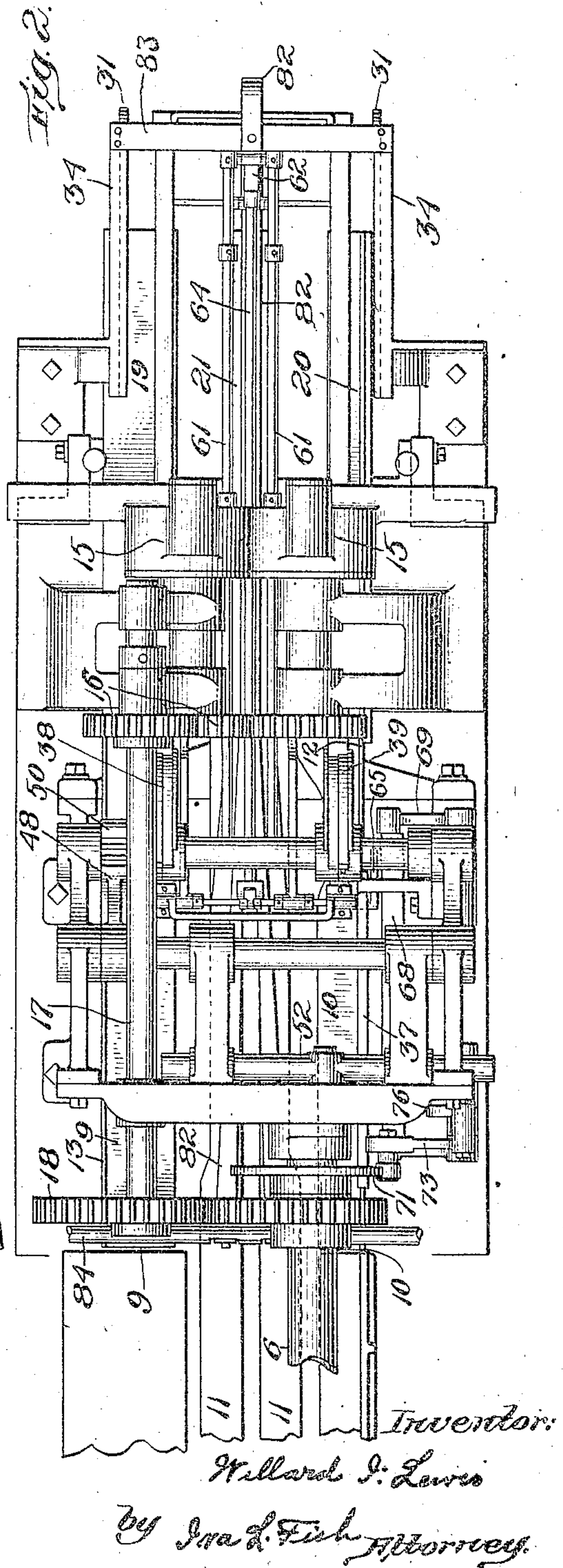
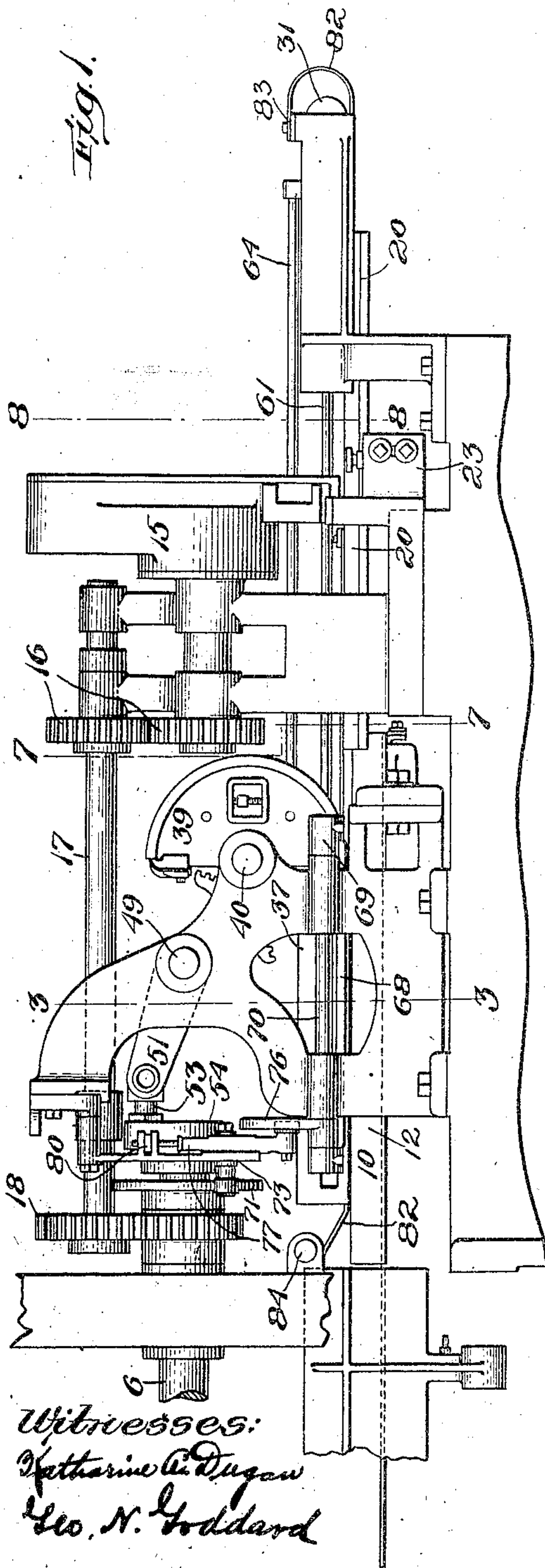


W. I. LEWIS.
STITCHING MECHANISM FOR SIGNATURE GATHERING MACHINES.
APPLICATION FILED MAY 9, 1906.

985,264.

Patented Feb. 28, 1911.
4 SHEETS—SHEET 1.

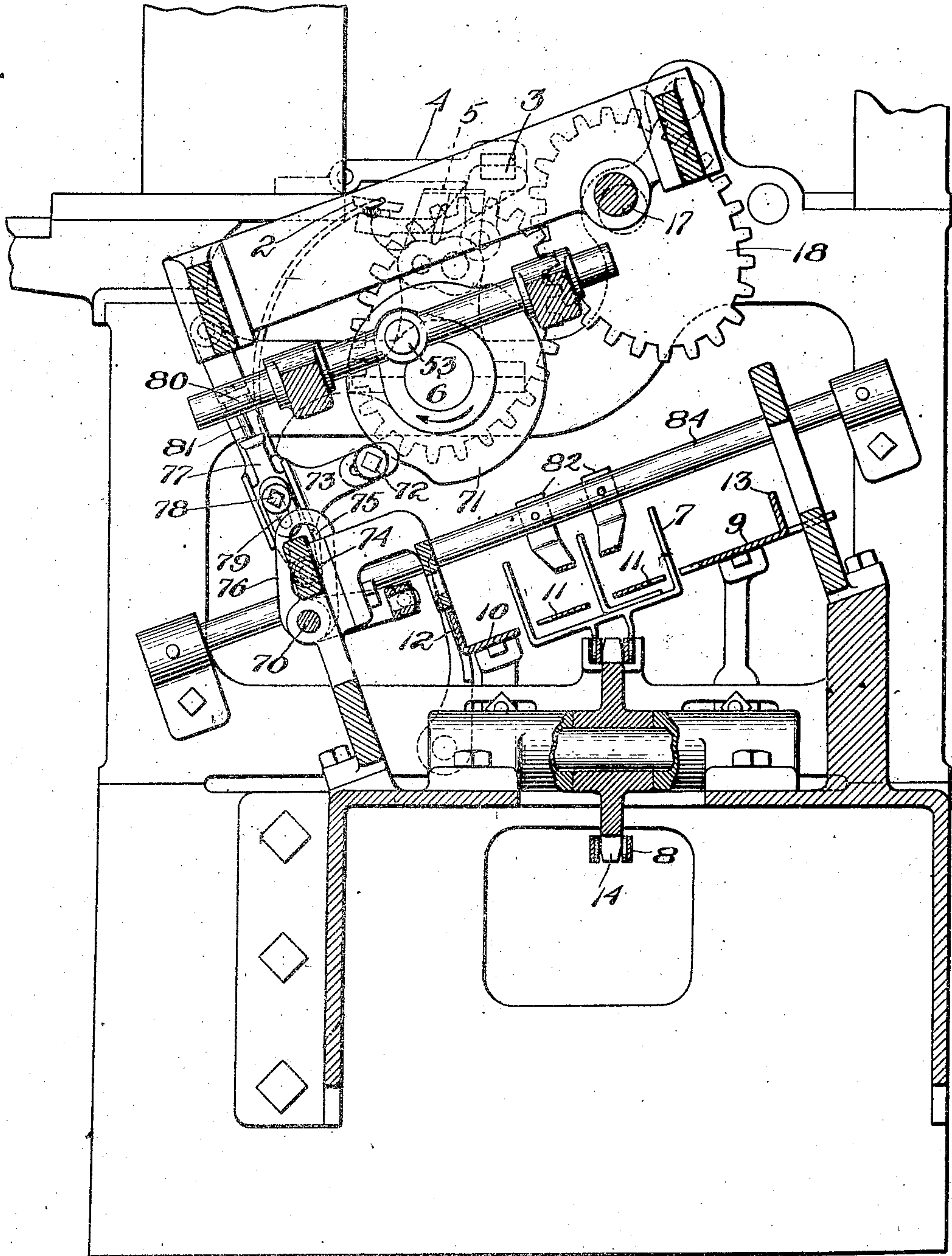


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4 SHEETS—SHEET 2.



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Fig. 3.

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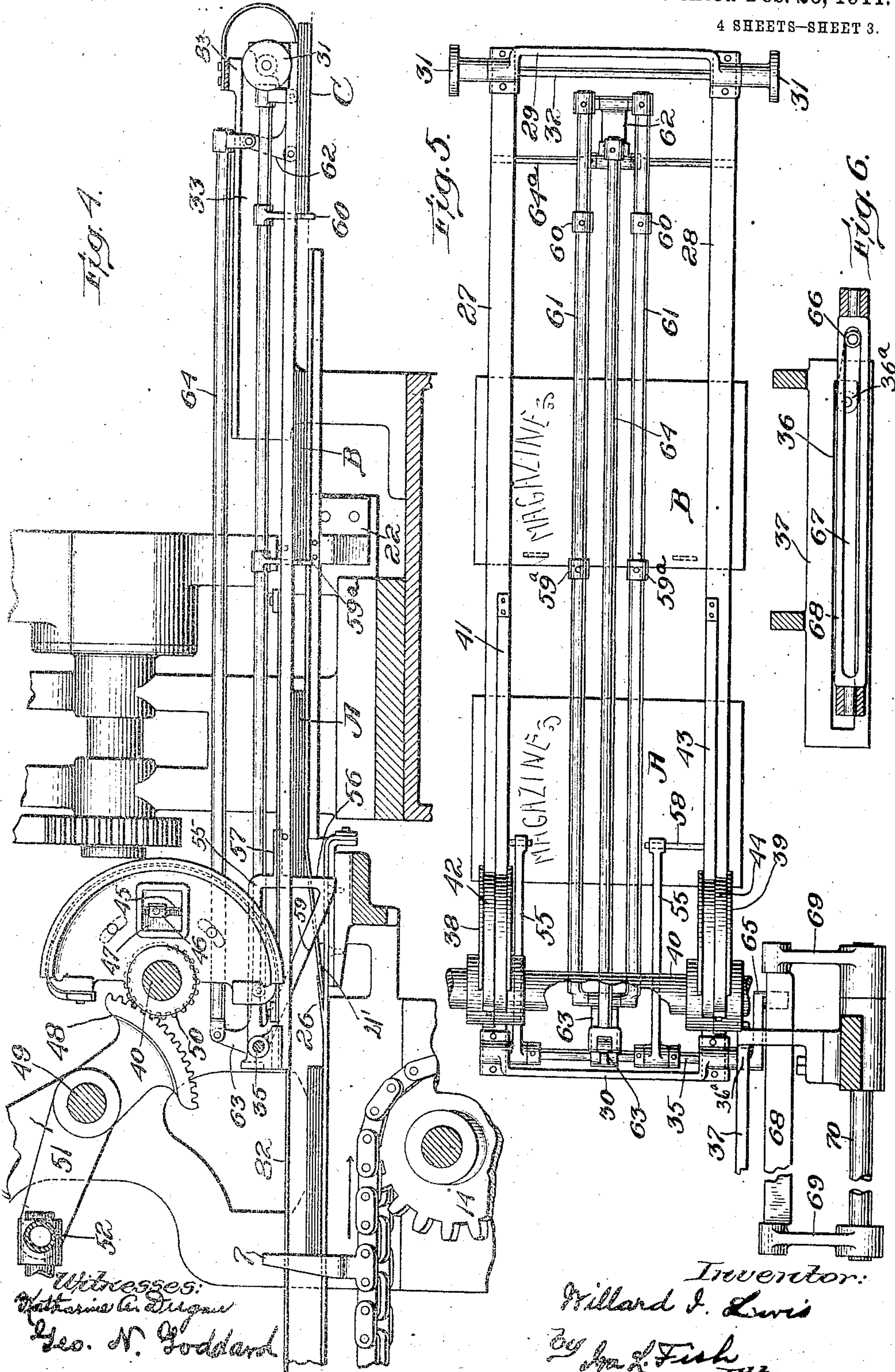
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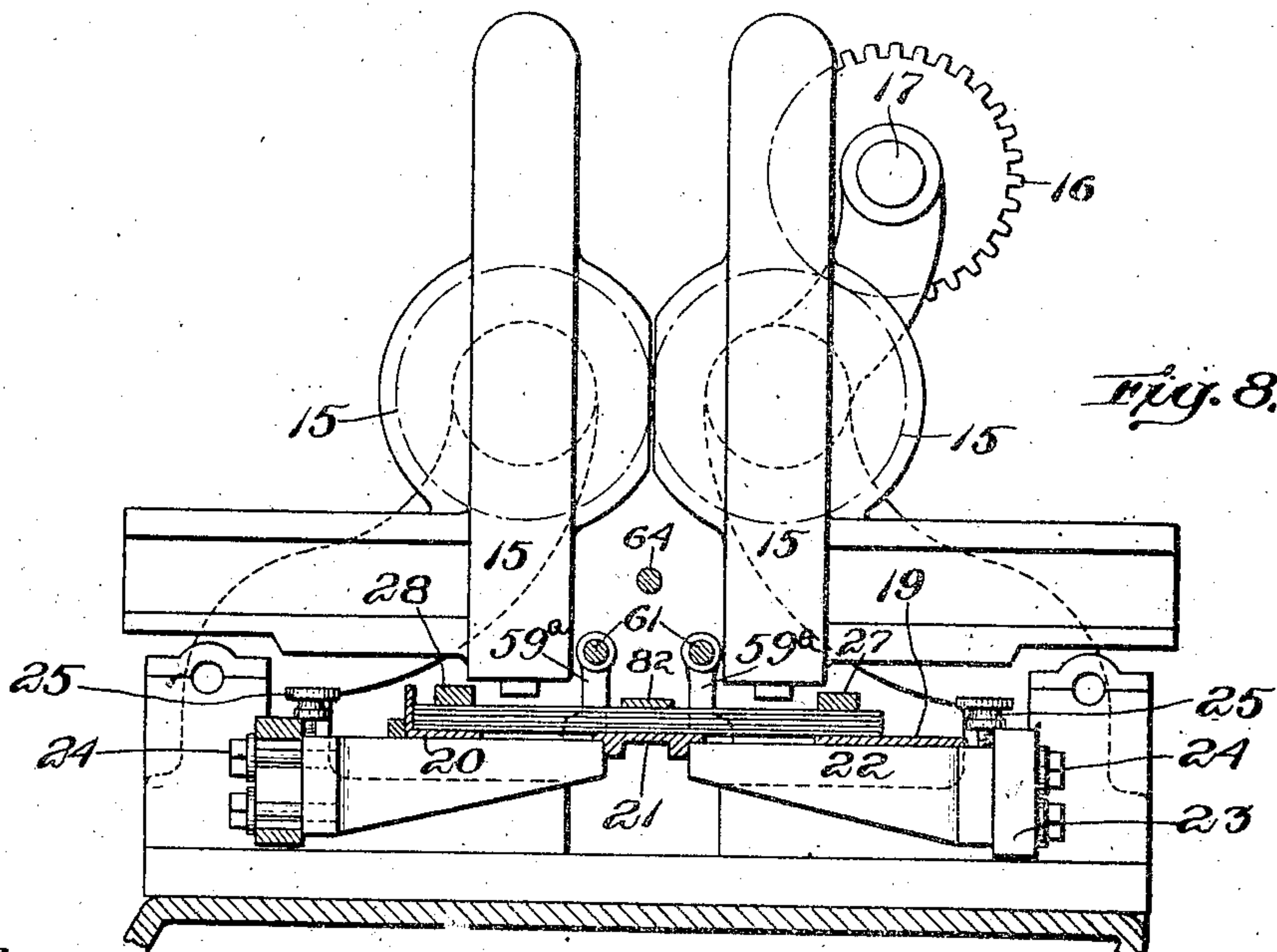
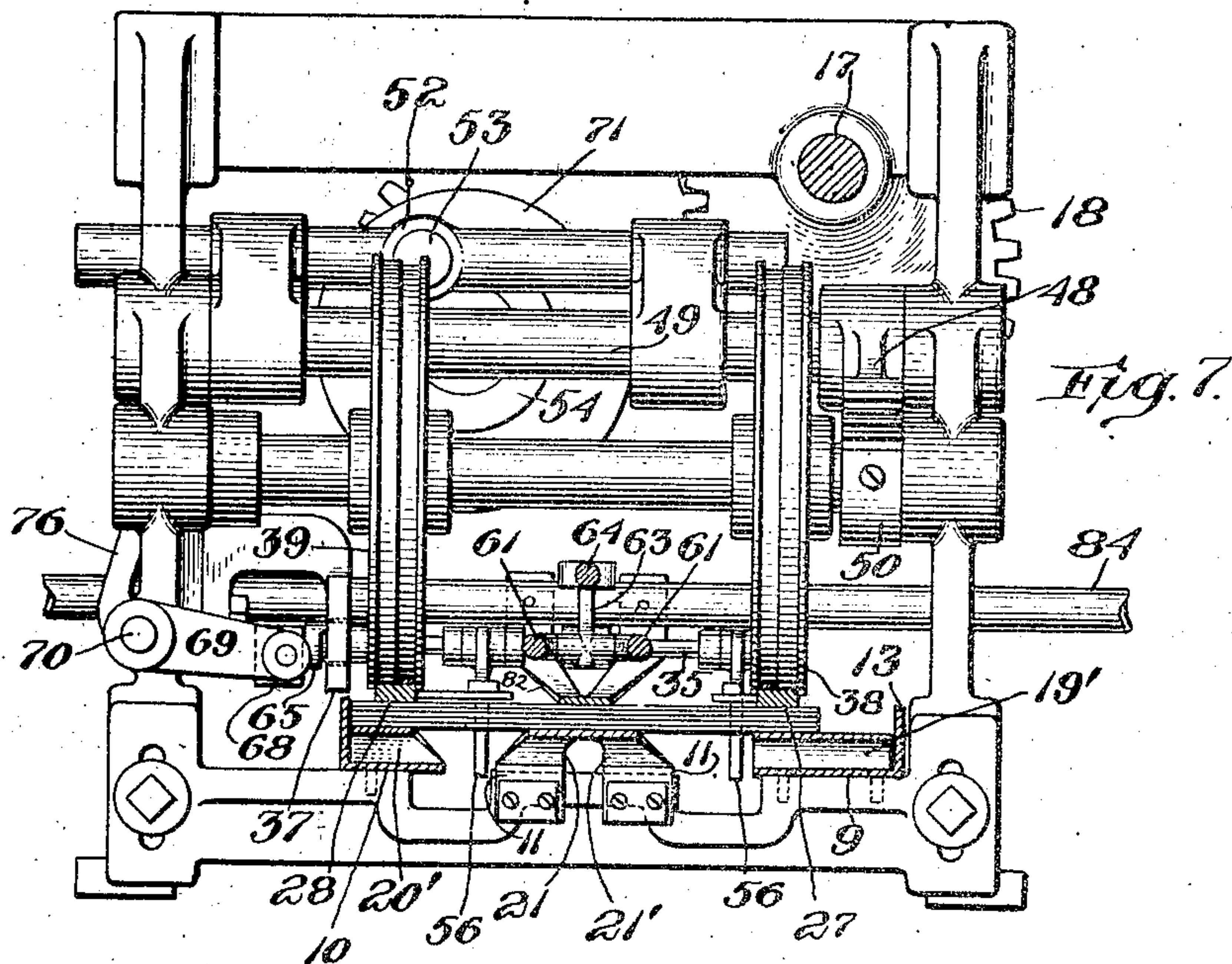
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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STITCHING MECHANISM FOR SIGNATURE-GATHERING MACHINES.

985,264.

Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed May 9, 1906. Serial No. 315,897.

To all whom it may concern:

Be it known that I, WILLARD I. LEWIS, citizen of the United States, and resident of Walpole, county of Norfolk, Massachusetts, have invented certain new and useful Improvements in Stitching Mechanisms for Signature-Gathering Machines; of which the following is a specification.

The invention relates to mechanism whereby the packs or bundles of signatures collected by the collecting mechanism of a signature gathering machine may be automatically taken from such collecting mechanism and bound or secured together by wiring, stitching or other suitable binding devices.

In magazine or pamphlet work it is customary to secure the packs or bundles or signatures together after they have been collected by presenting them manually to stitching mechanism which forms and introduces the wire staples or other devices which serve to bind the signatures together. This mode of procedure requires the handling of the collected signatures as they are delivered from a signature gathering machine and also requires that the backs of the signatures be carefully aligned in presenting them to the stitching mechanism.

It is the object of the present invention to eliminate this handling and manipulating of the collected signatures and to avoid the inaccuracies incident to such handling and manipulation and this is accomplished by combining with the collecting mechanism of a signature gathering machine a stitching mechanism to which the packs of collected signatures are intermittently and successively presented after they have been collected.

The various features of the invention will be set forth in the claims and will be understood from the following detailed description of the mechanism shown in the accompanying drawings which embodies these features in the forms in which it is preferred to employ them.

In these drawings—Figure 1 is a side elevation of so much of a signature gathering machine as is necessary to illustrate the application of the present invention thereto. Fig. 2 is a plan view of the same. Fig. 3 is a vertical transverse section taken on line 3—3 Fig. 1. Fig. 4 is a longitudinal vertical section. Fig. 5 is a plan view showing a feeding frame by which the collected signa-

tures are transferred from the collecting mechanism into position to be acted upon by the stitching mechanism. Fig. 6 is a detail of parts shown in Fig. 5. Fig. 7 is a transverse sectional view on line 7—7 Fig. 1; and Fig. 8 is a transverse sectional view on line 8—8 Fig. 1.

For the purpose of illustration the various features of the invention have been shown in the accompanying drawings embodied in a machine in which the mechanisms for acting upon and collecting the various signatures have the same general construction and mode of operation as the corresponding devices shown and described in the patent to Pray No. 767,081 August 9, 1904. In this machine the stacks of signatures from which individual signatures are separated and transferred to the collecting mechanism are supported within a series of magazines arranged in succession along the machine, one of which is indicated at 1 in Fig. 3. The lowermost signature in each stack of signatures is separated from the stack of signatures in the magazine by the action of pickers 2 mounted upon a bar 3 which is carried by an oscillating arm 4. The mode of operation of these pickers is clearly described in the patent referred to. The signatures separated by the pickers 2 from the stacks of signatures in the magazines are withdrawn from the stacks by grippers indicated at 5 which are carried by a shaft 6 and which act to deliver the signatures in front of a series of collecting fingers 7. The signatures delivered by the grippers are supported upon a laterally inclined collecting table extending longitudinally of the machine and the signatures are advanced along this table by the travel of the fingers 7 which are secured to an endless carrier chain 8 and project up through slots in the table. The collecting table consists of inner and outer sections 9 and 10 which are supported from beneath and extend from end to end of the machine and of intermediate strips 11 which are supported at opposite ends and extend from end to end of the machine between the collecting fingers 7. The inner section 10 of the collecting table is provided with an upwardly projecting guard or flange 12 against which the lower ends of the signatures ride as they are advanced along the collecting table. Near the delivery end of the collecting table the outer

section 9 is also provided with an upwardly extending guard flange 13. The carrier chain 8 is supported upon sprocket wheels one of which is indicated at 14 and the chain is continuously driven by gearing connecting one of the sprocket wheels with the shaft 6 at a proper speed to bring the fingers 7 successively into position to receive the signatures from the successive grippers 5, the fingers traveling the distance from one signature holding magazine to another at each revolution of the shaft 6.

The packs or bundles of signatures which have been transferred to the collecting table and collected by the collecting fingers 7 are transferred from the collecting mechanism to stitching mechanism by which the signatures are bound or secured together. In the construction shown this stitching mechanism consists of two wire stitchers indicated at 15 (Figs. 1, 2, 4, and 8). These stitchers may be of any suitable and well known construction such as are employed for forming and inserting wire stitches or staples in pamphlets or magazines. The stitchers are operated at proper intervals during the operation of the machine through gearing 16 which connects the operating shafts of the stitchers with a shaft 17. The shaft 17 is driven from the shaft 6 (Fig. 3) through elliptical gears 18 so arranged that the staple forming and driving mechanism of the stitchers will be driven at a high rate of speed at the time that the staples are being formed and forced through the packs of signatures.

In the machine shown the signatures are delivered to the collecting table in such position that the backs of the signatures are engaged by the collecting fingers 7 and the stitchers are arranged transversely of the path of travel of the signatures so that two wire staples or stitches will be simultaneously inserted at the proper points near the backs of the signatures. The signatures are supported during the operation of the stitching mechanism and during their travel into position to be operated upon by the stitching mechanism, by a supporting table arranged in a plane parallel with the plane of the collecting table and consisting of outer and inner plates 19, 20 and an intermediate plate or strip 21. These strips or plates which form the supporting table are secured upon transverse bars 22 which also support or form the clenching anvils for the wire stitching devices (Figs. 4 and 8). The bars 22 are secured to brackets 23 by bolts 24 which pass through vertical slots in the brackets and these bars may be vertically adjusted by means of screws 25 in adapting the machine for collecting and stitching different thicknesses of product. At its inner end the plate or strap 21 is provided with two thin resilient extensions 21', the ends

of which underlie lips 26 formed on the upper face of the straps 11 of the collecting table as indicated in Figs. 4 and 7. The inner and outer plates 19 and 20 are also provided with thin resilient extensions 19' and 20' the ends of which underlie lips similar to the lips 26 formed on the outer and inner plates 9 and 10 of the collecting table. These resilient extensions on the strips or plates forming the supporting table over which the signatures pass, form a support for the signatures as they are transferred from the collecting table to the supporting table and these extensions automatically accommodate themselves to the different adjustments of the supporting table.

The means for taking the collected signatures from the collecting mechanism and bringing them in succession into position beneath the stapling mechanism, comprises a frame arranged above the path of the signatures and provided with feeding fingers which rise during the backward stroke of the frame so that they pass over the packs of signatures and then move downward into position back of the packs of signatures so that on the forward movement of the frame they will act to engage the packs of signatures and move them forward. In the construction shown this frame consists of two side bars 27 and 28 connected by transverse bars 29 and 30 (Fig. 5). The front end of the feeding frame is supported and guided by means of two rolls 31 mounted upon a transverse shaft 32 and arranged to engage guiding grooves 33 formed in two fixed guide bars 34. The rear end of the frame is supported and guided by means of a roll 36^a mounted on a transverse shaft 35 and engaging a slot 36 formed in a fixed guide bar 37. The frame is reciprocated at each revolution of the shaft 6 by means of segments 38, 39 secured to a rock shaft 40 and connected with the side bars 27 and 28 of the frame by means of flexible straps 41, 42, 43, 44. The straps 41 and 43 are connected to the side bars 27 and 28 at some distance from their rear ends and these straps extend toward the rear ends of the bars and about the segments 38 and 39 and have their rear ends secured to the segments. The straps 42 and 44 are connected to the bars 27 and 28 near the rear ends of the bars and extend toward the forward ends of the bars and about the segments 38 and 39 and have their free ends secured to the segments. By this form of connection between the feeding frame and the segments 38 and 39 the frame is held snugly against the peripheries of the segments and is moved backward and forward as the segments are oscillated, the straps 41 and 43 unwinding from the segments and the straps 42 and 44 being wound upon the segments as the frame advances, while the straps 42 and 44

unwind from the segments and the straps 41 and 43 wind upon the segments as the frame is retracted. In order that the straps may be tightened and held taut the segments are made in sections which may be adjusted in opposite directions about the shaft 40 by means of screws 45 which pass through lug 46 in one section and engage the side of a recess 47 in the other section as indicated in Fig. 4.

The shaft 40 is oscillated to effect the reciprocation of the feed frame by means of a gear segment 48 secured to a rock shaft 49 and engaging a pinion 50 on the shaft 40. The rock shaft 49 is provided with arms 51 in the ends of which is mounted a bar 52. The bar 52 is connected by a crank pin 53 with a crank disk 54 secured to the end of the shaft 6. As the shaft 6 revolves the bar 52 is carried up and down by the crank pin, thus oscillating the shaft 49, the bar sliding longitudinally in the arms 51 to accommodate the rotary movement of the crank pin.

In the construction shown the feeding frame is provided with three sets of feeding fingers and at each reciprocation of the frame three packs of signatures are advanced, the rear pack being taken from the collecting fingers and advanced out of the path of travel of the fingers and this pack being advanced during the next succeeding advance movement of the feeding frame into position to register with the stapling mechanism and then during the next succeeding advance movement of the feeding frame being removed from the stapling mechanism and either discharged from the machine or presented to delivery devices by which it may be carried to any convenient position for handling.

The feeding fingers for taking the pack of signatures from the collecting mechanism consist of two fingers 55 loosely mounted on the shaft 35 and provided at their forward ends with vertical faces 56 for engaging the backs of the signatures. These fingers are provided with forward extensions 57 which rest upon pins 58 and thus support the fingers. During the backward or retracting movement of the feeding frame inclined surfaces 59 on the fingers which extend from their rear ends to their forward ends ride against the signatures which are being advanced by the collecting fingers 7 so that the feeding fingers are raised above the signatures and dragged along over the top of the pile of signatures until the front ends of the fingers pass beyond the rear of the pile of signatures when the fingers drop into position with the vertical faces 56 back of the pile of signatures. This action of the feeding fingers upon the signatures tends to crowd them snugly against the feeding fingers 7 and the fingers thus act as jogging devices for keeping or bringing the backs of

the signatures in alinement. As the feeding frame starts forward the feeding fingers 55 engage the backs of the signatures and carry the pile of signatures away from the fingers 7, the movement of the feeding frame being accelerated by the action of the crank which operates it. Thus the pile of signatures is carried forward away from the finger 7 and out of the path of the fingers so that they may pass down around the sprocket wheel 14 without disarranging the signatures in the pile. By the advance movement of the fingers 55 the pile of collected signatures is carried up the support between the collecting table and the supporting table and is brought into the position indicated in Fig. 4. The feeding fingers for further advancing the pack or pile of signatures consist of two sets of feeding fingers 59^a and 60 which are secured to two bars 61 extending longitudinally of the feeding frame between the bars 27 and 28. These bars 61 are supported at opposite ends upon bellcrank levers 62 and 63, the lever 62 being mounted upon a transverse shaft 64^a near the front end of the feeding frame and the bellcrank lever 63 being secured to the shaft 35 at the rear end of the feeding frame. The bellcrank levers are connected by a rod 64 so that they will move in unison and by the rocking movement of the bellcrank levers the bars 61 are raised and lowered in unison to raise and lower the feeding fingers 59^a and 60. The means for operating the bellcrank levers to raise and lower the feeding fingers consists of an arm 65 secured to one end of the shaft 35 and provided at its outer end with a roll 66 which engages a slot 67 formed in a bar 68. The bar 68 is carried in arms 69 secured to a rock shaft 70. The rock shaft 70 is operated at proper intervals to raise and lower the bar 68 and thus rock the shaft 35 to raise and lower the feeding fingers by the operation of a cam 71 secured to the shaft 6. The cam 71 engages a roll 72 secured to a lever 73 and this lever is connected with the shaft 70 by means of a roll 74 engaging a radial slot 75 formed in an arm 76 secured to the shaft 70. In order that the vertical movements of the feeding fingers may be varied for different thicknesses of product, the roll 74 is carried by a slide 77 adjustably secured upon the lever 73 by means of a bolt 78 passing through a slot 79 in the slide. The adjustment of the slide may be effected by means of a nut 80 threaded on a rod 81 projecting from the upper end of the slide as indicated in Fig. 3. During the return movement of the feeding frame the fingers 59^a and 60 are raised so that they pass above the packs of signatures which occupy the positions A and B Fig. 4. As the frame reaches the rearward limit of its movement the fingers 59^a and 60 are lowered so that they lie back of the packs of signatures and

as the frame is advanced the fingers 59^a engage the pack of signatures occupying the position A and advance this pack into the position B where it is in proper register with the stitching mechanism and where the wire staples are inserted at the proper distance from the backs of the signatures as indicated in dotted lines in Fig. 5. During this same advance movement of the feeding frame the fingers 60 engage the pack of signatures which has previously been operated upon by the stitching mechanism and advance this pack from the position B to the position C where the pack may drop into a suitable receptacle or may be delivered onto a belt or other delivery device.

In adjusting the mechanism for a given thickness of pack or pile of signatures, the support formed by the plates 19, 20 and 21 is so adjusted that the tops of the piles of signatures as they are transferred from the collecting table to this support will be brought against a retaining plate or strip 82 which extends longitudinally above the supporting table at a suitable height to bear against the upper surface of the piles of signatures and maintain them accurately in proper alinement. The plate 82 is secured at one end to a bar 83 which is supported upon the guide bars 34 and at its other end this plate is bifurcated and spread laterally as indicated in Figs. 3 and 7 and is supported upon a transverse rod 84.

By the operation of the mechanism described the signatures collected by the collecting mechanism may be rapidly and accurately transferred from the collecting mechanism to the stapling mechanism without danger of getting the signatures out of alinement and the signatures may be secured or bound together and then delivered ready for the securing of the covers thereto.

While it is preferred to employ the construction and arrangement of mechanisms and parts shown and described in embodying the various features of the invention in a simple and efficient mechanism, it will be understood that the forms and arrangements may be varied to suit the conditions under which the invention is to be employed without departing therefrom.

Without attempting to set forth the various forms and arrangements in which the features of the invention may be embodied, what I claim and desire to secure by Letters Patent is:—

1. A machine having in combination, a collecting table, traveling feeding fingers for advancing the signatures along the table, a vertically adjustable table arranged at the end of the collecting table, a support extending from one table to the other, a stitching mechanism above the second table, and intermittently acting feeding fingers for taking the packs of collected signatures from

the collecting fingers and presenting them to the stitching mechanism, substantially as described.

2. A machine having in combination, a collecting table, traveling feeding fingers for advancing the signatures along the table, a supporting table arranged at the end of the collecting table and in a parallel plane, the support extending from one table to the other, stitching mechanism above the second table, and a reciprocating feeding frame arranged above the supporting table and provided with feeding fingers for advancing the packs of signatures from the collecting fingers to the stitching mechanism, substantially as described.

3. A machine having in combination, a collecting table, traveling feeding fingers for advancing the signatures along the table, a supporting table arranged at the end of the collecting table, a support extending from one table to the other, a retaining plate extending longitudinally above the supporting table, a stitching mechanism above the supporting table, and means for transferring the packs of signatures from the collecting table into position to be acted upon by the stitching mechanism, substantially as described.

4. A machine having in combination, means for delivering packs of signatures in succession, a stitching mechanism, a vertically adjustable supporting table below the stitching mechanism, a reciprocating feeding frame above the supporting table, and vertically movable feeding fingers carried by said frame for advancing the packs of signatures from the delivering means to the stitching mechanism, substantially as described.

5. A machine having in combination, a stitching mechanism, a vertically adjustable supporting table below the stitching mechanism, a reciprocating feeding frame above the supporting table, feeding fingers pivoted upon said frame and provided with inclined surfaces for engaging the stacks of signatures and raising the fingers on the return stroke of the feeding frame, and means for advancing the stacks of signatures into position to be operated upon by the stitching mechanism, substantially as described.

6. A machine having in combination, a collecting table consisting of longitudinally extending plates, means for advancing the signatures along said table, a supporting table arranged at the end of the collecting table and comprising longitudinally extending plates, resilient extensions upon the plates of the supporting table, and lips upon the plates of the collecting table under which the ends of the resilient extensions engage, stitching mechanism above the supporting table, and means for advancing the stacks of signatures from the collecting table into

position to be operated upon by the stitching mechanism, substantially as described.

7. In a signature gathering machine the combination of a collecting table, traveling fingers for advancing the signatures along the table, a stitching mechanism, a supporting table below said mechanism, a reciprocating frame provided with feeding fingers, and means for moving said fingers out of the path of the signatures during the return stroke of the frame, substantially as described.

8. In a signature gathering machine the combination of a collecting table, traveling fingers for advancing the signatures along the table, a stitching mechanism, a supporting table below the stitching mechanism, a reciprocating feeding frame provided with feeding fingers, means for moving the fingers out of the path of the signatures during the return stroke of the frame and moving said fingers into the path of the signatures at the end of the return movement of the frame, substantially as described.

9. In a machine the combination of stitching mechanism, a supporting table below the stitching mechanism, a reciprocating feeding frame above the supporting table, fingers 55 pivoted upon said frame and provided with inclined surfaces, feeding fingers 59^a and 60 mounted upon said frame, and mechanism for raising and lowering the feeding fingers 59^a and 60, substantially as described.

10. In a machine the combination of stitch-

ing mechanism, a supporting table below the stitching mechanism, a reciprocating feeding frame above the supporting table provided with feeding fingers, rocking segments 38 and 39, and straps 41, 42, 43, 44 connecting the frame with said segments, substantially as described.

11. In a machine the combination of stitching mechanism, a vertically adjustable supporting table below said mechanism comprising longitudinally extending plates, a reciprocating feeding frame above the supporting table provided with vertically movable feeding fingers, and a retaining plate 82 extending longitudinally above the supporting table, substantially as described.

12. In a machine the combination of stitching mechanism, a supporting table below said mechanism, a reciprocating feeding frame above the supporting table, bars 61 provided with feeding fingers 59^a and 60, levers 62 and 63 in which said bars are mounted a rod 64 connecting said levers, a shaft 35 to which the lever 63 is secured, an arm 65 secured to said shaft, a guide bar 68 provided with a slot 67 engaged by said arm, and means for raising and lowering the bar 68, substantially as described.

In witness whereof, I have hereunto set my hand, this 4th day of May, 1906.

WILLARD I. LEWIS.

In the presence of—

FRANK O. PILSBURY,
WILLIAM H. CLARKE.