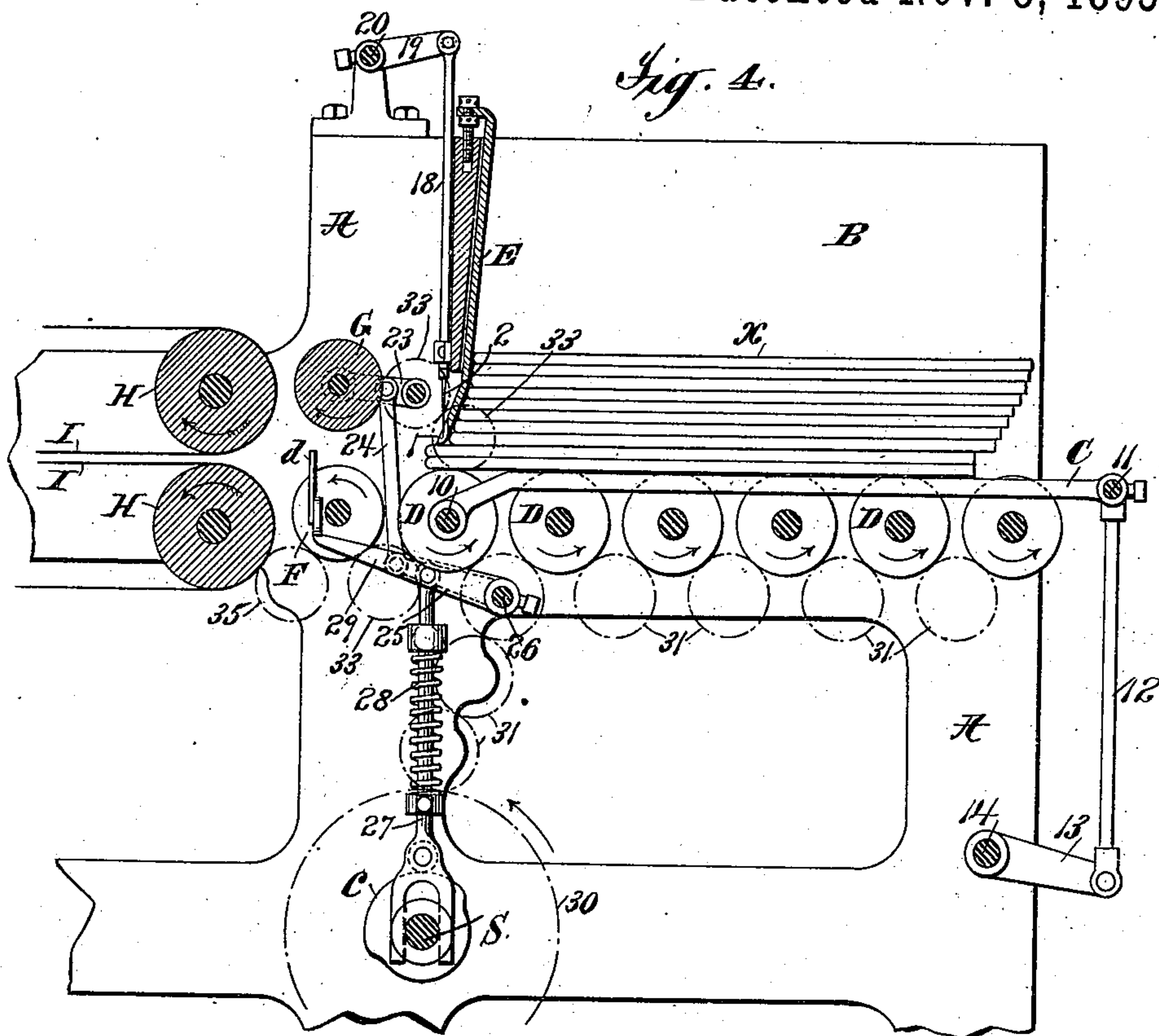
(No Model.)

3 Sheets—Sheet 3.

L. C. CROWELL.
SHEET FEEDING MACHINE.

No. 549,111.

Patented Nov. 5, 1895.



Attest:
Geo H Bott
D. G. Howe

Inventor
Luther C. Crouse
by
Philip
Blumson
's Patent Attys

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

SHEET-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,111, dated November 5, 1895.

Application filed November 21, 1894. Serial No. 529,447. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 In feeding the bottom sheets from a pile it is found difficult to secure the feeding of the sheets singly, as the bottom sheet tends to carry with it one or more of the sheets above it on account of the adhesion between the
15 sheets, this difficulty being increased when sheets are fed out from the pile by rolls or equivalent feeding devices engaging the bottom of the sheet, as the rolls engage the second sheet before the first sheet has been entirely removed from the pile, tending to carry the second sheet forward with the bottom sheet, besides causing much objectionable wear on the bottom of the second sheet. I avoid this difficulty in feeding sheets from a
25 pile by frictional engagement of the bottom sheet by separating the sheets and the "rolls," which term will be used herein to include equivalent feeding devices, such as endless belts or rotating or traveling fingers, so as to avoid feeding action on the second sheet while
30 securing the feeding of the bottom sheet by the rolls, this result being attained, preferably, by moving the sheets away from the rolls, for which purpose I use a movable support for the sheets, by which the second sheet is raised from contact with the rolls as the bottom sheet is fed forward, thus not only preventing any feeding engagement of the rolls upon the second sheet, but at the same
40 time loosening up the sheets by their alternate raising and lowering, which action aids in preventing the feeding forward of the second sheet by adhesion with the bottom sheet.

As a further protection against the feeding
45 out of more than one sheet at a time, I preferably use, also, means for stopping a second sheet which may be fed forward with the bottom sheet, the complete construction thus forming a mechanism by which sheets may
50 be fed from a pile singly with almost absolute certainty, and I have devised an improved

means for thus stopping the sheets which in itself forms a part of the invention. In this improved stopping means I employ one or more stops, which may be arranged to extend 55 in series across the whole or any part of the width of the sheet, but which it is found in practice need usually be employed only at the center of the sheet, these stops being alternately raised and lowered, so as to allow the
60 bottom sheet to pass freely, but to be brought down into position to stop the second sheet, these stops preferably consisting of sharp pins arranged so that when lowered they will be forced into the leading end of the second
65 sheet if a second sheet has been fed out, and stop also any third or upper sheet, if such be started, the sheets being released again as the pins are raised. The stops may, however, be arranged to be lowered in front of the second
70 sheet, and in such case may be blunt pins or of any other suitable form. The use of the pins sharp enough to impale the sheet will be found much preferable, however, even when arranged normally to descend in advance of
75 the second sheet, as the pins will thus impale and stop the second sheet without retarding the bottom sheet in case the second sheet should be fed out farther than usual, and a construction employing such pins forms a part
80 of the invention.

The stops are preferably used in combination with a fixed guard of suitable form placed at the front of the pile for positively preventing the feeding out of a third sheet; but
85 this may be omitted and fairly good results secured.

As the sheet is fed out from the pile it may be received by any suitable mechanism; but when, as is frequently the case, it is desirable to time the delivery of a sheet relatively to other parts of the machine I preferably use a drop-roll, which seizes the leading end of the sheet at the proper time when advanced from the pile, and a stop which holds
95 the sheet in proper position against the feeding pressure of the rolls by which the sheets are fed from the pile until the drop-roll seizes or is about to seize the leading end, when the stop is withdrawn to permit the sheet to pass
100 forward.

For a full understanding of the invention

there is shown in the accompanying drawings a construction of the preferred form embodying all the features of the invention, and a detailed description of the same will now be given, and the features forming the invention then specifically pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a side elevation of the sheet-feeding mechanism. Fig. 2 is a plan view with the sheets removed. Fig. 3 is a front view, the frame being sectioned on a vertical plane between the rolls H G. Fig. 4 is a central longitudinal vertical section of the mechanism with the papers in place, showing the parts in the position they occupy as the bottom sheet is just started, a second sheet being shown as passing out therewith. Fig. 5 is a similar view showing the parts in the position they occupy when the bottom sheet has been partially fed out and seized by the drop-roll and the second sheet pierced and stopped by the pins.

Referring to said drawings, A is the frame on which is supported the sheet-holder B, which may consist of a box or receptacle of any suitable form for supporting the sheets α in the pile and holding them in proper position. The bottom of the sheet-holder B consists of a series of bars C, forming a support for the sheets and between which the feeding-rolls D engage the bottom paper, these feeding-rolls being preferably formed with roughened surfaces or faced with suitable material, such as rubber or emery, to increase the friction.

The bars C are pivotally mounted upon the shaft 10 of the forward feed-roll D, and at their outer ends are connected to a bar 11, which is connected at each end by connecting-rods 12 to crank-arms 13 on a rock-shaft 14, which is actuated by a crank-arm 15 and pitman 16, spring-pressed in one direction by a spring 17 and actuated in the opposite direction by a cam α on the main shaft S, so that the cam, through these connections, raises the bars C at the proper time, as hereinafter explained, and upon the release of the bars C by the cam α the spring 17 returns these bars to their lower position.

At the front end of the sheet-holder B is a guard E, preferably made adjustable vertically, as shown, and terminating at its lower end, just above the second paper, in a series of fingers 1, between which move the stops 2, consisting in the form shown of sharp pins, these pins, of which three are used in the construction shown, being carried by a bar 18, moving vertically in guides in the frame and actuated by a crank-arm 19 on a rock-shaft 20, which is actuated from the shaft S by a slotted crank-arm 21, connected to a pitman 22, operated in one direction by the cam b on the shaft S and returned by the spring 23.

Just in advance of the sheet-holder B is mounted a stationary lower feed-roll F, and above this a drop-roll G, carried by pivoted

arms 23 and raised and lowered at the proper time by a shaft S, through a link 24, connecting one of the arms 23 to a crank-arm 25 on a rock-shaft 26, the crank-arm 25 having connected thereto a pitman 27, pressed by a spring 28 and actuated by cam c on the shaft S, so that the drop-roll G is raised by the cam and returned by the spring when released by the cam. On the rock-shaft 26 are arms 29, carrying stops d , which are brought into position to stop the leading end of the sheet until the drop-roll G seizes it, and are then lowered to allow the sheet to be fed forward. By the drop-roll G and stationary roll F the sheet is fed forward to the feed-rolls H and belts I, or other suitable conveying mechanism.

The feeding-rolls D are driven from the shaft S through a gear 30 on the shaft S, intermediates 31 and gears 32 on the shafts of the feeding-rolls, so that all these rolls rotate in the same direction and at the same rate of speed. The stationary feed-roll F and drop-roll G are fed from the leading feed-roll D by intermediates 33 and gears 34 on the shafts of the rolls, and the lower belt-roll H is driven from roll F through intermediates 35 and gear 36 on the belt-roll.

The operation of the mechanism will be understood from a brief statement in connection with the drawings.

All the feed-rolls D engage the bottom sheet of the pile as the feeding movement is commenced, as shown in Fig. 4, and thus advance the sheet out from the holder B. As the sheet is advanced, the bars C are raised from the position shown in Fig. 4 to that shown in Fig. 5, so as to raise the sheets from engagement with the feeding-rolls D and thus prevent their engagement with the second sheet until the first sheet has been fully fed out and the feeding of the second sheet is to be commenced, when the bars C are lowered again.

It will be seen that with the bars C pivoted at the front of the holder, as shown, the sheets are raised on an incline, so as to separate the sheets from the rear and forward rolls successively. This permits the rear end of the second sheet, with the sheets above it, to be separated from the rolls immediately upon the commencement of the feeding of the bottom sheet, the bottom sheet, with the upper sheets, being gradually and successively raised from the different rolls, while the feeding action of the forward rolls on the bottom sheet is continued. This is an important feature, in that it avoids the contact of the second sheet with the feeding-rolls, which would result from the bending of the second sheet over the rear end of the bottom sheet if the latter were fed out a considerable distance before the action of the lifting devices and the latter engaged the second sheet behind the bottom sheet. This enables the present construction to be used for feeding sheets of considerable length and of such a character as to bend at their rear ends when unsupported.

ported by the bottom sheet. The slight bending of the sheets at their forward ends also aids in securing the separation and proper feed of the bottom sheet.

5 It is to be noted that the separation of the bottom sheet and feeding devices is essential to the result desired in feeding sheets of considerable length and flexibility, for if the lifting devices engage the second sheet close to
10 its rear edge, so as to prevent the latter bending over the rear edge of the bottom sheet as the latter is fed out, the second and upper sheets are likely to bend centrally after the bottom sheet has been fed out a considerable
15 distance and thus bring the second sheet into contact with the feeding devices. By separating the bottom sheet and feeding devices as the bottom sheet is fed out, however, the separation of the second sheet and feeding
20 devices may be secured throughout the feeding of the bottom sheet independently of the length or flexibility of the sheets.

The bottom sheet passes out beneath the guard E to the stops d, and is held in position by the latter until the feed-roll G drops, when by the same action that lowers the feed-roll the stops are removed from the path of the paper, and the drop-roll G, coacting with the stationary roll F, seizes the leading end
30 of the paper and advances it to the belt-rolls H.

If only one paper be fed out at a time, the raising and lowering of the pins 2 does not interfere in any way with the feeding of the paper; but if, as shown in the drawings, a
35 second sheet is fed out beneath the guard E, which positively stops the third and upper sheets, the pins 2, in their downward movement on the rocking of the shaft 20, pierce the leading end of this sheet, as shown in
40 Fig. 5, and stop it, so as to hold it against the friction of the bottom sheet until the latter is fed out, when the fingers are withdrawn and the second sheet, now become the bottom sheet, is free to be fed out by the rolls D.

45 It will be understood that I am not to be limited to the specific details of the construction shown as embodying the invention, as it is obvious that these may be varied in many respects without departing from the inven-
50 tion.

It will be understood, also, that different means for taking the sheet as it is advanced from the sheet-holder may be used, and that the means for separating the feeding-rolls
55 and second sheet to prevent the feeding forward of the second sheet with the bottom sheet, and the means for stopping a second sheet, if fed forward, may be used independently of each other, either alone or with other
60 devices for securing the proper feeding of a single sheet, and each in itself forms a part of the invention, although they are preferably combined as coacting to secure a greatly improved result, and such combination also
65 forms a part of this invention.

What I claim is—

1. The combination with a holder adapted

to receive a pile of sheets, of feeding devices engaging the bottom sheet, and means for separating the rear end of the bottom sheet
70 and the upper sheets from the feeding devices and supporting said sheets throughout substantially their length while retaining the engagement of the front end of the bottom sheet by the feeding devices, substantially
75 as described.

2. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, and means for raising and lowering the sheets to separate
80 the rear end of the bottom sheet and the upper sheets from the feeding devices and supporting said sheets throughout substantially their length while retaining the engagement of the front end of the bottom sheet by the
85 feeding devices, substantially as described.

3. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, and means for separating the different parts of the bottom
90 sheet with the upper sheets from the feeding devices gradually from the rear end toward the front end of the sheets, and supporting the portions of said sheets separated from the feeding devices throughout substantially
95 their length, substantially as described.

4. The combination with a holder adapted to receive a pile of sheets, of feeding rolls engaging the bottom sheet, and means for raising the sheets on an incline to separate the
100 sheets from the rear and forward rolls successively to prevent the feeding of the second sheet by the feeding rolls during the feeding of the bottom sheet, substantially as described.

5. The combination with a holder adapted
105 to receive a pile of sheets and supports pivoted at the forward end of the holder, of feeding devices engaging the bottom sheet between the supports, and means for swinging said supports vertically to raise the sheets from
110 the feeding devices, whereby the feeding of the second sheet by the feeding devices during the feeding of the bottom sheet is avoided, substantially as described.

6. The combination with feeding mechanism for advancing the bottom sheet from a
115 pile, of one or more vertically movable stops arranged to stop a second sheet when the stops are lowered, and means for raising and lowering said stops, substantially as described.
120

7. The combination with feeding mechanism for advancing the bottom sheet from a
125 pile, of one or more vertically movable sharp pins constructed and positioned to pierce a second sheet, when advanced with the bottom sheet, and means for raising and lowering said pins, substantially as described.

8. The combination with feeding mechanism for advancing the bottom sheet from a
130 pile, of guards arranged to stop a third sheet, one or more vertically movable stops arranged to stop a second sheet when the stops are lowered, and means for raising and lowering said stops, substantially as described.

9. The combination with feeding mechanism for advancing the bottom sheet from a pile, of guards arranged to stop a third sheet, one or more vertically movable sharp pins arranged to stop a second sheet when the pins are lowered, and means for raising and lowering said pins, substantially as described.

10. The combination with feeding mechanism for advancing the bottom sheet from a pile, of guards arranged to stop a third sheet, one or more vertically movable sharp pins arranged to pierce a second sheet when advanced beyond the guards, and means for raising and lowering said pins, substantially as described.

11. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, means for preventing feeding contact between the other sheets and the feeding devices during the feeding of the bottom sheet, one or more vertically movable stops arranged to stop a second sheet when lowered, and means for raising and lowering said stops, substantially as described.

12. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, means for preventing feeding contact between the other sheets and the feeding devices during the feeding of the bottom sheet, one or more vertically movable sharp pins arranged to stop a second sheet when lowered, and means for raising and lowering said pins, substantially as described.

13. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, means for preventing feeding contact between the other sheets and the feeding devices during the feeding of the bottom sheet, guards arranged to stop a third sheet, one or more vertically movable stops arranged to stop a second sheet when lowered, and means for raising and lowering said stops, substantially as described.

14. The combination with a holder adapted to receive a pile of sheets, of feeding devices engaging the bottom sheet, means for pre-

venting feeding contact between the other sheets and the feeding devices during the feeding of the bottom sheet, guards arranged to stop a third sheet, one or more vertically movable sharp pins arranged to stop a second sheet when lowered, and means for raising and lowering said pins, substantially as described.

15. The combination with a holder B, of a series of feeding rolls D below said holder, bars C pivoted at the front of the holder, means for swinging said bars vertically during the feeding of the bottom sheet, pins 2, and means for raising and lowering said pins, substantially as described.

16. The combination with a holder B, of a series of feeding rolls D below said holder, bars C pivoted at the front of the holder, means for swinging said bars vertically during the feeding of the bottom sheet, guard E at the front of said holder having fingers 1, pins 2 moving between said fingers, and means for raising and lowering said pins, substantially as described.

17. The combination with a holder B, of means for advancing the bottom sheet from the holder, guard E at the front of the holder having fingers 1, pins 2 moving between said fingers, and means for raising and lowering said pins, substantially as described.

18. The combination with a holder B, of a series of feeding rolls D below said holder, bars C normally supporting the sheets in the holder and pivoted at the front of the holder, and means for swinging said bars vertically during the feeding of the bottom sheet to raise the bottom sheet with the upper sheets from the feeding devices gradually from the rear end toward the front end of the sheets, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

C. J. SAWYER,
A. L. KENT.