

Feb. 28, 1939.

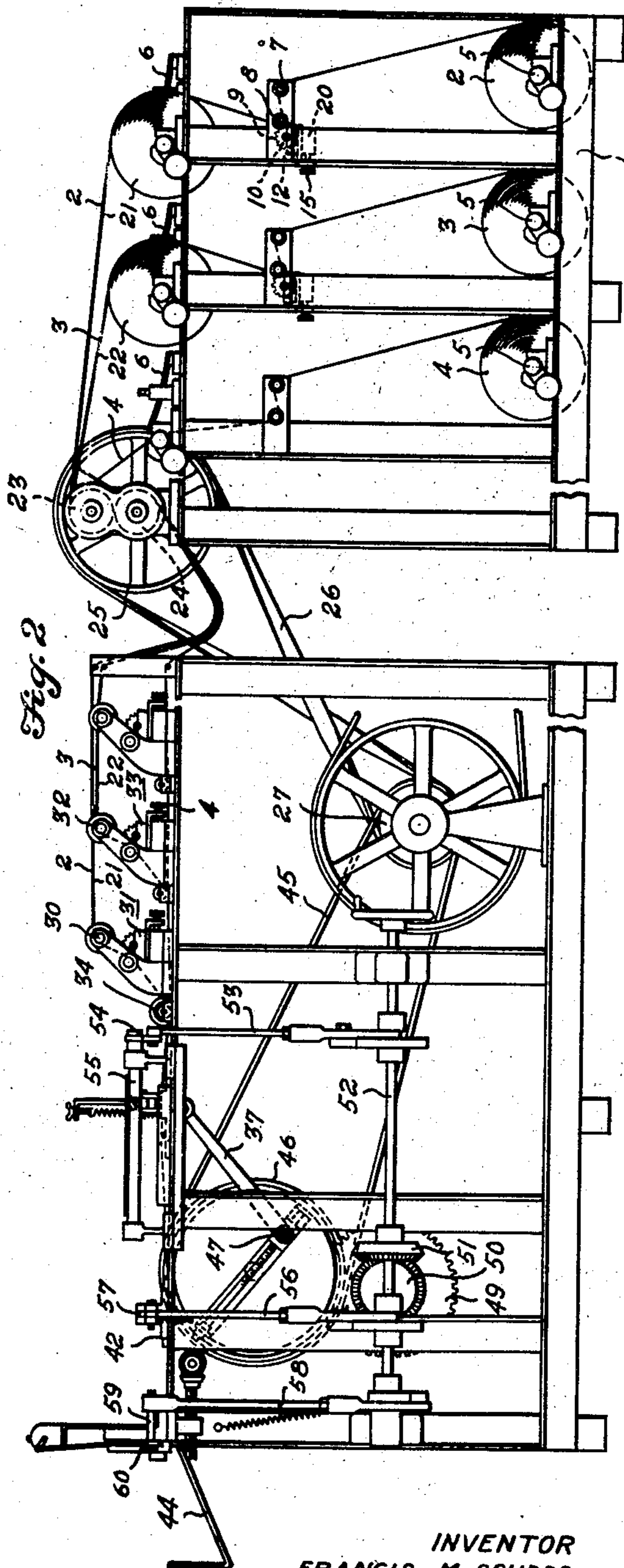
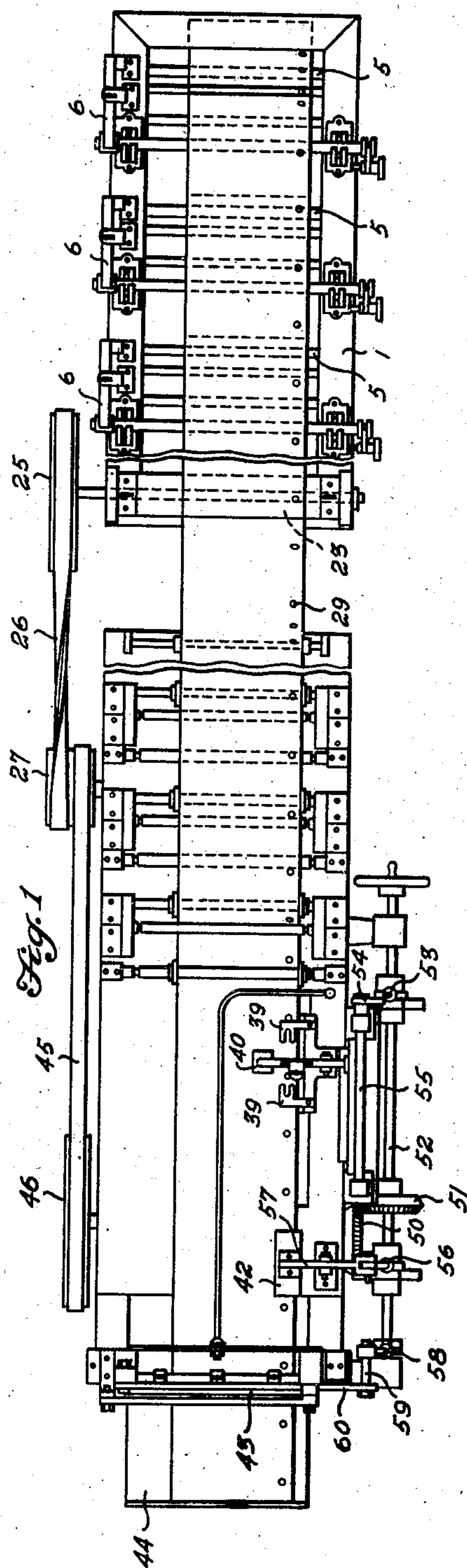
F. M. SCUDDS

2,148,586

GATHERING MACHINE

Filed Feb. 1, 1937

5 Sheets-Sheet 1



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Feb. 28, 1939.

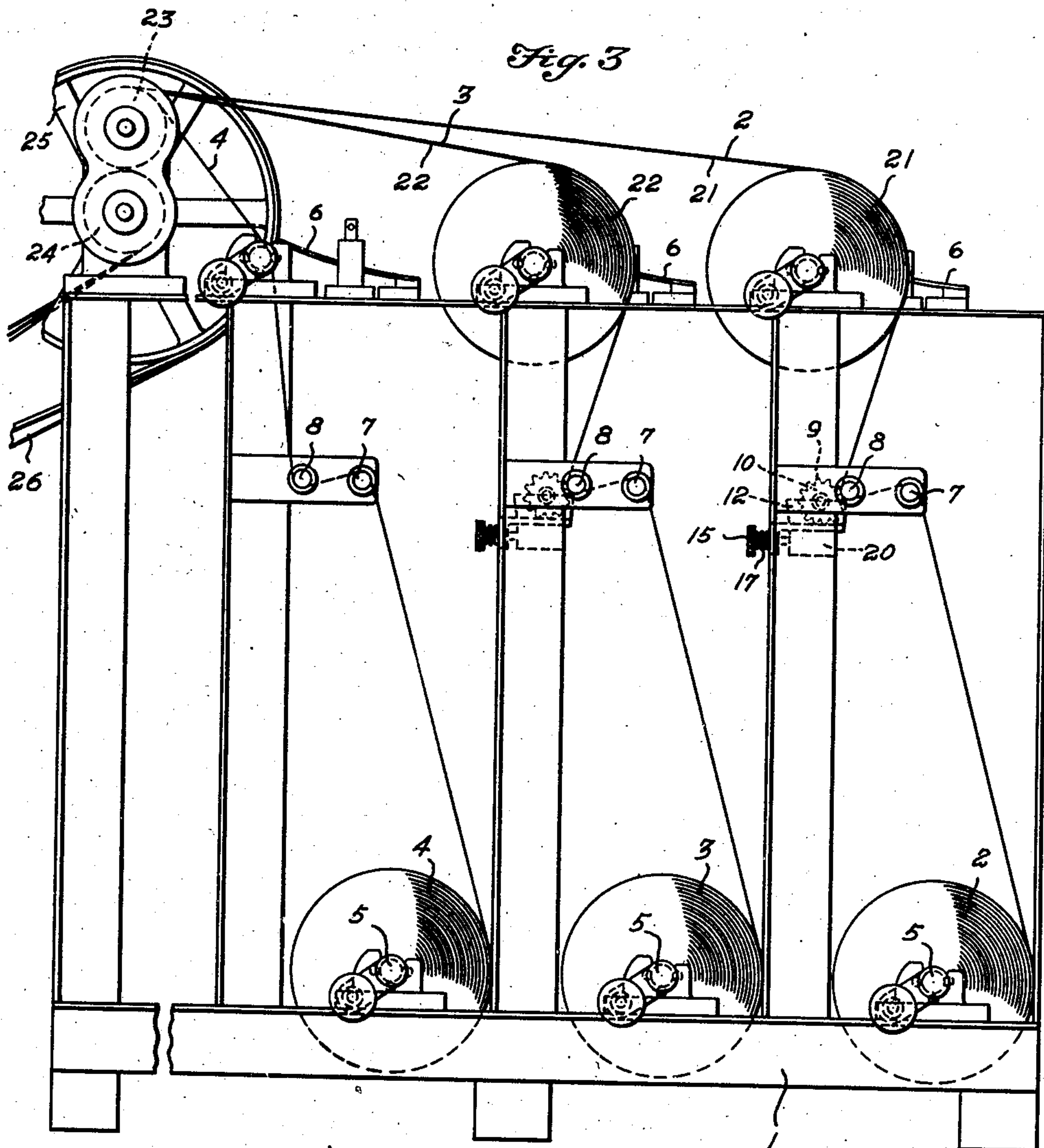
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GATHERING MACHINE

Filed Feb. 1, 1937

5 Sheets-Sheet 2



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# GATHERING MACHINE

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5. Sheets-Sheet 3

*Fig. 4*

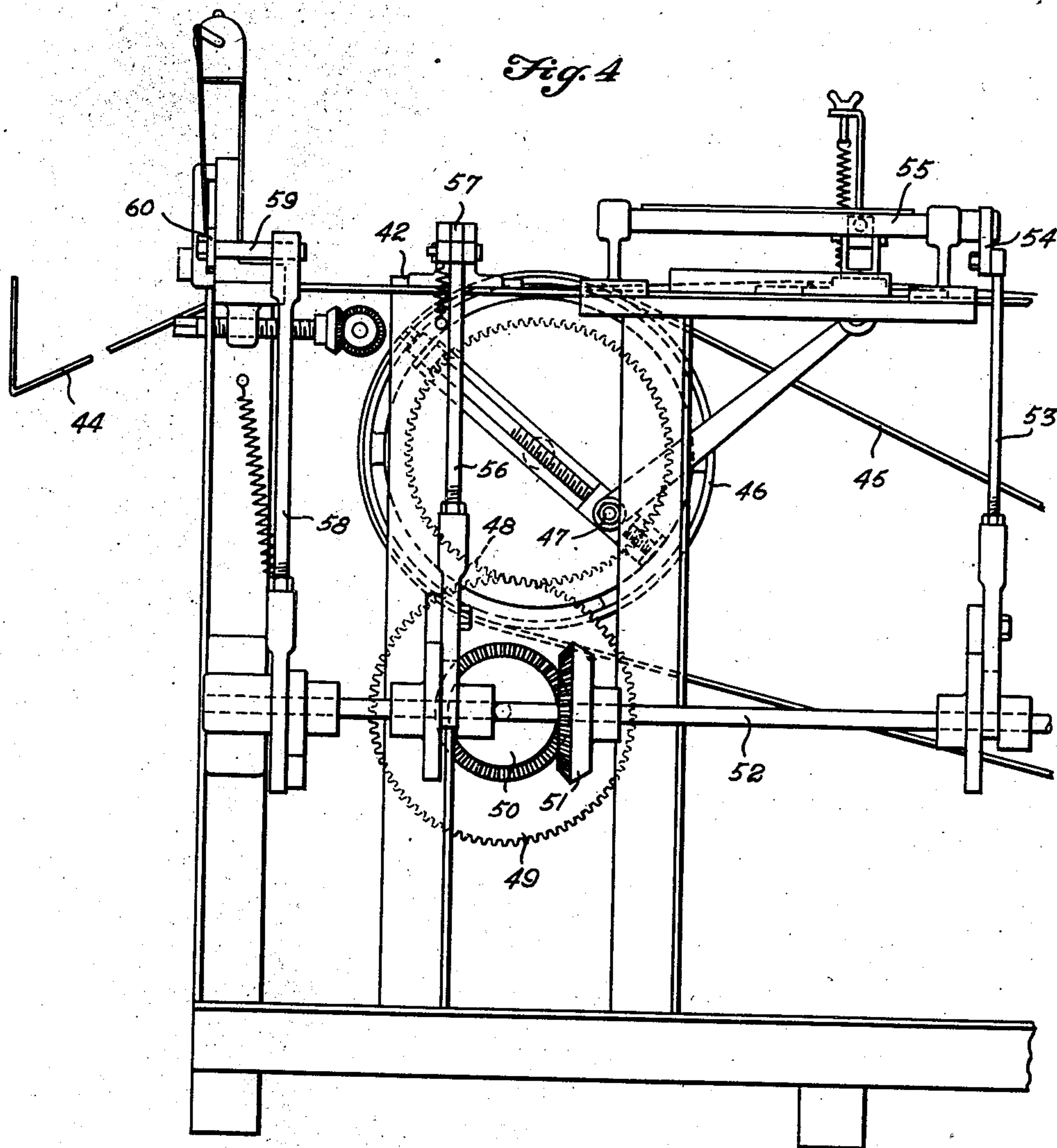
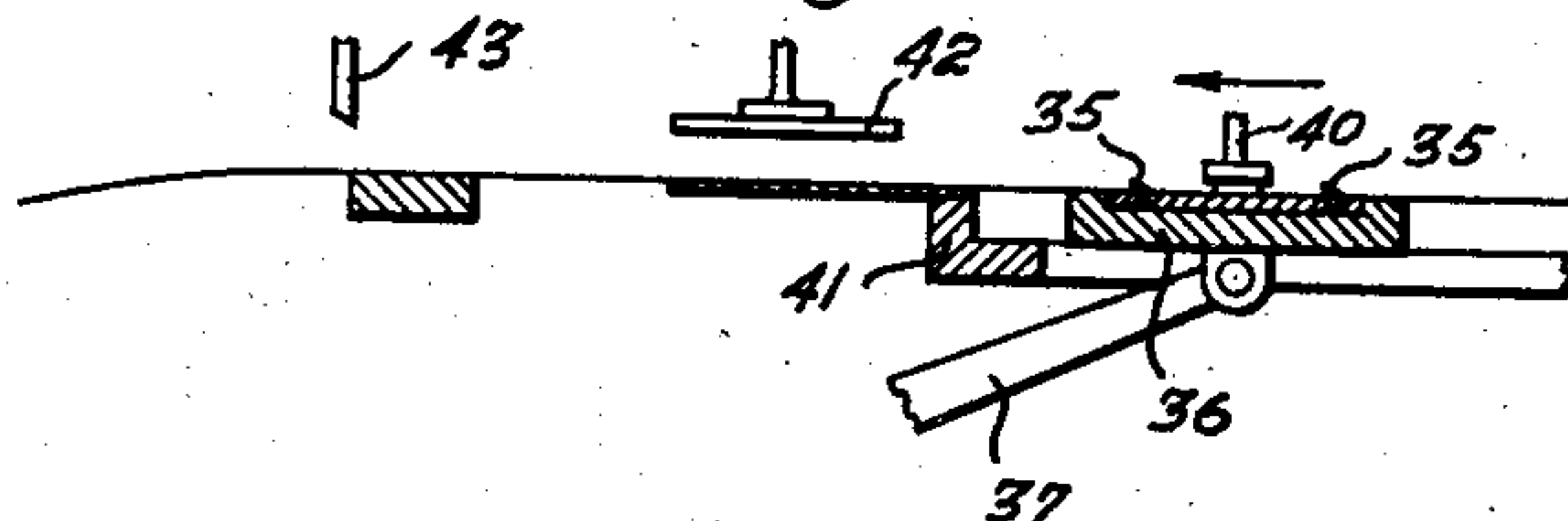


Fig. 5



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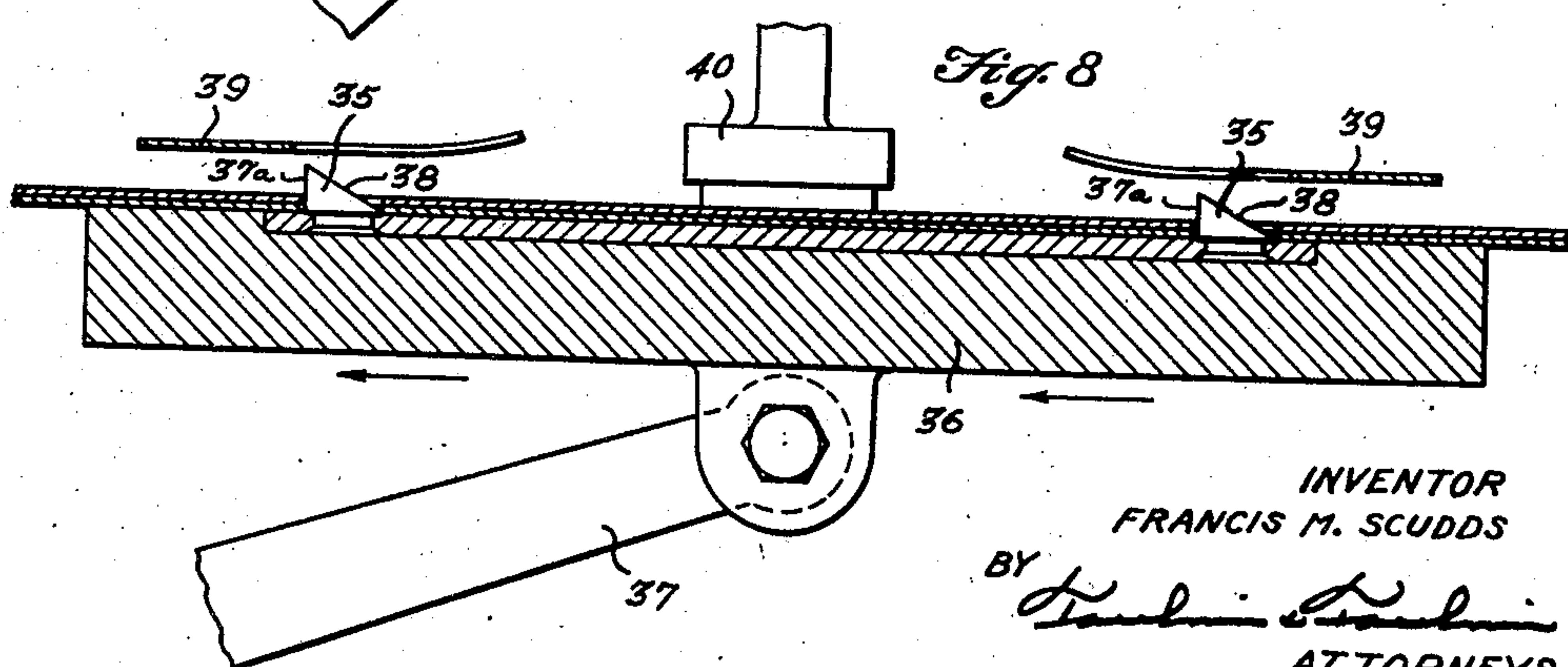
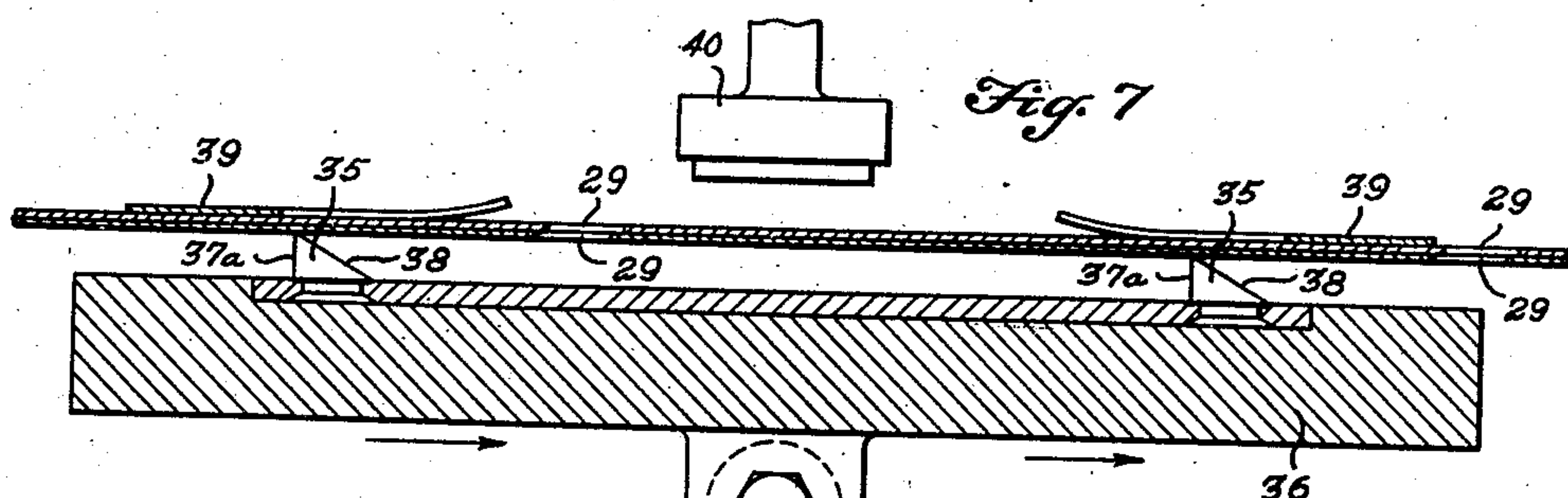
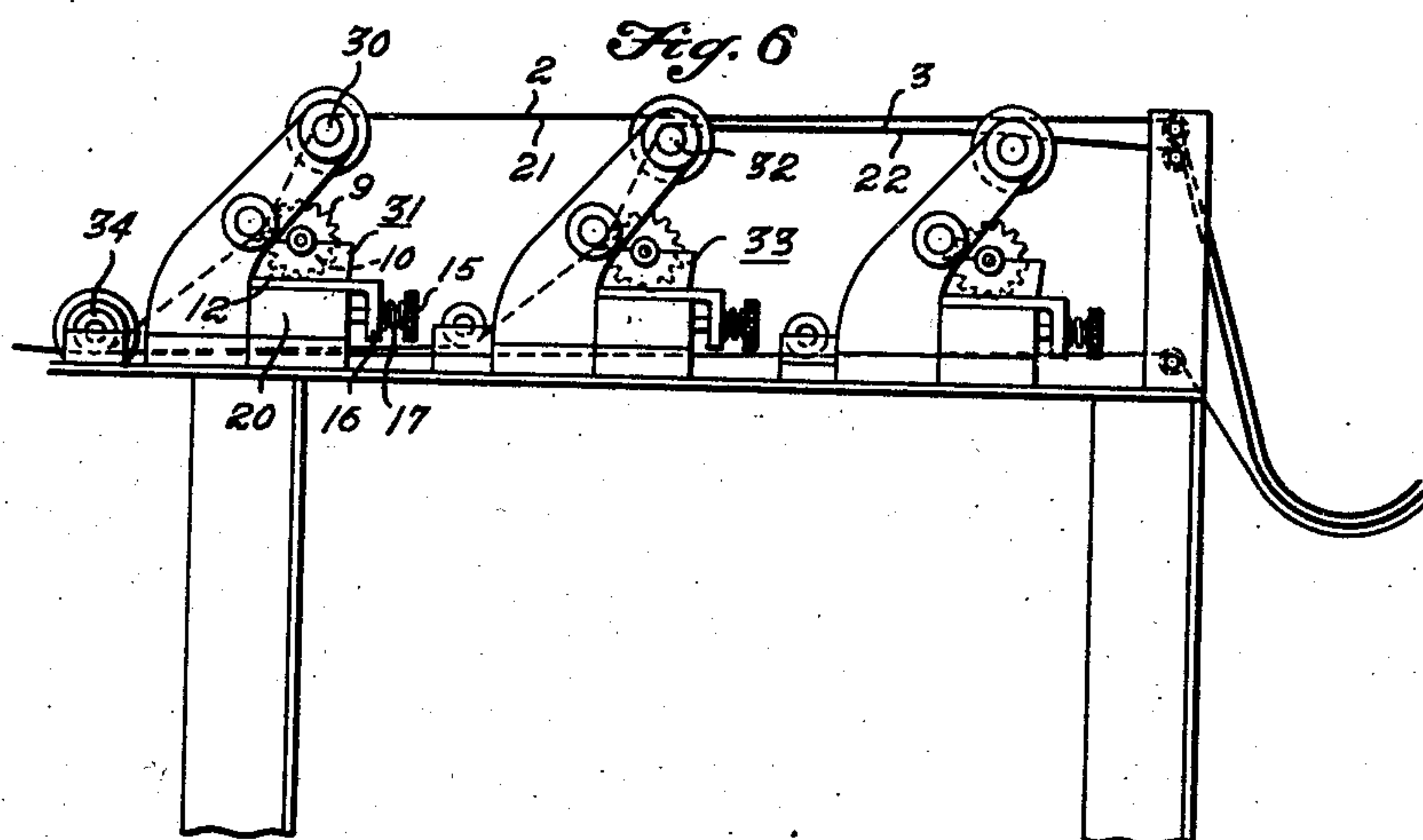
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GATHERING MACHINE

Filed Feb. 1, 1937

5 Sheets-Sheet 4



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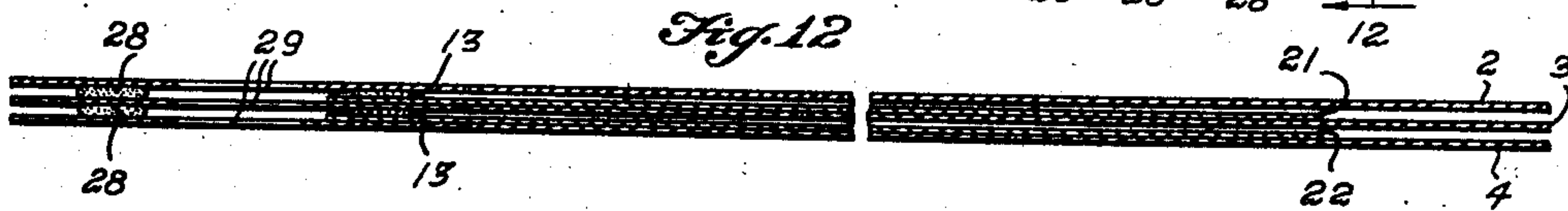
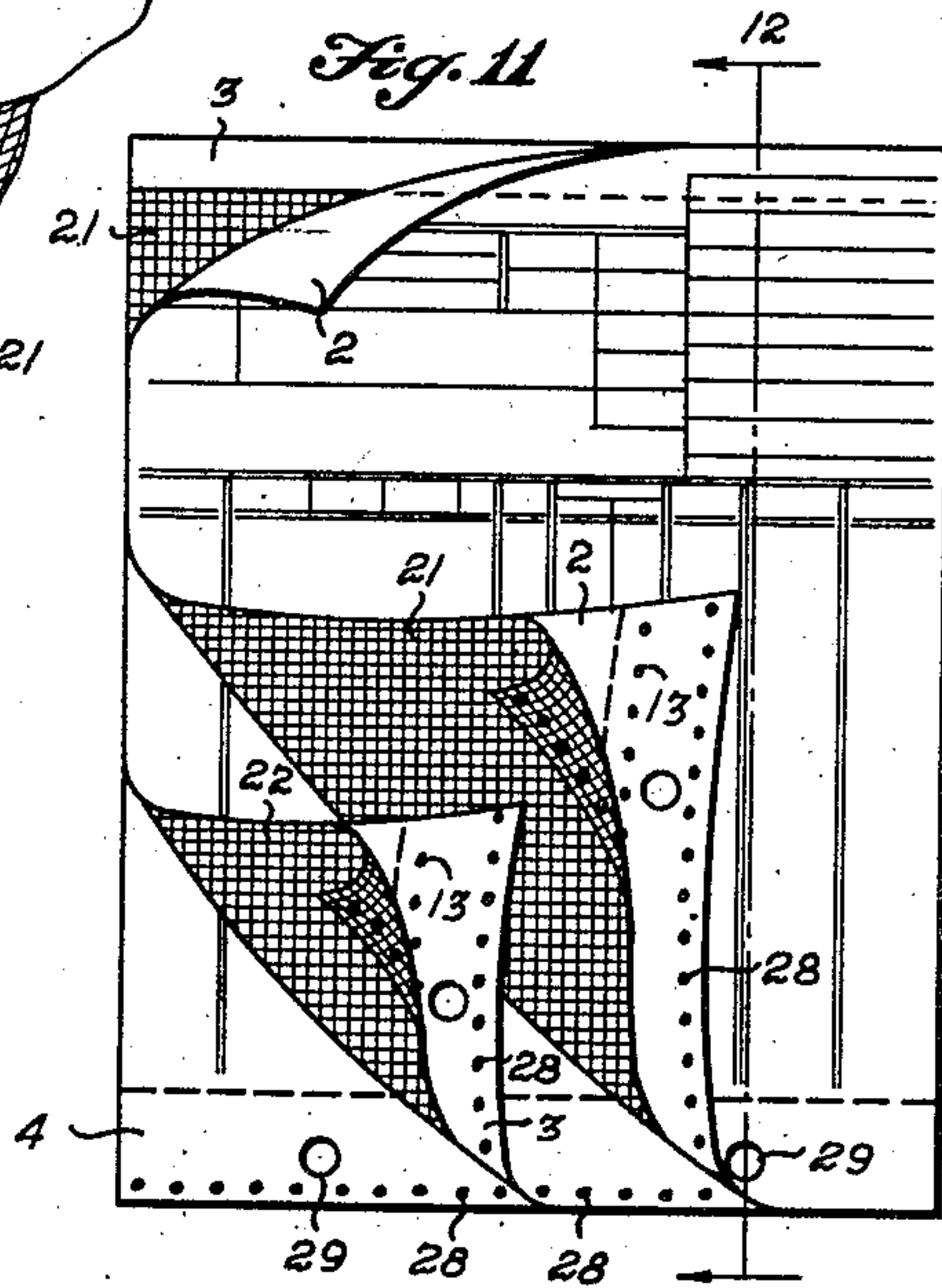
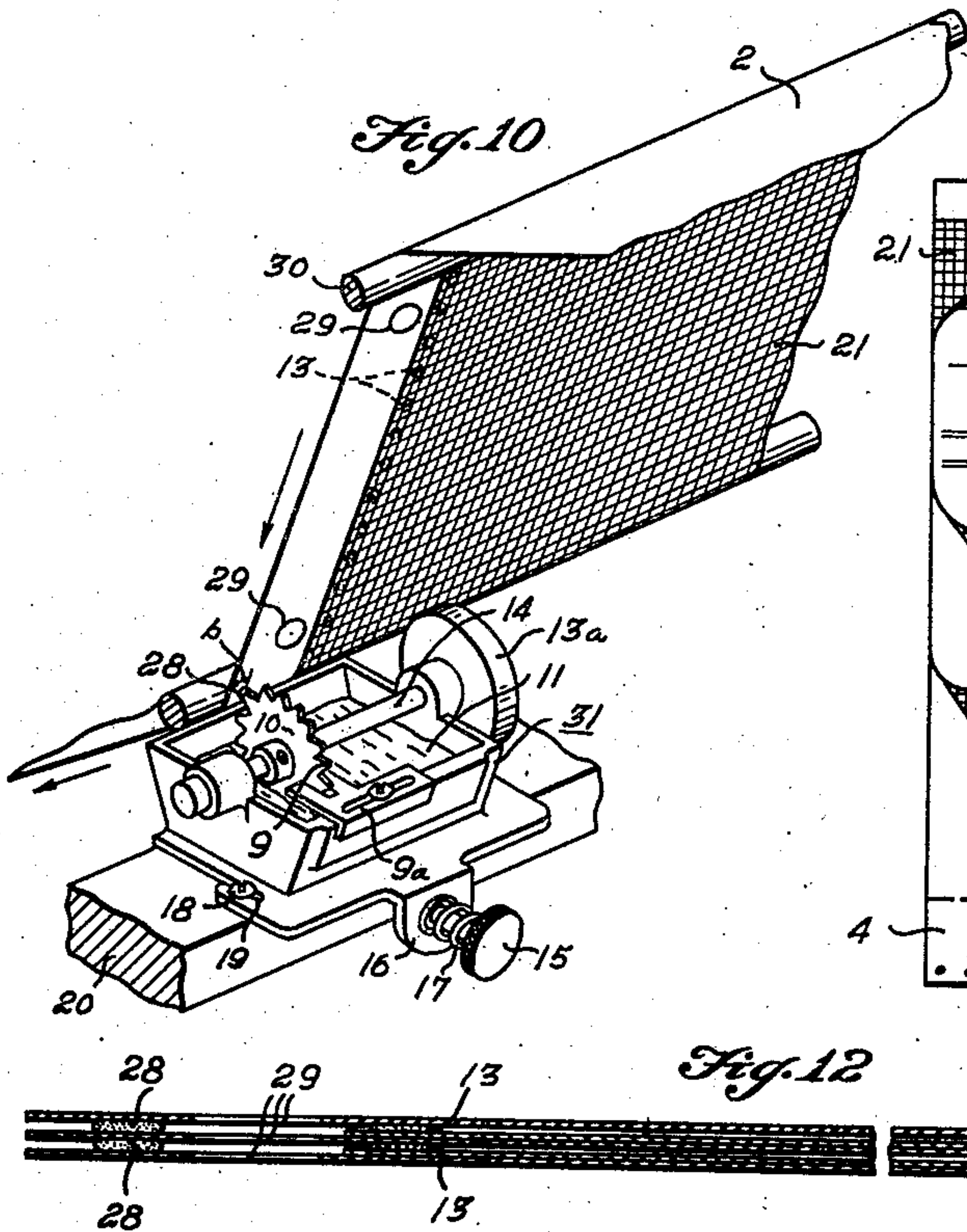
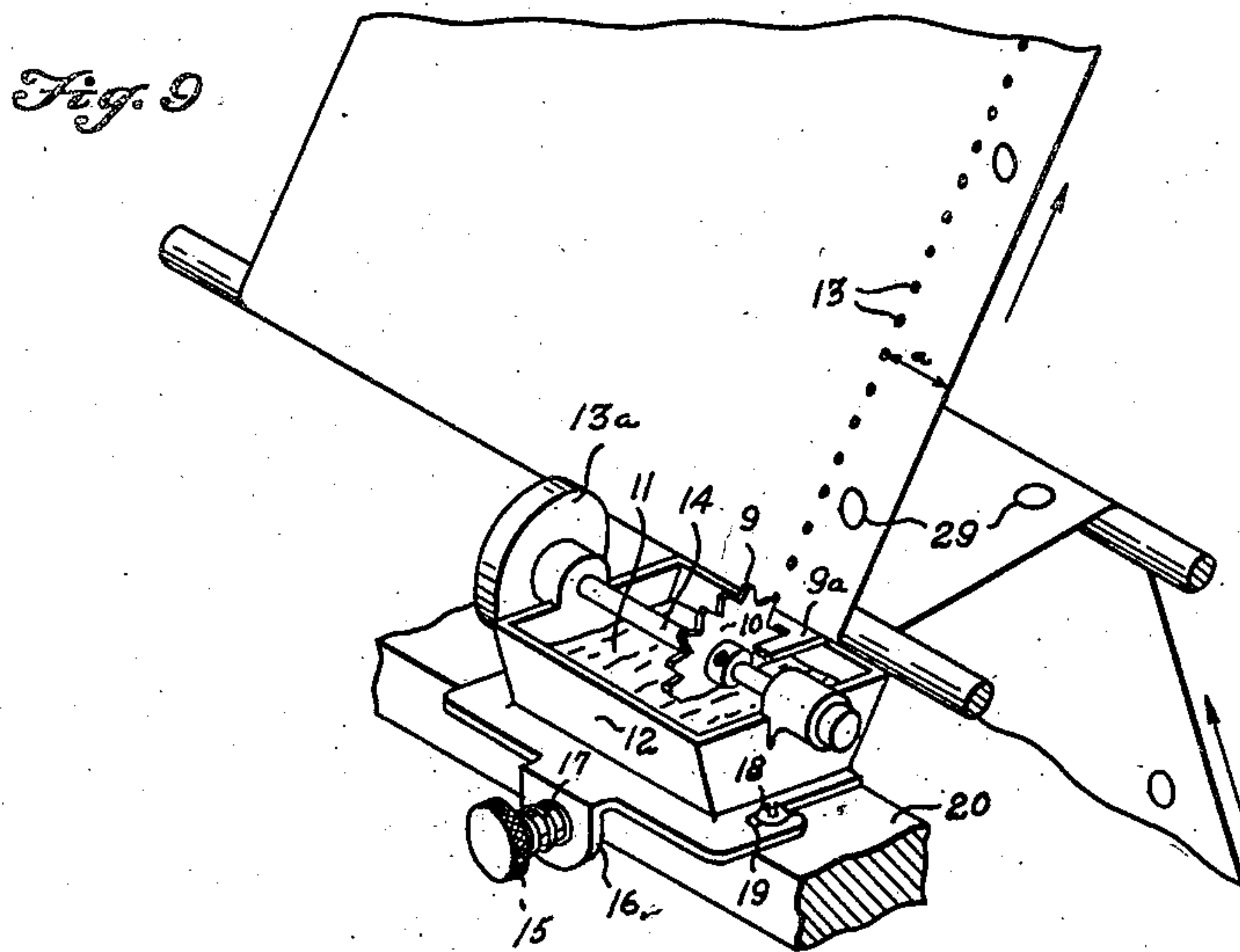
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2,148,586

GATHERING MACHINE

Filed Feb. 1, 1937

5 Sheets-Sheet 5



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## UNITED STATES PATENT OFFICE

2,148,586

## GATHERING MACHINE

Francis M. Scudds, Dayton, Ohio, assignor to  
The Egry Register Company, Dayton, Ohio, a  
corporation of Ohio

Application February 1, 1937, Serial No. 123,430

15 Claims. (Cl. 270—52)

My invention relates to an apparatus for and method of collating multiple strips of paper in registration.

It is my object to collate multiple strips of forms in registration with alternate, interleaved carbon strips, and to thereafter either fold or sever in sections the collated forms in permanent, aligned, collated condition.

The particular object of my invention is to apply liquid adhesive at spaced intervals to a plurality of paper sheets prior to interleaving with carbon sheets and to locate these spots of glue inwardly a predetermined distance from one margin of the paper and the same distance from the margin of the paper; to thereafter interleave carbon sheets with the paper sheets in adhesive engagement therewith; to thereafter apply a second line of adhesive spots in alignment with the spots on each sheet but closer to the margin of the sheet than the first mentioned series of spots; to thereby attach the paper sheets to one another and while the sheets are so attached but the glue is still plastic or fluid so as to permit the sheets to slip with respect to one another, to draw the sheets into alignment by means of the file punch holes in the sheets, which are afterwards used in the sheets for filing purposes; and to thereafter clamp the aligned sheets which are glued to one another and either fold or shear the sheets into separate forms or tickets.

The principal object of my invention is to first connect the carbons to the paper sheets adhesively by superimposed lines of adhesive or dots of adhesive; thereafter to attach the paper sheets to one another by another laterally spaced line or lines of adhesive or dots of adhesive; and while all of these adhesive areas are still fluid or plastic so the sheets can slip over one another, to align the sheets by using the file punch holes, as the sheets are in loose arrangement; and then, upon alignment, to hold the sheets in clamped relationship to cause them to finally adhere through the adhesive, and to sever the sheets in section.

Referring to the drawings:

Figure 1 is a top plan view of a machine for practicing my invention.

Figure 2 is a side elevation thereof.

Figure 3 is a detailed side elevation of the paper and carbon collating mechanism and the mechanism for applying spaced glue spots on the paper sheets to cause the carbon sheets to adhere thereto.

Figure 4 is a detailed side elevation of the aligning, clamping and shearing mechanism.

Figure 5 is a diagrammatic view of the same mechanism showing the paper being aligned prior to clamping and shearing.

Figure 6 is a detailed side elevation of the collating and glue applying mechanism for causing the paper sheets to be glued to one another.

Figure 7 is a diagrammatic view showing the relationship of the paper sheets during their unaligned condition and during the backward movement of the aligning collator. Only two sheets are shown for the purpose of simplicity in order to illustrate the principle of my invention.

Figure 8 is a similar view showing the aligning collator in position moving the sheets forward into alignment and to clamping position where they have been clamped.

Figure 9 is a perspective of the glue applying mechanism for causing the carbon sheets to adhere to the paper sheets.

Figure 10 is a perspective of the glue applying mechanism for causing the paper sheets to adhere to one another.

Figure 11 is a plan view of a typical ticket or section of the superimposed paper and carbon sheets with the edges turned back to illustrate the position of the spots of glue, the file punch holes, and the carbon and paper sheets.

Figure 12 is a section on the line 12—12 of Figure 11.

Referring to the drawings in detail, I generally designate a frame supporting a plurality of paper rolls 2, 3 and 4. The paper sheets that are pulled from the rolls are designated the same numbers. The axles of the rolls at 5 are provided with the usual brakes 6 for regulating the unwinding of the paper. Each paper sheet passes over a guide roll 7 and beneath a guide roll 8 where it is engaged by the spaced teeth 9 of a glue applying disk 10 which dips within the glue 11 in the glue pot 12 so that a series of glue spots 13 are applied, as shown more particularly in Figure 9. 9a is a wiper.

This application of the glue is regulated by the drive wheel 13a on the shaft 14 on which the glue wheel 10 is mounted. The relationship of the glue pot 12 and its wheel 10 is determined by the adjustment of the screw 15, between which and the frame 16 supporting the pot 12 is a helical spring 17. The inward and outward movement of the glue pot is guided by the screw 18 mounted within the slot 19 and supported upon the transverse frame member 20. The drive wheel 13a resists the spring 17.

The several paper sheets, after being so glued



at any predetermined uniform distance from the margin, which in this case is indicated as the distance  $a$  (Figure 9), are brought over the sheets 21 and 22 respectively from the carbon rolls of the same number. These rolls likewise have the brakes 6 on their axles. The undermost paper sheet does not pass over a carbon roll, but is assembled with the carbon sheets and paper sheets between the pressure rolls 23 and 24 which are synchronously driven through the drive wheel 25, which in turn is driven by a belt 26 from a common drive pulley 27. The assembled carbon and paper sheets then pass to the machine for gluing the sheets to one another. This machine consists of means of applying glue to the margins of the paper, as shown in Figure 10, the distance  $b$  from the margin of the paper. These glue spots are designated 28. Located between the glue spots are the file punch holes 29, of which there are a pair widely spaced from one another, for each superimposed set of forms.

The paper sheet 2 and carbon 21 pass over one guide roller 30 and then the paper sheet receives its glue spots 28 from the gluing mechanism generally designated 31. Likewise the assembled paper sheet 3 and carbon sheet 22 pass over the guide roller 32 receiving its glue spots from the gluing mechanism 33. The paper sheet 4 passes directly beneath the pressure roll 34, where the paper sheets are assembled with it after having received the glue spots 28. Up to this point the glue is still "wet", that is, plastic or liquid, and the sheets can move over one another for collating and aligning purposes.

To effect this operation, the mechanism shown in Figures 4, 5, 7 and 8 is employed.

The several sheets, being provided with the file punch holes 29, are engaged by the aligning studs 35, of which there is a pair. These studs are carried upon the reciprocating plate 36 that is moved back and forth by the pitman 37, which in turn is synchronously driven from the main power pulley 27 as hereinafter described. The exact details of this mechanism are not important.

The aligning studs 35 have vertical forward faces 37a and tapered rear faces 38 so that as they are moved backwardly, the paper beneath the guides 39 will be mounted on the studs 35. The paper sheets may or may not be out of alignment with one another. It is important that they be brought into alignment so that the printed forms on the sheets may be brought in registration. After having the pins 35 inserted in the file punch holes 29, the reciprocating plate 36 then moves forwardly with the several sheets, and due to the drag on the sheets, they are brought into alignment with the forward edge of the file punch holes 29, aligning against the forward vertical face 37a of the pins 35. Thus the sheets are moved forwardly in aligned condition to their final position for the next operation. The sheets are shown brought to their aligned condition in Figure 8, at which time they are held firmly by the descending clamps 40.

It will be understood that the sheets can be brought into alignment because the glue has not yet "set", and, therefore, any misalignment between the sheets is corrected by this pulling forward of them between the pins 35 in engagement with the forward edges of the file punch holes 29.

The final movement forwardly of the sheets so aligned under the clamp 40 terminates as indicated in Figure 5 when the reciprocating carrier 36 reaches the shoulder of the guiding frame

41. At this point the clamp 42 is lowered to hold the sheets, and while so held, the reciprocating plate 36 with its pins 35 starts to move backwardly. It can do so because the tapered surfaces of the pins 35 at 38 and the lifting of the clamp 40 permits the pins to slip out of the file punch holes 29 and move backwardly to engage a new group of sheets for moving them forwardly and aligning them at the same time.

While this is going on, the clamp 42 is holding the aligned sheets that have been brought forward, and the shearer 43 is descending to shear the sheets into a group of tickets which have been adhesively connected to one another with interleaved carbons in aligned condition, as shown in Figures 11 and 12. The sheets so sheared are caught in the support 44.

It will be noted that the synchronizing mechanism for these operations comprises a belt 45 driven from the driving pulley 27 which drives a pulley 46, which in turn is connected pivotally at 47 to the pitman 37. This provides for the reciprocation of the plate 36 and pins 35. A gear 48 mounted on the pulley 46 drives the gear 49, which in turn drives the bevel pinion 50 and its bevel pinion 51. This serves to supply power to the shaft 52. The shaft 52 is connected by a pitman 53 through the link 54 and shaft 55 to the clamp 40 that moves back and forth with the pins 35 to hold the paper sheets on the bed 36.

Likewise, the shaft 52 operates through the link 56 and lever 57 the holding clamp 42 which holds the sheets against backward movement during the return movement of the pins 35 and during the shearing operation.

Likewise the shaft 52 supplies power to the pitman 58 that in turn operates the shaft 59 and the lever 60 that actuates the shearer 43.

My method consists of applying spots of glue in one plane to attach the carbons to the paper sheets and the spots of glue in another plane to attach the paper sheets to one another, and thereafter to align the sheets through their file punch holes while the glue is still wet. Then the sheets are clamped and sheared, and while being so clamped and sheared, the sheets that are being glued can be engaged by the aligning pins to the file punch holes and moved forwardly to a new position for the repetition of the operation.

By using the large file punch holes and large pins, the sheets can be suitably aligned.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

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

1. In combination, means for adhesively connecting carbon webs and paper webs together a spaced distance from one edge of said webs; means for adhesively connecting said paper webs only to one another adjacent to said edge; means for aligning said webs while so adhesively connected before the adhesive dries, said aligning means comprising a reciprocating plate having pin means for engaging file punch holes in said paper webs; means for moving the webs forwardly while said pins are engaged with the forward edges of said file punch holes; means for clamping said webs while moved forward in alignment; and means for holding said webs in aligned clamped condition while said aligning plate and pins are returned for engaging in a new set of file punch holes for another aligning operation.



2. In combination, means for adhesively connecting carbon webs and paper webs together a spaced distance from one edge of said webs; means for adhesively connecting said paper webs only to one another adjacent to said edge; means for aligning said webs while so adhesively connected before the adhesive dries, said aligning means comprising a reciprocating plate having pin means for engaging file punch holes in said paper webs; means for moving the webs forwardly while said pins are engaged with the forward edges of said file punch holes; means for clamping said webs while moved forward in alignment; means for holding said webs in aligned clamped condition while said aligning plate and pins are returned for engaging in a new set of file punch holes for another aligning operation; and means for shearing said webs into aligned sets while they are so held and while the pins are being returned to pick up a new set of webs to move them forwardly to aligned, clamping position.

3. In combination, means for adhesively connecting continuous carbon webs and paper webs in superimposed sets of paper and carbon webs; means for adhesively connecting sets of carbon paper and paper in pairs by connecting the paper sheets only adhesively; means for aligning said sets while the adhesive between the paper webs is still plastic to permit relative movement between the adhesively connected paper webs; means for causing said webs to align by the drag thereof against aligning pins, and aligning pins adapted to be inserted into marginal holes in said paper webs so that the paper webs through their drag will be aligned against said pins as the webs are moved forward bodily.

4. In combination, means for adhesively connecting carbon webs and paper webs in superimposed sets of paper and carbon webs; means for adhesively connecting sets of carbon paper and paper into pairs by connecting the paper webs only adhesively; means for aligning said paper webs with their attached carbon webs while the adhesive between the paper webs is still plastic to permit relative movement between the adhesively connected paper webs; means for causing said webs to align by the drag thereof against aligning pins; aligning pins adapted to be inserted into marginal holes in said paper webs so that the paper webs through their drag will be aligned against said pins as the webs are moved forward bodily; and means for clamping said webs when so aligned to cause them to adhesively adhere.

5. In combination, means for adhesively connecting carbon webs and paper webs in superimposed sets of paper and carbon sheets; means for adhesively connecting sets of carbon paper and paper into pairs by connecting the paper sheets only adhesively; means for aligning said sets while the adhesive between the paper webs is still plastic to permit relative movement between the adhesively connected paper webs; means for causing said webs to align by the drag thereof against aligning pins; aligning pins adapted to be inserted into marginal holes in said paper webs so that the paper webs through their drag will be aligned against said pins as the webs are moved forward bodily; means for clamping said webs when so aligned to cause them to adhesively adhere; and means for holding said webs in aligned, clamped condition to permit the aligning means to be withdrawn therefrom and returned for engagement with the next successive pair of aligning apertures in said webs.

6. In combination, means for adhesively connecting a plurality of paper webs having holes for alignment, aligning pins, and means for introducing said pins into said holes and moving said webs bodily forwardly while the adhesive between the webs is still wet so that the drag of the webs will cause their alignment against the forward walls of the pins.

7. In combination, means for adhesively connecting a plurality of paper webs having holes for alignment, aligning pins, means for introducing said pins into said holes and moving said webs bodily forwardly while the adhesive between the webs is still wet so that the drag of the webs will cause their alignment against the forward walls of the pins, and means for holding said webs in their aligned, forwardly disposed position while said pins are returned beneath said webs for engagement with a new set of aligning holes.

8. In combination, means for adhesively connecting a plurality of paper webs having holes for alignment, aligning pins, means for introducing said pins into said holes and moving said webs bodily forwardly while the adhesive between the webs is still wet so that the drag of the webs will cause their alignment against the forward walls of the pins, means for holding said webs in their aligned, forwardly disposed position while said pins are returned beneath said webs for engagement with a new set of aligning holes, and means for shearing a predetermined length from the ends of said aligned webs while so held.

9. In a method of forming collated sets of forms with interleaved carbon sheets, arranging superimposed pairs of carbon webs and paper webs in adhesive engagement with one another adjacent an edge of the carbon web displayed inwardly with respect to the edge of the paper web; adhesively connecting the carbon-free edges of the paper webs of adjacent pairs of carbon and paper webs into sets; and engaging apertures in said paper webs and moving them forward bodily to align said apertures while the adhesive between the paper webs is still wet.

10. In a method of forming collated sets of forms with interleaved carbon sheets, arranging superimposed pairs of carbon webs and paper webs in adhesive engagement with one another adjacent an edge of the carbon web displayed inwardly with respect to the edge of the paper sheet; adhesively connecting the carbon-free edges of the paper webs of adjacent pairs of carbon and paper webs into sets; engaging apertures in said paper webs and moving them forward bodily to align said apertures while the adhesive between the paper webs is still wet; clamping said aligned webs and while so clamped aligning the next adjacent portions of the webs so adhesively connected.

11. In a method of forming collated sets of forms with interleaved carbon sheets, arranging superimposed pairs of carbon webs and paper webs in adhesive engagement with one another adjacent an edge of the carbon web displayed inwardly with respect to the edge of the paper web; adhesively connecting the carbon-free edges of the paper webs of adjacent pairs of carbon and paper webs into sets; engaging apertures in said paper webs and moving them forward bodily to align said apertures while the adhesive between the paper webs is still wet; clamping said aligned webs and while so clamped aligning the next adjacent portions of the webs so adhesively connected; and successively shearing said webs



into sets of aligned forms with carbon adhesively attached and interleaved therebetween.

12. In a method of making a manifold pack in which strips of transfer material are interleaved between strips of record material, the following steps in order; applying adhesive to a strip of record material over a limited surface spaced a distance from one edge of the strip, covering the strip including the adhesive portion with a strip of transfer material but leaving a margin uncovered by the transfer material, applying adhesive to the margin on the record material, and superimposing a strip of record material over the transfer strip so as to cover the adhesive on the margin of the first-mentioned record material.

13. In a method of making a manifold pack in which strips of transfer material are interleaved between strips of record material, the following steps in order; applying adhesive to a strip of record material over a limited surface spaced a distance from one edge of the strip, covering the strip including the adhesive portion with a strip of transfer material but leaving a margin uncovered by the transfer material, applying adhesive to said margin on the record material, superimposing a strip of record material on the transfer strip so as to cover the adhesive on the margin of the first-mentioned record material, aligning the record strips and the interleaved transfer strips, and, while in aligned condition, exerting pressure on all of the strips to form a pack.

14. In a method of making a manifold pack in which strips of transfer material are interleaved with strips of record-material, the follow-

ing steps in order; simultaneously applying adhesive to a plurality of strips of record material over a limited surface of the strips which surface is spaced a distance from one edge of the strips, covering the strips including the adhesive-covered portions with strips of transfer material but leaving a margin uncovered by the transfer material, applying adhesive simultaneously to the margins of the strips of record material, assembling and aligning the record and transfer strips in such a manner that a record strip will cover each transfer strip and will contact with another record strip at the adhesive-covered margin to form a pack, then applying pressure to the pack to cause the strips to adhere to one another in aligned position.

15. In a method of making a manifold pack in which strips of transfer material are interleaved with strips of record material, the following steps; applying adhesive over a pair of limited surfaces of a strip of record material, said surfaces being spaced different distances from the edge of the strip, covering the strip including one of the adhesive surfaces with a strip of transfer material, covering said transfer material with a strip of record material including the remaining adhesive surface of the record material to which the transfer material is secured, then moving the combined strip material while the adhesive is in a plastic condition in such a manner that the drag of the strips tends to bring about alignment between the strips, and then applying pressure to the strips to cause them to adhere to one another in their aligned positions.

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