

965,598.

5 SHEETS—SHEET 1.



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A. M. PRICE.
SHEET GATHERING MACHINE.
APPLICATION FILED NOV. 22, 1909.

965,598.

Patented July 26, 1910.

5 SHEETS—SHEET 2.

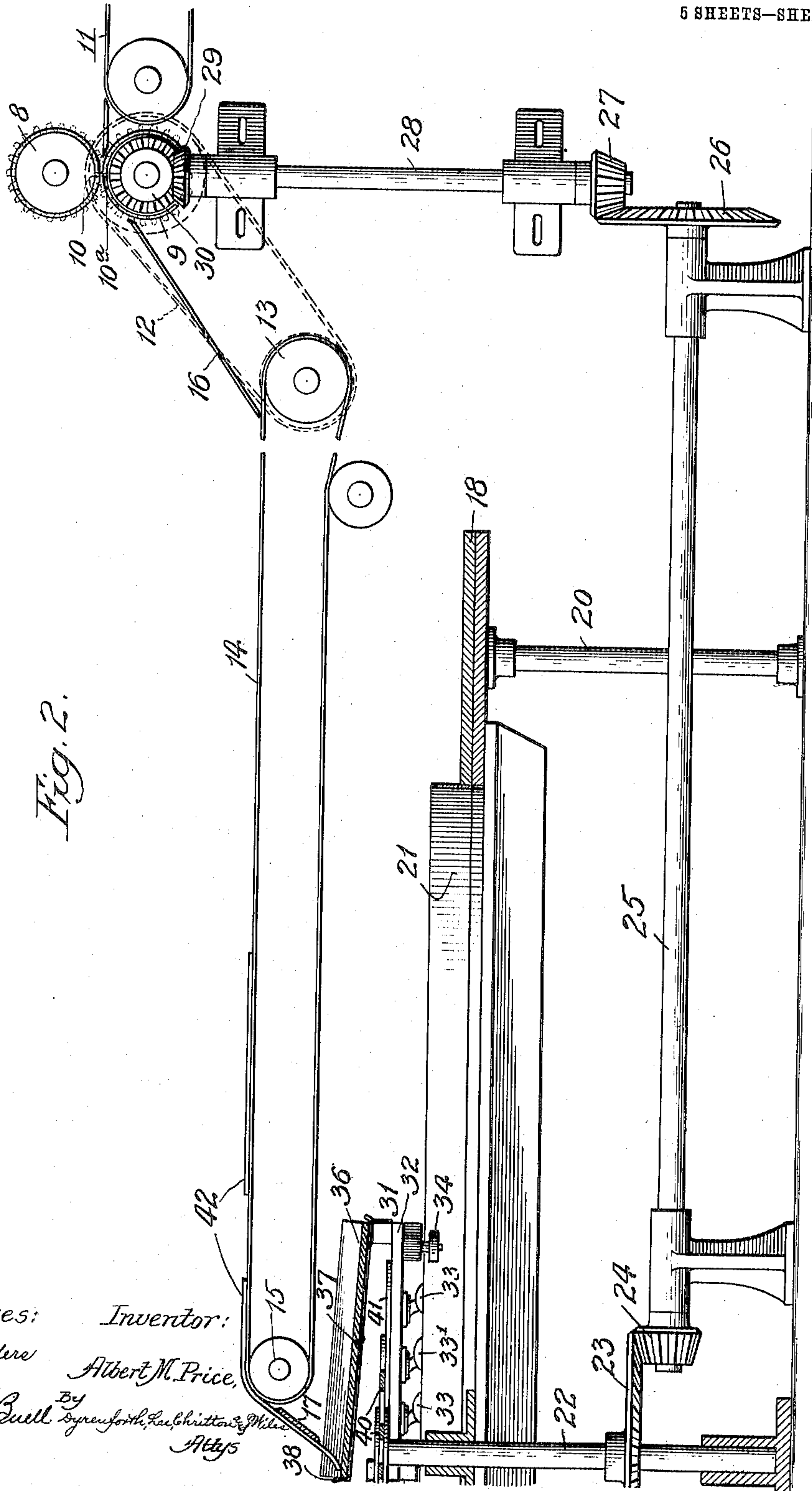


Fig. 2.

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5 SHEETS—SHEET 3.

Fig. 3.

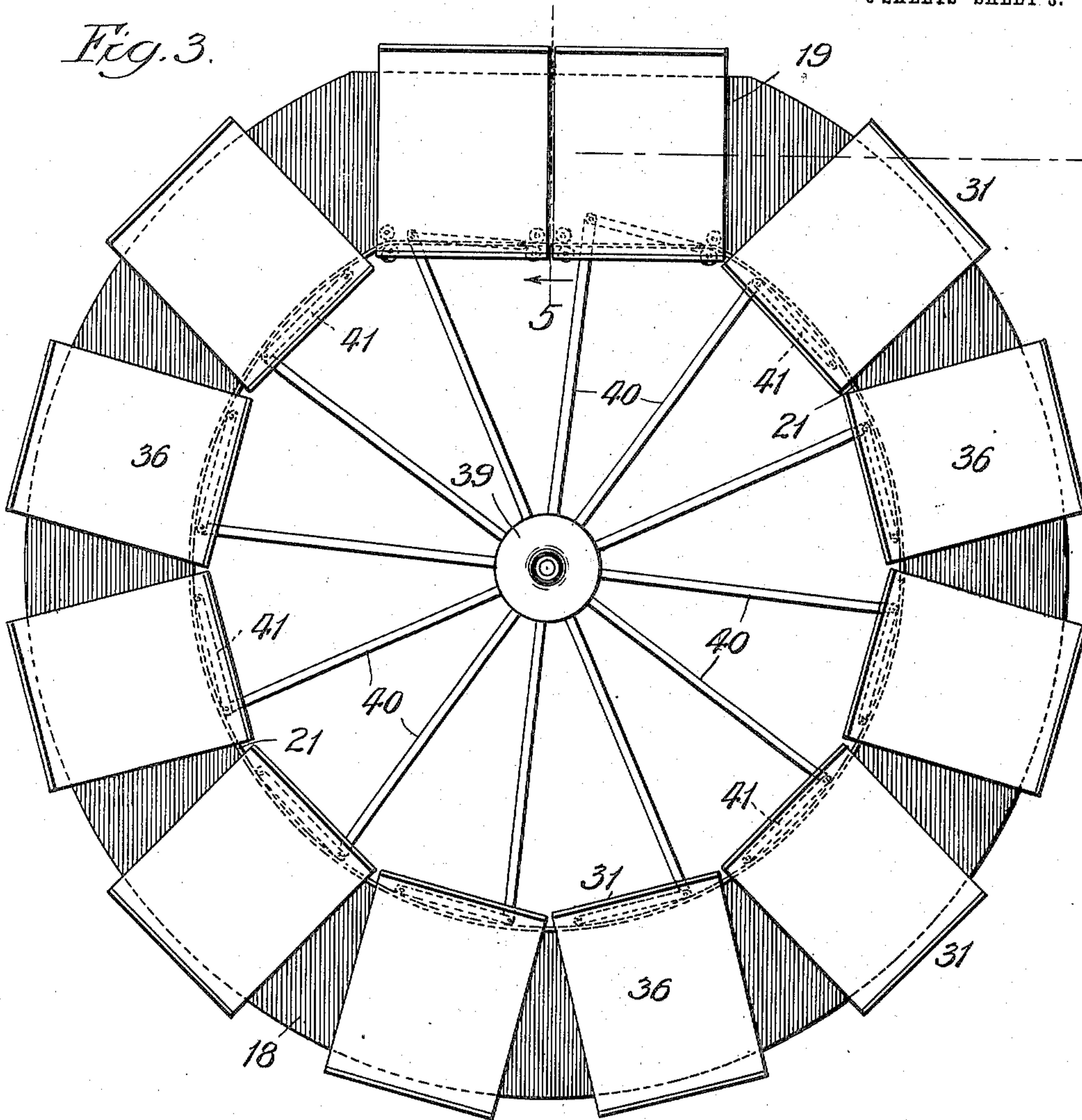
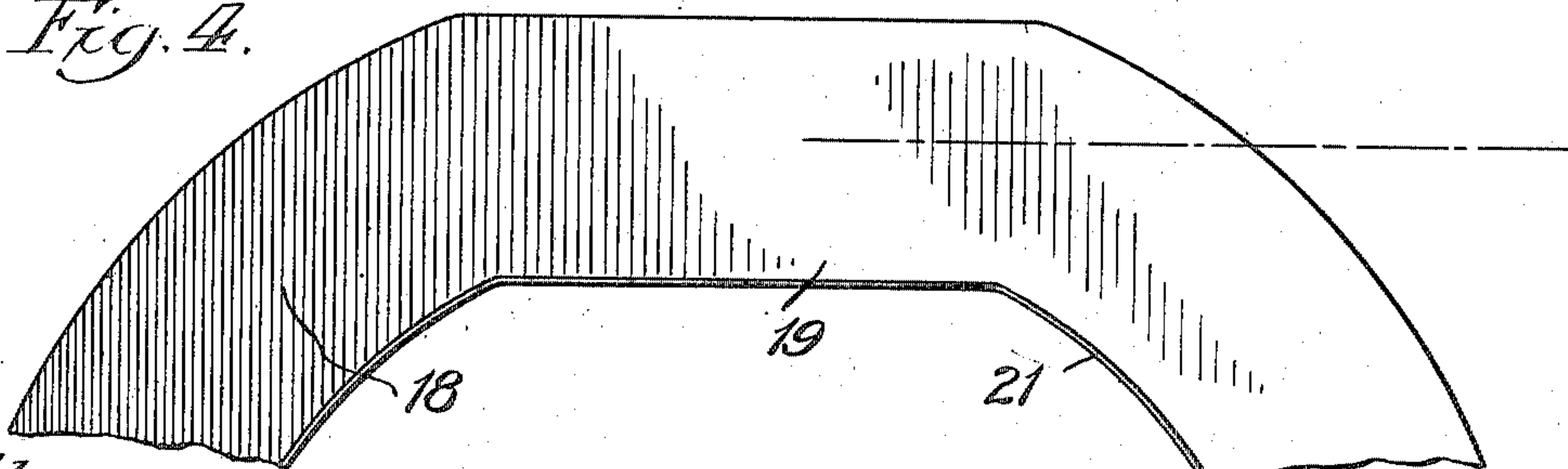


Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 5.

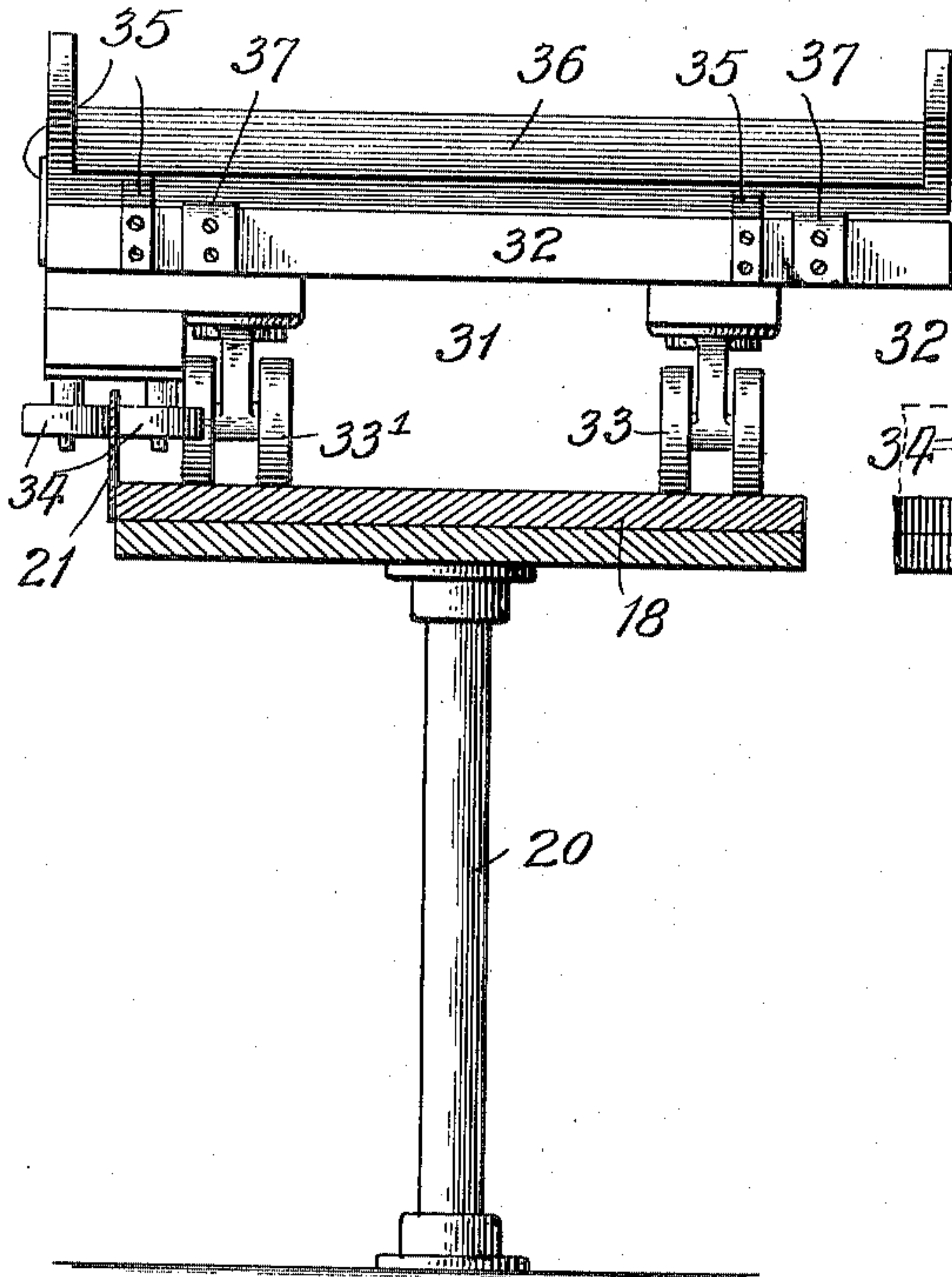


Fig. 6.

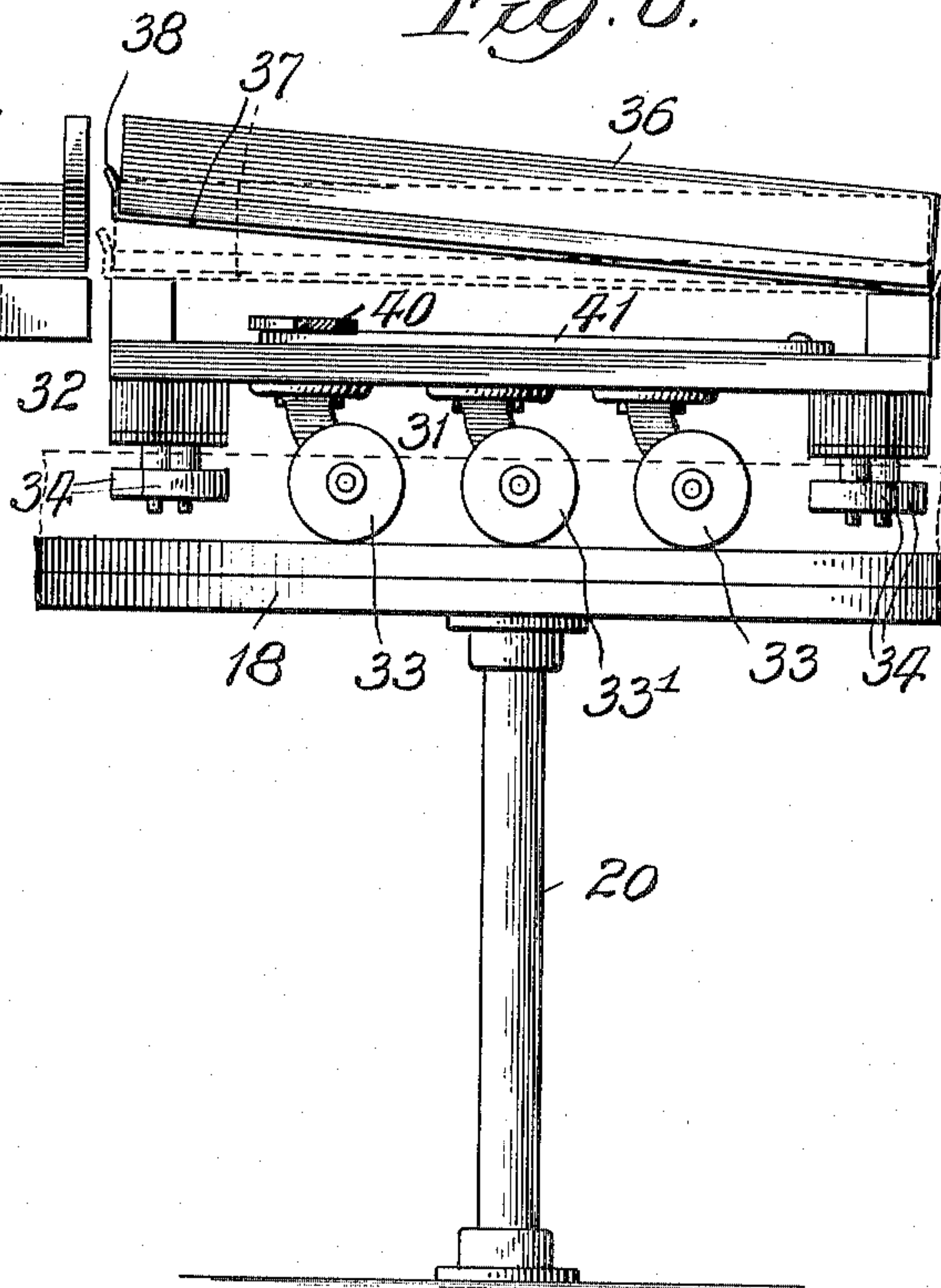
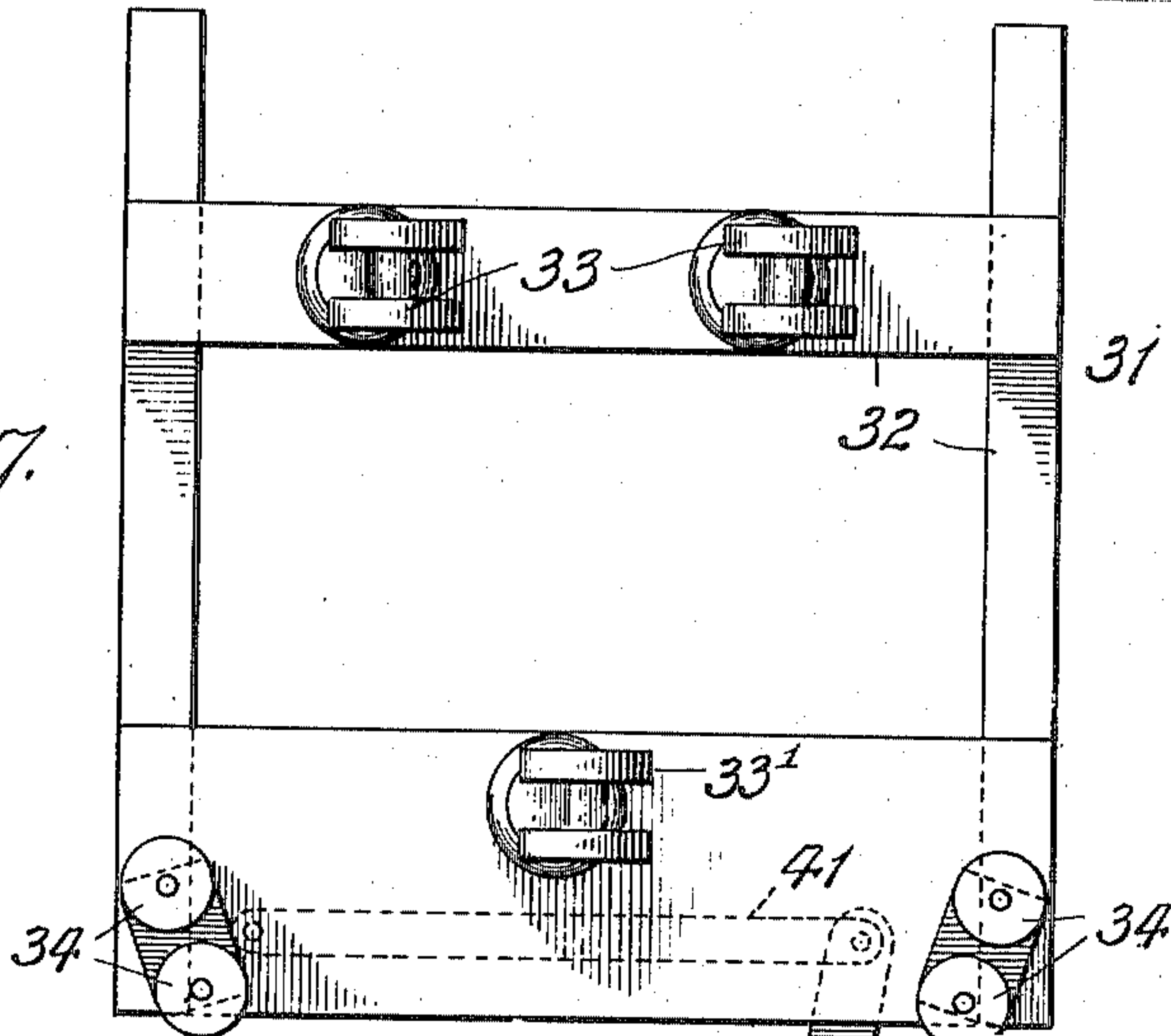


Fig. 7.



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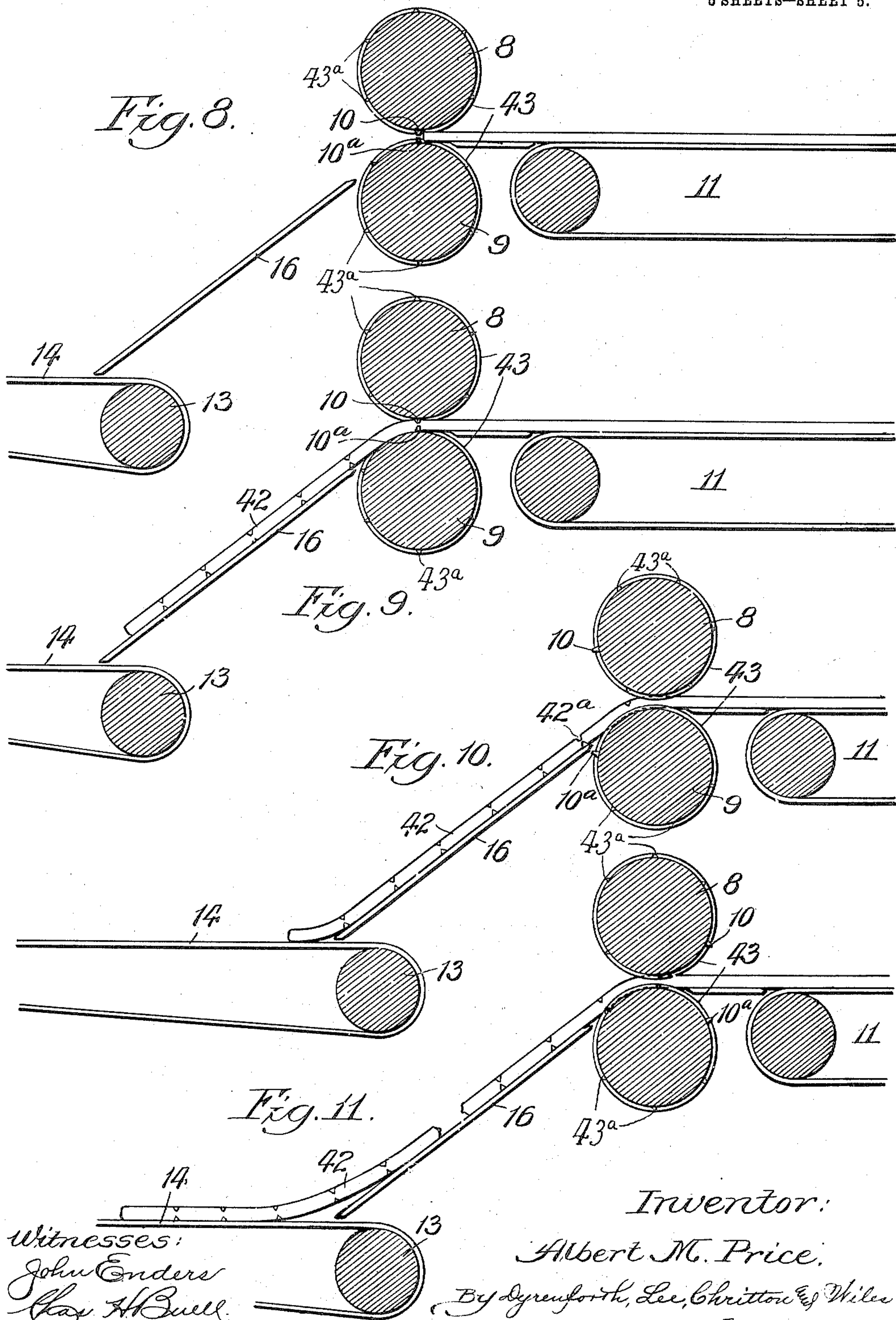
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SHEET GATHERING MACHINE.
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Patented July 26, 1910.

6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

ALBERT M. PRICE, OF ELGIN, ILLINOIS, ASSIGNOR TO ZENO MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

SHEET-GATHERING MACHINE.

965,598.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed November 22, 1909. Serial No. 529,253.

To all whom it may concern:

Be it known that I, ALBERT M. PRICE, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Sheet-Gathering Machines, of which the following is a specification.

My invention relates to an improvement in machines for gathering sheets, whereby they shall be gathered automatically in stacks or piles at points presented in succession to the point of delivery to them of the sheets.

In the accompanying drawings—Figure 1 is a plan view of my improved gathering-machine in the preferred form of embodiment of my invention; Fig. 2 is an enlarged section taken approximately on the line 2, Fig. 1, but showing only one of the series of gathering-cars; Fig. 3 is a plan view, enlarged over the scale observed in Fig. 1, of the stationary car-supporting gathering table, showing its straight section and, by dotted representation, certain details of construction; Fig. 4 is a broken plan view of the table showing its straight section; Fig. 5 is an enlarged section on line 5, Fig. 3, showing one of the cars in end elevation; Fig. 6 is a broken view in side elevation of the table and a car surmounting it; Fig. 7 is a bottom plan view of one of the similar cars, showing by dotted lines its link-connection with an arm, shown broken away, through the medium of which the car is driven; and Figs. 8, 9, 10 and 11 are enlarged views in longitudinal sectional elevation, the section being taken through the cutting and scoring rolls and through the sheet-delivering means at opposite sides thereof, shown in Fig. 2, these views illustrating progressively the action of the rolls in partially severing a sheet of gum, or the like, and the action of the delivery from the rolls in completing the severance.

While my improved machine is adaptable to gathering into orderly piles, from a proper delivery, sheets of any material, whether of paper, metal, cloth, candy, cement, or the like, I have especially devised it as an attachment to cooperate with the sheet-scoring, cutting and delivery mechanisms employed in the manufacture of chewing-gum in sticks; and for convenience in

explanation the description hereinafter contained is confined to that application of my invention.

In the manufacture of chewing-gum, as the practice has come under my observation, the mixed ingredients, in dough-like condition, are fed through a hopper between sheeting-rolls, from which the gum passes, in a continuous sheet upon an endless traveling apron, between a pair of scoring and cutting rolls. The surfaces of these last-named rolls are adapted to score the sheets into stick-defining sections of uniform size, to adapt the sheet to be readily broken up, when sufficiently dry, into sticks, which are prepared for the market by wrapping and boxing them. Prior to the use of my invention, the practice prevailed of delivering the scored sheets upon suitable trays in the hands of employees, of whom a large number were required in constant attention upon the delivery; but my present machine has enabled all such employees to be dispensed with.

The cooperating scoring-rolls 8 and 9, hereinbefore referred to, and which carry similar cooperating cutters 10 and 10^a, are adapted to receive the sheet from continuous-sheet delivery, indicated at 11, the roll 9 being suitably geared, as represented at 12 in Fig. 2, to a roller 13 at one end of an endless sectional-sheet-conveying belt 14, the forward end of which passes about a roller 15, the gearing being such (see Fig. 2) as to cause this belt to travel at a somewhat higher rate of speed than the scoring-rolls. An inclined guide-board 16 directs the severed sheets, as they come from the rolls 8 and 9, upon the apron 14, which delivers them, in uniformly spaced succession, at its forward end, from which they pass over a suitably inclined stationary guide-board 17. Cooperating with the parts thus described is a table 18 surrounded by or affording a circular track containing a straight section to register and aline with the sheet-delivery, the table serving to carry traveling cars upon which the sheets are delivered in succession. The table 18, as shown, is annular and circular except for a straight section 19. It is supported at intervals on vertical posts 20 in position to extend horizontally with its straight section

lying underneath and parallel with the delivery-end portion of the apron 14; and about the inner edge of the annulus extends and conforms thereto a vertical car-guiding flange 21. At the center of the table is provided, in suitable bearings (Fig. 2), a vertical rotary shaft 22 which may be driven from the scoring-roll 9 by suitable gear-connection therewith, that shown (most clearly in Fig. 2) comprising a beveled gear 23 on the shaft 22, with which meshes a beveled pinion 24 on one end of a suitably journaled horizontal shaft 25 carrying on its opposite end a beveled gear 26 engaged by a beveled pinion 27 on the lower end of a suitably-journaled vertical shaft 28, which carries on its upper end a beveled pinion 29 in driven engagement with a beveled gear 30 on the shaft of the roll 9. Similar tray-carrying cars, or carriages, 31, of the preferred construction hereinafter described, are caused to travel upon the table in succession and in timed relation to the delivery, in a circular path except as to the straight section, which they are caused to follow for the purpose hereinafter explained. The car consists of a rectangular body-portion, or frame, 32 carrying on its under side, near the outer edge, two similar pairs of swiveled caster-wheels 33 at a suitable distance apart and alining with each other, and in a plane midway between the pairs of wheels 33, and near the outer edge of the frame, a single swiveled pair of caster-wheels 33'. The car runs on these wheels upon the table. From each of the two opposite corners of the inner end of the car-frame depends a pair of fixed guide-rollers 34 spaced apart to admit between them the flange 21, which they embrace; and flanges, or stops, 35 project upwardly at the sides of the frame to hold in place and assist in guiding thereto a rectangular tray 36 in loading it upon the car. A pair of similar leaf-springs 37, affording a tray-seat, extend parallel with each other across the top of the car-frame, each being secured at one end and normally inclining upwardly toward its opposite free end at the advance side of the car, where it terminates in a stop-flange 38. The purpose of seating a tray on these springs is hereinafter explained. To drive the cars about the table, each is connected with a head 39 on the shaft 22 by a rigid arm 40 extending radially from the head and pivotally connected, at its outer end, with the free end of a link 41 pivoted at its opposite end to the bottom of the car-frame near the inner side of the latter. Twelve cars are shown to be provided on the table, but the number may be greater or smaller, though the size of the table should be such as to be filled by the number of cars employed when extending, as they do, radially on the circular portion of their support with their inner

corners in close proximity to each other. Upon the seating-springs 37 on each car is removably supported a tray 36 conforming in shape to and being in area somewhat less than that of the car on which it seats but greater than that of a sheet of gum, indicated at 42 in Fig. 2, to be gathered.

With the sheet-scoring and cutting, and sheet-delivery mechanisms in motion, the shaft 22 is driven to turn the arms 40 and thereby drive the cars about the table 18 in a path defined by the flange 41, which, by engagement therewith of the rollers 34, guides the movement of the cars. The operations are so timed that as a car passes, at its advance-end, beyond the corresponding end of the delivery-apron 14, the foremost of a series of the severed sheets of gum 42 on that apron will have been fed across the guide-plate 17 sufficiently far to extend the advance-end of the sheet into the adjacent spring-elevated end of the tray on that car, by the continued movement of which the sheet is spread upon the bottom of the tray. Thus the car-carried trays receive, in succession, a sheet of the gum from the delivery 14; and in each succeeding passage of a car beyond the advance-end of the delivery-apron it receives an additional sheet of the gum, spread in an orderly manner onto its tray upon the preceding sheet, until the trays become adequately filled, in succession, each with a pile or stack of the gum-sheets, when they are removed, in that succession, from the cars by an attendant or attendants and replaced by empty trays. The delivery to a car is effected while it is running on the straight section of the table, which extends parallel with the delivery, the path being, in the illustrated embodiment of the invention, defined by the flange 21; and this manner of delivery is an important feature of my improvement, since unless the track or path extends thus the sheets will not only fail of orderly piling upon their gathering-trays, but they will be warped and twisted in their delivery to the trays and become torn and broken. The deflection in the course of the cars at the straight section 19 is made possible by their flexible, or link, connection with the driving-arms 40.

The tension of the springs 37 is so gaged as to cause them to resist depression under the weight of an empty tray 36, but to be overcome more and more as the tray becomes loaded with successive sheets 42. This is an important provision, that is to say, the provision of a tray-seat depressible for the gaging purpose hereinafter described, inasmuch as it renders practically uniform the distance a sheet must move across the plate 17 to reach the surface presented to it in a tray, which distance would become less and less with accretion of the sheet-pile and thus cause the advance-end of each succeeding

sheet to meet that surface sooner and thereby impair the regular spreading of the sheets one upon the other. Such irregularity is avoided by causing the progressive depression of the seating-springs to present approximately the same distance from the advance-end of the sheet-delivery notwithstanding the increasing height of the pile of sheets in the trays.

10 It will be observed, upon reference to Figs. 8 to 11, inclusive, in connection with the following explanation, that the cutters 10 and 10^a do not meet to entirely sever the continuous sheet of gum as it passes between
15 them from the delivery 11. They are of slightly greater height than the circumferential and longitudinal scoring-knives 43 and 43^a on the rolls, but insufficiently high to cut entirely through the sheet, whereby
20 they leave the partially severed sheet 42 united to the continuous sheet by a thin web 42^a (Fig. 10). This is to avoid tendency of the advance-end of the continuous sheet to adhere to the scoring-roll 9 and follow it
25 about, when it would encounter the rear end of the guide-plate 16 and disorganize the operation of the machine. By leaving the partially-severed sheet thus attached, in moving across the plate 16 upon the apron
30 14, it lifts the advance-end of the continuous sheet over the receiving-end of the guide-plate; and since the apron 14 travels at a somewhat greater rate of speed than the rolls 8 and 9, to space upon it uniformly the
35 sheets 42 from each other, the frictional action of the apron upon the severed sheet will exert upon it sufficient drag to pull it apart, at the web 42^a, from the advance-end of the continuous sheet.

40 What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination of a sheet-delivery device and automatic means for receiving
45 therefrom a sheet, conveying the sheet through an endless path and presenting the sheet repeatedly to said device in proper time for successive sheets to be deposited therefrom upon the first.

50 2. In a machine of the character described, the combination of a sheet-delivery device and automatic means for gathering sheets therefrom one by one and in succession and carrying them in separated relation
55 to each other through an endless path and presenting the sheets so gathered in order to said delivery-device in proper time for each sheet so conveyed to receive upon it in order another sheet.

60 3. In a sheet-gathering machine, the combination with sheet-delivery means, of automatic sheet-gathering means and means for moving the same continuously in a path past the delivery-end of said delivering-means, to
65 take from said end sheets in succession at

intervals in said path and retain them in the circuit for presentation repeatedly to said end for the accumulation therefrom of sheets in piles.

4. In a machine of the character de- 70 scribed, the combination of sheet-cutting rolls, a sheet-delivery device moving at a higher rate of speed than said rolls and co-operating therewith to receive sheet-material passed between them, and means oper- 75 ating to receive from said device a sheet, convey the same through an endless path and present the same repeatedly to said device in proper time for successive sheets to be deposited therefrom upon the first. 80

5. In a sheet-gathering machine, the combination with sheet-delivering means, of an endless car-path in substantially the same horizontal plane with said sheet-delivering means, and having a straight section extend- 85 ing beneath the delivery-end of said means, cars movable on said path, and means operating to move the cars thereon continuously during the progress of delivery from and toward said straight section and on the lat- 90 ter past said delivery-end, for the purpose set forth.

6. In a sheet-gathering machine, the combination with sheet-delivering means, of an endless car-path in substantially the same 95 horizontal plane with said sheet-delivery means and having a curved section and a straight section, the latter extending beneath the delivery-end of said means, cars movable on said path, and means operating 100 to move the cars about said curved section and along said straight section past said delivery-end, for the purpose set forth.

7. In combination, a pair of sheet-cutting rolls coöperating to partially sever a sheet 105 passing between them, sheet-delivering means coöperating with said rolls to receive sheet-material passed between them and complete the severance of the sheet, and sheet-gathering means moving in a continu- 110 ous path past the delivery-end of said delivering-means to receive therefrom the sheets and form successive piles thereof by repeated movements of the gathering means past said end, for the purpose set forth. 115

8. In combination, a pair of sheet-cutting rolls coöperating to partially sever a sheet passing between them, sheet-delivering means moving at a higher rate of speed than said cutting-rolls and coöperating therewith 120 to receive sheet-material passed between them and complete the severance of the sheet, and sheet-gathering means moving in a continuous path past the delivery-end of said delivering means to receive therefrom 125 the sheets and form successive piles thereof by repeated movements of the gathering-means past said end, for the purpose set forth.

9. In a sheet-gathering machine, the com- 130

combination with sheet-delivering means, of a stationary table in the same horizontal plane with said sheet-delivering means and having a circular-path-forming section and a straight-path-forming section extending beneath and parallel with the delivery-end of said sheet-delivering means, cars movable on the table, and means for guiding the cars along said path-sections, for the purpose set forth.

10. In a sheet-gathering machine, the combination with sheet-delivering means, of a circular table substantially horizontal throughout having a straight section extending beneath and parallel with the delivery-end of said means, cars movable on the table, and means for guiding the cars in a circular path about said circular section and in a straight path along said straight section, for the purpose set forth.

11. In a sheet-gathering machine, the combination with sheet-delivering means, of an annular table substantially horizontal throughout having a circular section and a straight section extending beneath and parallel with the delivery-end of said means, cars movable on the table, and means for guiding the cars in a circular path about said circular section and in a straight path along said straight section, for the purpose set forth.

12. In a sheet-gathering machine, the combination with sheet-delivering means, of a table extending, as to a section thereof, beneath the delivery-end of said means, a guide-flange extending in a partial circle partway about said table and having a straight section extending underneath and parallel with said delivery-end, and cars movable on the table and provided with guide-rollers engaging said flange, for the purpose set forth.

13. In a sheet-gathering machine, the combination with sheet-delivering means, of an annular table extending, as to a section thereof, beneath the delivery-end of said means, cars movable on the table, means for guiding the cars in a circular path toward and from said delivery-end but past the same in a straight section of said path parallel with said end, a rotary shaft at the center of the table, and arms radiating from said shaft and flexibly connected at their

outer ends with the cars, for the purpose set forth.

14. In a sheet-gathering machine, the combination with sheet-delivering means, of an annular table extending, as to a section thereof, beneath the delivery-end of said means, cars movable on the table, means for guiding the cars in a circular path toward and from said delivery-end but past the same in a straight section of said path parallel with said end, pivoted links on the cars, a rotary shaft at the center of the table, and arms radiating from said shaft and pivotally connected at their outer ends with the free ends of said links, for the purpose set forth.

15. In a sheet-gathering machine, the combination with sheet-delivering means, of a table extending, as to a section thereof, beneath the delivery-end of said means, cars movable on the table and provided with depressible tray-seats, and means for guiding the cars in a circular path toward and from said delivery-end but past the same along a straight section of said path parallel with said end, for the purpose set forth.

16. In a sheet-gathering machine, the combination with sheet-delivering means, of a table extending, as to a section thereof, beneath the delivery-end of said means, cars movable on the table and provided with spring tray-seats, and means for guiding the cars in a circular path toward and from said delivery-end but past the same along a straight section of said path parallel with said end, for the purpose set forth.

17. In a sheet-gathering machine, the combination with sheet-delivering means, of a table extending, as to a section thereof, beneath the delivery-end of said means, cars movable on the table and provided with tray-seating leaf-springs fastened at their outer ends to the rear sides of the cars to extend their free ends toward the opposite sides thereof, and means for guiding the cars in a circular path toward and from said delivery-end but past the same along a straight section of said path parallel with said end, for the purpose set forth.

ALBERT M. PRICE.

In presence of—

CHAS. E. GAYLORD,
RALPH SCHAEFER.