Jan. 2, 1923.

1,440,787

C. A. MEISEL.
PRESS.
FILED MAR. 29, 1920.

5 SHEETS-SHEET 1

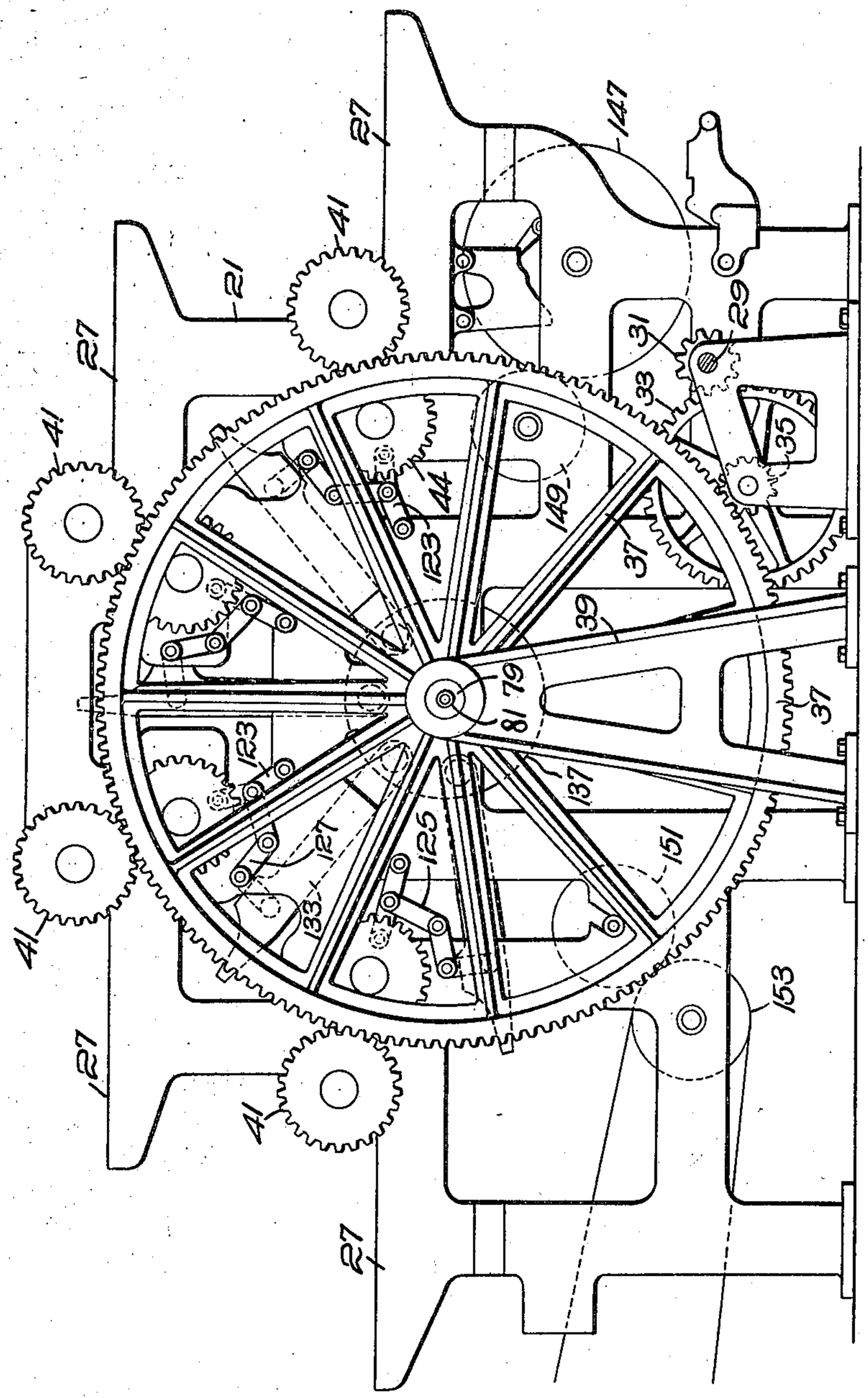

Fig. 1.

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5 SHEETS-SHEET 2

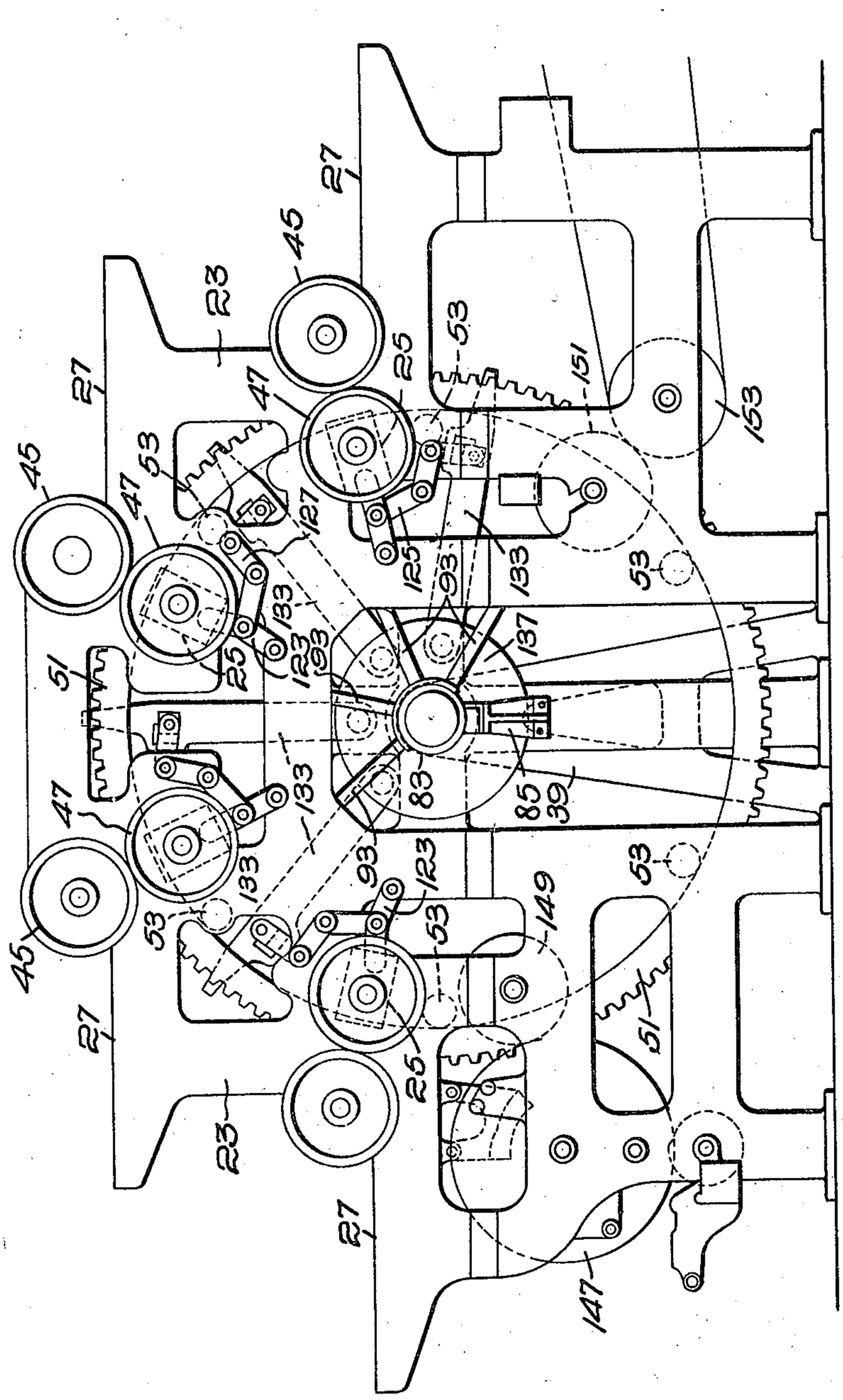

Fig. 2.

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5 SHEETS-SHEET 3

Fig. 3.

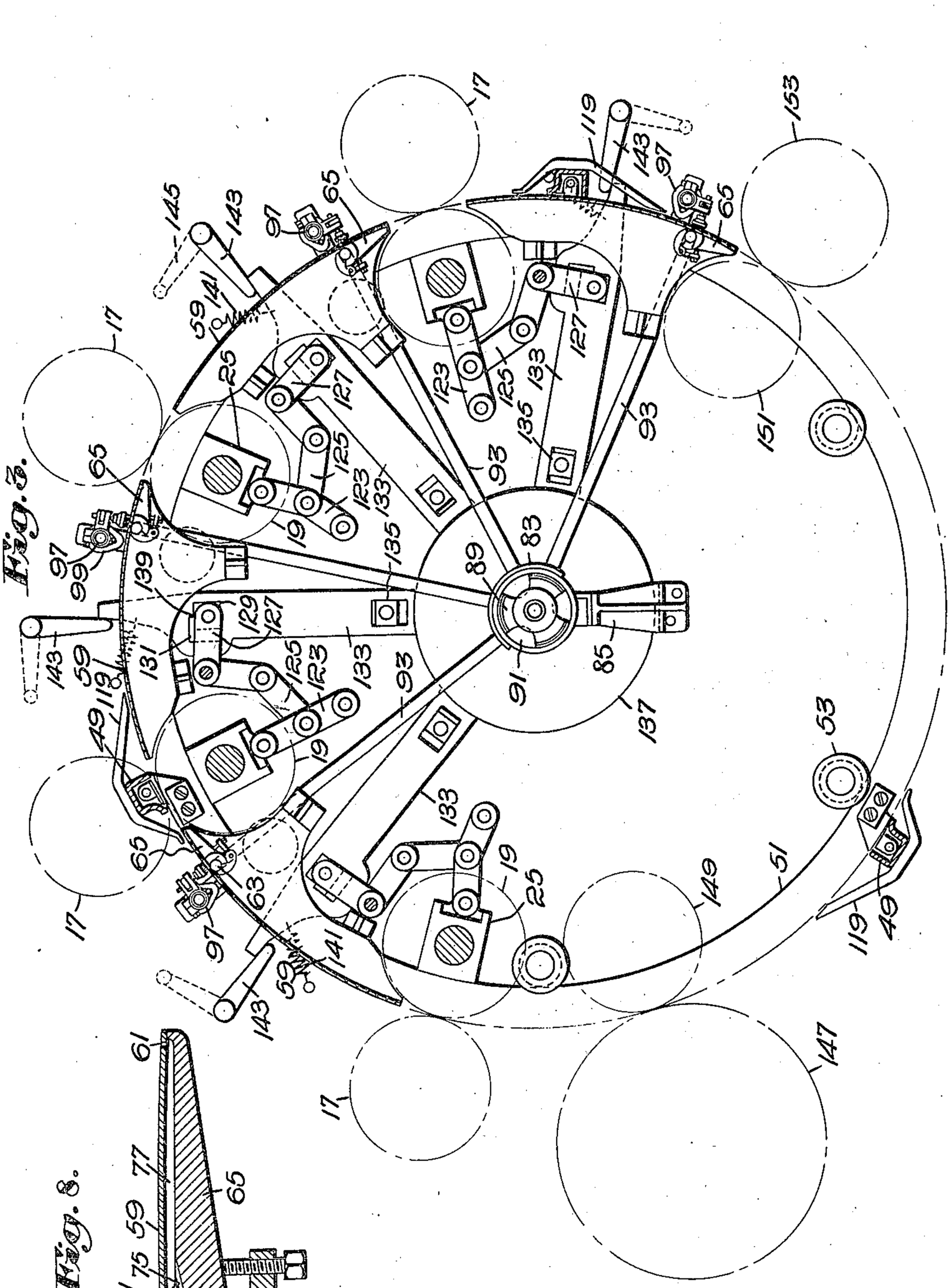

Fig. 8.

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5 SHEETS-SHEET 4

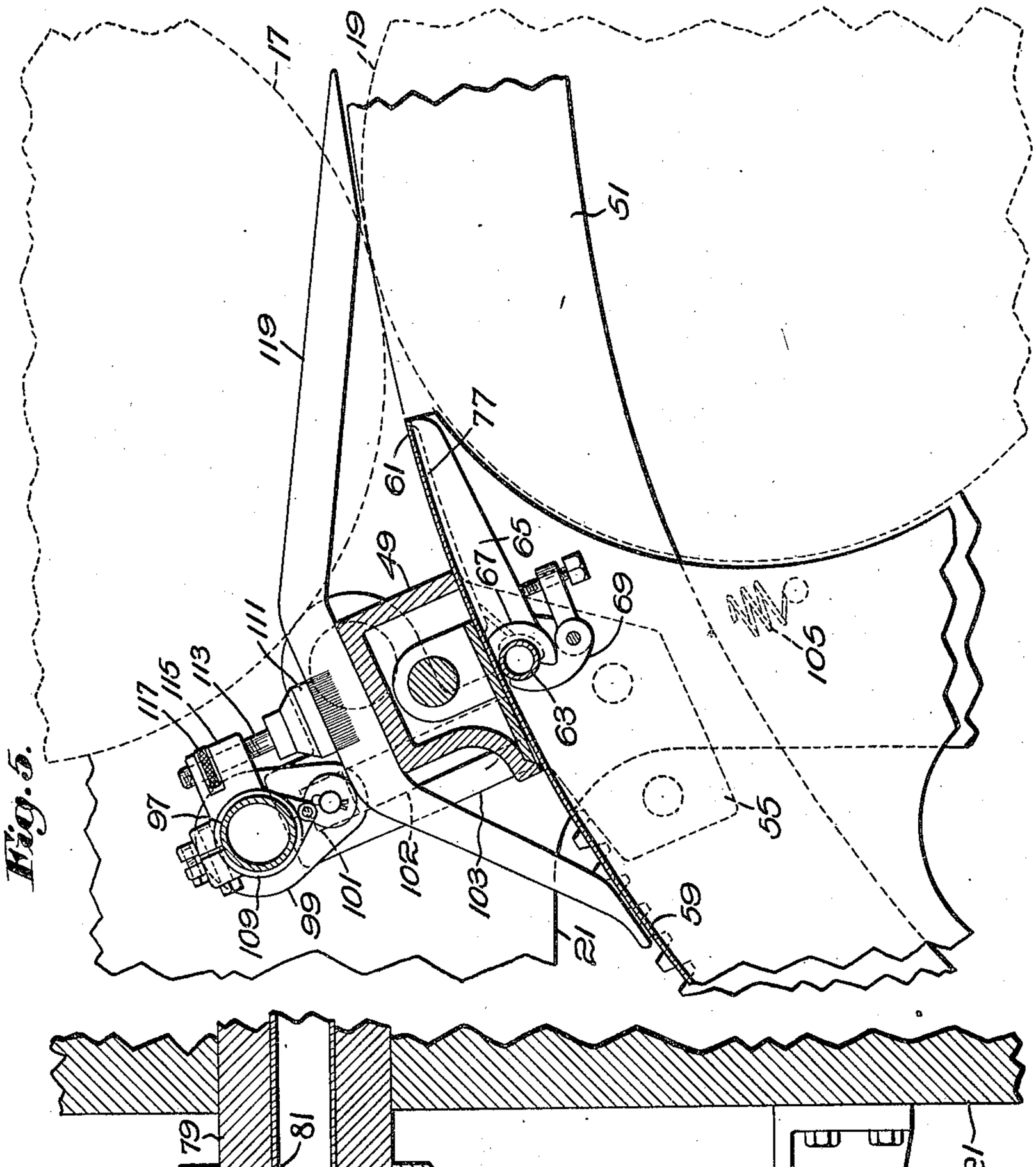

Fig. 5.

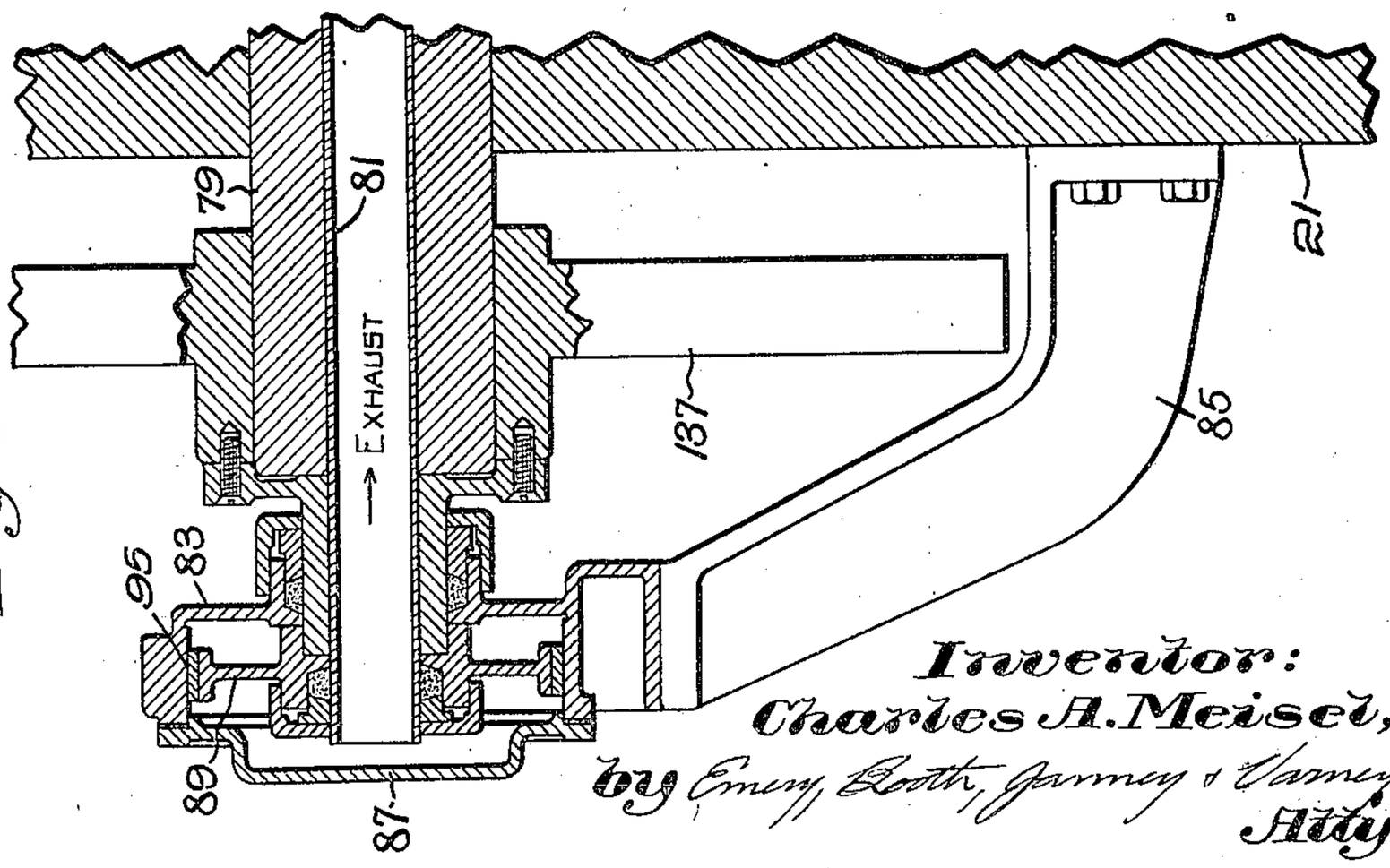

Fig. 4.

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5 SHEETS-SHEET 5

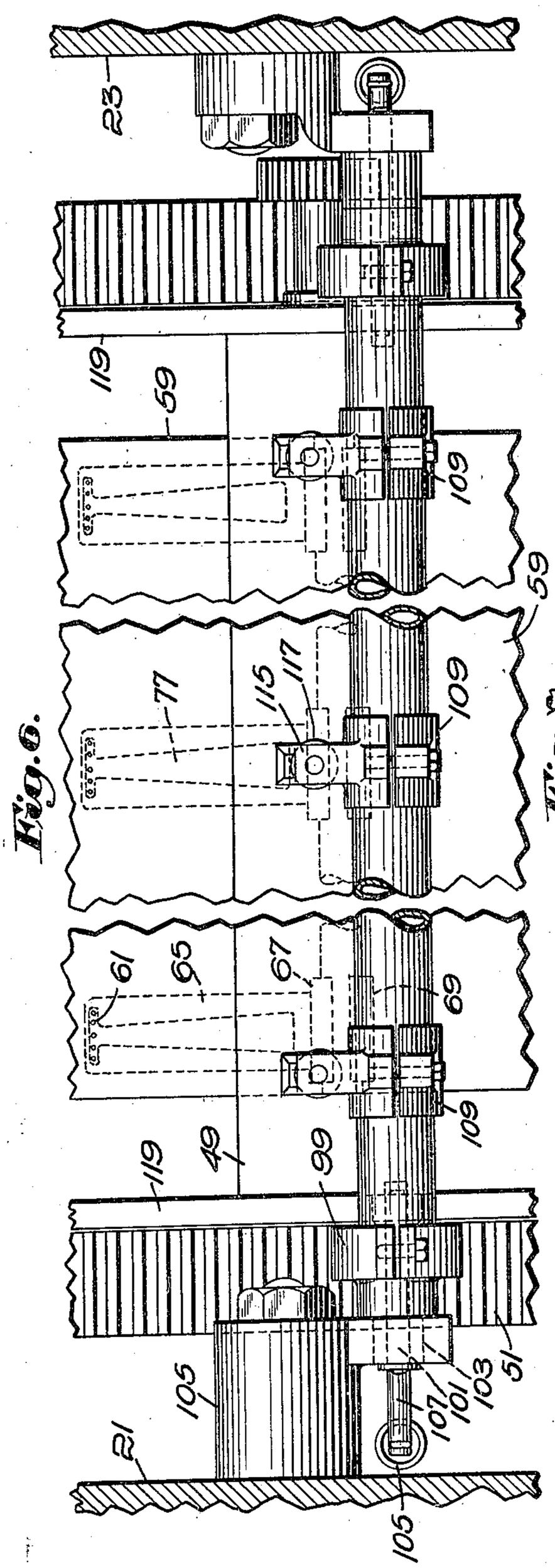

Fig. 6.

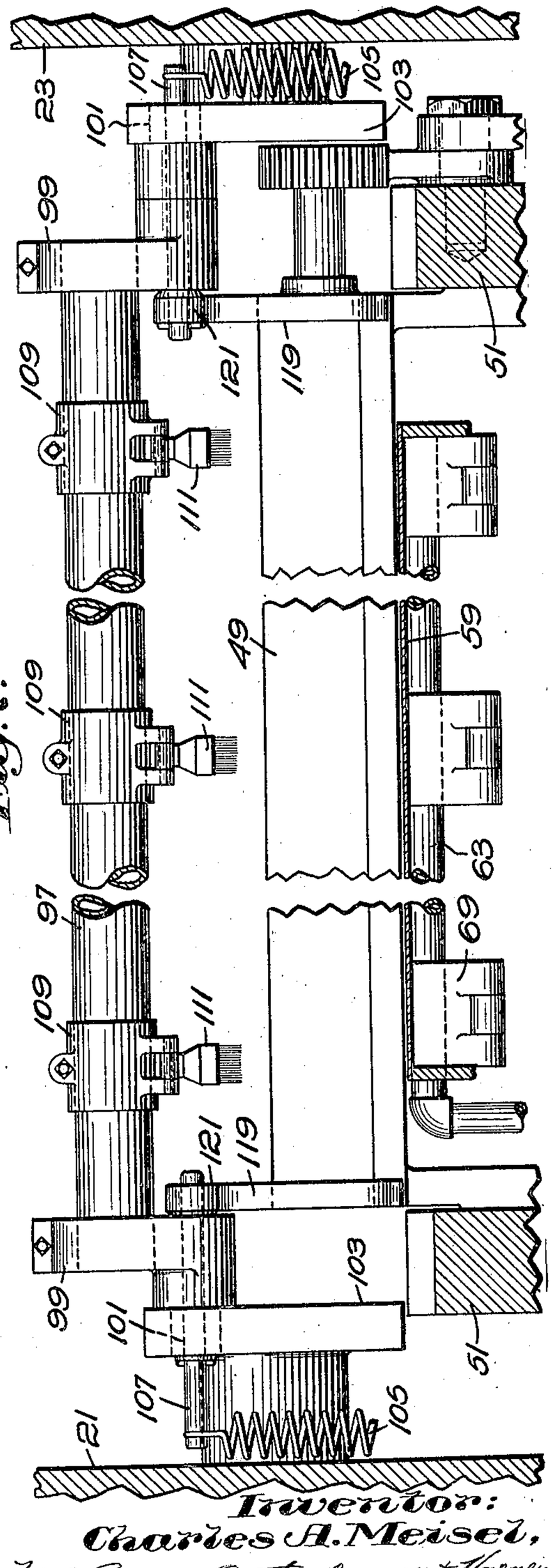

Fig. 2.

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Patented Jan. 2, 1923. 1,440,787

UNITED STATES PATENT OFFICE.

CHARLES A. MEISEL, OF DORCHESTER, MASSACHUSETTS, ASSIGNOR TO MEISEL PRESS MANUFACTURING COMPANY, OF DORCHESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PRESS.

Application filed March 29, 1920. Serial No. 369,598.

To all whom it may concern:

Be it known that I, CHARLES A. MEISEL, a citizen of the United States, and a resident of Dorchester, county of Suffolk, and State of Massachusetts, have invented an Improvement in Presses, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to printing presses and in its more specific aspects to presses wherein a plurality of impressions are made on a single sheet of paper, as in color work. As an illustrative embodiment of my invention, I here show a four-color, rotary press and shall describe the same in detail, reserving for the claims the statement of the novel principles exemplified thereby.

The following specific description of an example of my invention may be taken in connection with the accompaning drawings, wherein:

Fig. 1 is a side elevation of the press as seen from the left, parts being omitted and left being understood as the left hand of a person facing in the direction in which paper passes through the press;

Fig. 2 is a side elevation as seen from the right;

Fig. 3 is a general schematic view, the point of view being from the right;

Fig. 4 is a central vertical section through the air control valve;

Fig. 5 is an enlarged sectional view through a gripper bar and cooperating mechanism immediately adjacent a printing couple;

Fig. 6 is a plan view of the mechanism shown in Fig. 5;

Fig. 7 is a radial section showing parts of the mechanism of Fig. 6 in elevation, and

Fig. 8 is a detailed section through an air nozzle.

Referring to the illustrative embodiment of my invention illustrated in the accompanying drawings, I may utilize a series of printing couples, in number corresponding to the desired number of impressions, and I have herein (see Fig. 3) shown four such couples, each embodying a plate roll 17 and an impression roll 19. These couples are preferably ranged about a circle in such manner that the lines of contact between the rolls when they are in printing position correspond to the elements of an imaginary cylinder, the word elements being used in the geometrical sense. Preferably the rolls are confined to the upper half of the cylinder. The plate rolls 17 may be journalled in suitable frames 21 and 23 and the impression rolls 19 are journalled in suitable boxes 25 slidable in such frames. The frames 21 and 23 are also provided with suitable supporting surfaces 27 for inking mechanism of desired type, not shown.

For driving the rolls, I here illustrate a train of gearing best shown in Fig. 1 and comprising a shaft 29 adapted to be driven by any suitable form of motor or prime mover and having a pinion 31 meshing with a gear wheel 33 with which turns the pinion 35 meshing with the large gear wheel 37 the shaft of which may conveniently be substantially axial of the cylindrical surface about which the printing couples are disposed, this shaft being herein shown as journalled in the frame 21 and in an auxiliary support 39. The large gear 37 meshes with gear wheels 41 which are fast to the ends of the journals of plate rolls 17. The journals of these rolls also carry gear wheels adapted to mesh with similar gears 44 on the journals of impression rolls 19 to drive the same. I may also provide the flat-faced wheels 45 and 47 (Fig. 2) at opposite ends of the journals of rolls 17 and 19, respectively, the faces of these wheels bearing on each other when the impression roll is in contact with the plate roll, and serving to hold the parts in proper relation to insure the required action of the gears.

Referring again to Fig. 3, the paper is carried through the printing couple by suitable gripper bars 49 which travel orbitally, herein through a circular path. The travel of the gripper bars may be effected in any desired manner but preferably, as herein shown, they are carried by a pair of rings 51 (see Fig. 7) supported internally by rolls 53 (Fig. 3) mounted on the frames. These rings may conveniently take the form of annular gears for the purpose presently to be described, and desirably the pitch circle of the gears is of substantially the same diameter as the circle about which the printing couples are ranged. The gripper bars 49 are supported by means of suitable brackets 55, as shown in Fig. 5, exteriorly of the gears in such manner that the paper is held sub-

stantially on the pitch line. The gears 51 correspond to the bases of the cylinder of which the lines of contact of each printing couple are elements and with the gripper bars form a sort of lantern wheel of which the gripper bars are the trundles.

To move the gripper bars orbitally to carry the paper through the printing couples in succession, the annular gears 51 may be revolved and they may take motion from gears mounted on the journal of the plate cylinders 17 and turning with them.

To support the paper in its passage through the couples and to control the handling thereof in the efficient manner hereafter more fully to be explained, supporting surfaces (see Fig. 3) are provided between successive printing couples, these surfaces preferably taking the form of cylindrical segments and lying in the cylindrical path swept out by the gripper bars 49 as the gears 51 rotate. The lines of contact between the plate and impression rolls of the printing couples lie in this same cylindrical surface between successive supporting surfaces.

In the present example of the invention I have shown means for pneumatically controlling the paper as it passes over the surfaces 59 and between successive printing couples. Closely adjacent the intake side of the couple (see Fig. 5) there are provided air ports 61 by which suction may be applied to the paper as it is carried forward by the gripper bar. In Fig. 6 I have shown a single row of these ports and although the ports need not be in strict alignment they preferably constitute in a sense a single row in that they are disposed solely along a narrow zone immediately adjacent the printing couple. Particularly when the suction is timed relatively to the passage of the sheet as hereinafter explained, this provides for a continuous and constant retarding suction on the paper as it is carried forward through the printing couple, keeping it smoothly tensioned behind the gripper bar 49 in the cylindrical path of constant curvature defined by the supporting surfaces 59 and insures perfect registration of successive imprints. By continuous suction I refer to a suction which is constantly exerted on the sheet in such manner that there may be no chattering of the same during its passage. By constant suction I mean a suction of unvarying value during the passage of the sheet. For example, if a sheet is dragged over a perforated surface and subjected to a suction exerted therethrough, the pressure varies in accordance with the number of openings which the sheet covers as it passes to and from the surface.

As shown in Fig. 5, the ports 61 are herein formed directly through the supporting surface itself and to exhaust air therethrough I may provide a header or pipe 63 extending beneath the surface to which are connected nozzles 65 extending forwardly into the space between the rolls 17 and 19 of the printing couple. Herein as perhaps best shown in Fig. 8 the nozzles 65 are provided with hub-like portions 67 fitting the header 63 and adapted to be clamped thereto by the arms 69. A suitable chamber 71 in the hub portion 67 communicates with a port 73 in the header pipe 63 and from this chamber a passage 75 opens to a passage 77, herein a groove, extending to the ends of the nozzles. The passage 77, as best shown in Fig. 6, is preferably of a T shape to permit a single nozzle to supply a series of the ports 61. Herein the groove 77 is open at the top and closed by the supporting plate 59 through which are formed the ports 61 registering with the transverse T head of the groove.

I preferably provide means for controlling the air pressure exerted through the ports 61 in such manner that the suction starts just as the sheet of paper held by the gripper bar 49 comes into position over the ports 61, remains in action as long as the sheet is over those ports and is cut off as the sheet leaves. Herein I have shown the suction as controlled by a single timed valve, conveniently of rotary type. Referring to Figs. 4 and 5, herein the shaft 79 of the gear 37 shown in Fig. 1 may be hollow and receive an exhaust pipe 81 connected to any suitable exhauster. The exhaust pipe opens to a suitable chamber herein consisting of a cup-like casing 83 supported on a bracket 85 from frame 21 and closed by a plate 87, the parts being suitably packed as illustrated in Fig. 4 in a manner unnecessary to describe in detail.

Mounted on shaft 79 and rotating in the chamber formed by parts 83 and 87 and about the pipe 81 is a valve disc 89 having, as shown in Fig. 3, suitable cut away portions 91 which correspond in angular position to the position of the gripper bars 49 about the gears 51. Suitable pipes 93 connect the headers 63 to the casing 83 and the edge of the valve disc, provided with suitable packing 95, closes the ports opening to these pipes and as the valve disc revolves the cut away portions 91 uncover these ports and cause air to be drawn through the nozzles. The suction is thus readily controlled in correlation with the passage of the paper sheets held by the several gripper bars. This centralized control is particularly facilitated by the construction of the press since all the parts rotate about a common center and the angular speed of the valve disc 89 is the same as that of the carrier consisting of the ring gears 51 and the connecting gripper bars 49.

In the press here illustrated I have also shown means for mechanically smoothing

out the sheet as it passes from supporting surface 59 to the printing couple to be printed upon, this means being in the present instance adapted to exert a sort of frictional drag on the face of the sheet. Referring to Figs. 4, 5 and 6, I have therein shown a bar 97 extending parallel to the axes of the cylinders of the couple and transversely of the supporting surface 59 immediately above the same and adjacent the intake side of the couple. The bar is supported in end brackets 99 having square studs 101 slidably received by radial slots 102 in the brackets 103 which are secured to the side frames of the press. Suitable springs 105 normally tend to draw the bar downwardly in the slots, these springs being herein connected to pins 107 passing through the lugs 101 and the hubs of the brackets 99. Adjustably mounted for longitudinal shifting movement of the bar 97 are clamps 109 constituting carriers for brushes 111 which, as best shown in Fig. 5, may be provided with threaded stems 113 passing through ears 115 on the clamps, between which ears are received knurled nuts 117 which permit a radial adjustment of the brushes. When the bar 99 is lowered under the influence of the springs so that the lugs 101 lie at the inner ends of the slots 103, the brushes are adapted to make contact with the paper on the supporting surface 59. It will be understood that when a sheet is being printed on with successive impressions the brushes of the latter sets viewing Fig. 3 may not come in contact with the inked surface. Herein provision is made by the clamps 109 for adjusting the brushes so that certain of them may be turned up out of the way if necessary and those which are used shall make contact with the unprinted margins of the sheet or intermediate unprinted zones. As the paper passes forward under the brushes these smooth out and tension the same over the supporting surfaces 59.

Suitable means are provided for lifting the brushes and lowering them into cooperation with the sheet and herein suitable cams 119 (Figs. 5 and 7) are provided adjacent the ends of the gripper bar 49 which cooperate with cam rolls 121 carried on the pins 107. The action of these will be clearly understood from Fig. 5. As the gripper bar approaches the cross bar 97 carrying the brushes, it will be gradually raised to the position shown in Fig. 5 with a smooth easy motion and then will be lowered under the influence of the springs 105 into contact with the paper extending rearwardly from the gripper bar 49 over the supporting surface 59. As the gripper bar advances further to carry the paper between the cylinders of the printing couple the brushes will bear frictionally on the paper, smoothing the same out and tensioning it over the convex supporting surface.

The impression roll 19 should, of course, be pressed against the plate cylinder 17 solely when paper is interposed between them, and it is for this purpose that the roll 19 is journalled in the boxes 25 (Fig. 3) mounted to slide substantially radially in the frames 21 and 23. For operating the roll, I may provide toggles 123 so arranged that when straightened, as shown in the second and fourth instances in Fig. 3, the impression roll 19 will be pressed upwardly against the plate roll 17 and when broken will be drawn inwardly out of contact therewith, as shown in the first and third instances. For operating the toggle there may be provided a link 125 worked by a bell crank 127 secured at one end to the link 125 and having at the other end a square box 129 received in a recess 131 in the substantially radially extending arm 133. The arm 133, which may be guided on the frame at 135, may be oscillated substantially radially by means of a suitably grooved cam 137 conveniently centrally located and carried by the shaft of the large gear 37. The recess 131 in the arm, which receives the box 129 secured to bell crank 127, is provided with a shoulder 139, marked on the upright arm in Fig. 3, which normally confines the box 129 in such manner that it moves radially with the arm, the arm being drawn to the left in Fig. 3 by a spring 141 normally to hold the shoulder in engagement with the box 129. Thus, in the usual operation of the press, as the arm 133 is oscillated by the cam the bell crank 127 will be rocked to break toggle 123 at the proper time to draw the impression roll 19 out of contact with the plate roll 17. The boxes 129 may be disengaged from shoulders 139 as by means of levers 143 operated by handles 145 when it is desired to interrupt the regular recurrent operation of the throw-off mechanism and the arms 133 will then reciprocate idly under the action of cam 137 without rocking bell cranks 127.

In the example of the invention shown (Fig. 3) the paper is fed to the press from a receiving roll 147 rotating substantially tangent to the cylindric path of the sheet through the press and exteriorly thereto and delivered to a transfer roll 149 substantially tangent to said path but interiorly thereto. Both these rolls rotate at the same linear speed as the gripper bars 49 and the transfer roll 149 brings the paper into the cylindric path and delivers it to the gripper bar 49. After the paper has been printed on, a similar transfer roll 151 receives it from the gripper bar and delivers it to suitable delivery mechanism 153.

Having thus described in detail the form of my invention shown by way of illustration in the accompanying drawings, the principles exemplified thereby which might be embodied in other mechanical forms and

with different combinations which I claim as new and desire to secure by Letters Patent I shall express in the following claims.

Claims—

1. In a printing press a series of printing couples, means for drawing a sheet forward through a path passing through the contact lines of the couples, supporting surfaces to hold the sheet in the path and pneumatic means between adjacent couples constructed and arranged to maintain a retarding suction of constant strength on the sheet during its passage from one couple to another.

2. In a printing press the construction defined in claim 1 wherein the path defined by the supporting surface and the contact lines of the couples is cylindrical.

3. In a printing press a printing couple, a cylindric surface for supporting the sheet and defining a path through the contact line of the couple, means for drawing a sheet forward along the surface and through the couple and suction means operating on the sheet closely adjacent the intake side of the couple solely.

4. In a printing press a printing couple, a cylindric surface for supporting the sheet and defining a path through the contact line of the couple, means for drawing a sheet forward along the surface and through the couple and suction means operating on the sheet closely adjacent the intake side of the couple solely and means to render said suction means effective solely while the sheet overlies the same.

5. In a printing press a printing couple, fixed supporting means for the sheet defining a path through the contact line of the couple, means for advancing a sheet along the path, ports opening to said surface solely in the near vicinity of the couple and means to exhaust air through said ports governed to operate solely while the sheet overlies the ports.

6. In a printing press a series of printing couples, means for drawing a sheet forward through a path passing through the contact lines of the couples, fixed supporting surfaces to hold a sheet in the path, ports opening through said surfaces along limited areas adjacent the couples and means to exhaust air through said ports governed to operate solely while the sheet overlies the ports.

7. In a press as described, a printing couple, a fixed supporting surface leading to the bite thereof, ports opening through the surface adjacent the couple, a header beneath the surface and nozzles extending from the header toward the contact line of the couple and communicating with said ports.

8. In a printing press a series of printing couples, an orbitally movable carrier for advancing sheets therethrough, pneumatic means at separated points in the orbit acting on a sheet in its travel and a distributing valve selectively operating said means in correlation with the travel of the sheet.

9. In a printing press a series of printing couples ranged around the surface of a cylinder, a sheet carrier including a pair of rotary rings and connecting gripper bars adapted to move along the cylindrical surface, pneumatic means for controlling the sheet in its passage and a rotary valve moving in correlation with the carrier for governing the action of said means.

10. In a printing press a series of printing couples ranged around the surface of a cylinder, segmental supporting surfaces between the couples lying in said surface, ports opening to said surface adjacent respective couples, conduits leading to said ports, a sheet carrier including a pair of rotary rings and connecting gripper bars adapted to move along the cylindrical surface and a rotary valve moving in correlation with the carrier for controlling the conduits.

11. In a press in combination with a series of plate cylinders ranged about a cylindric path, a rotary device for advancing sheets along said path, pneumatic means controlling the sheets and a rotary valve concentric with said cylinder governing said pneumatic means.

12. In a press in combination with a series of printing couples ranged about a cylindric path, supporting surfaces corresponding to segments of the cylinder between successive couples, rotary elements at the bases of the cylinder, grippers connecting them exteriorly of the cylinder, pneumatic means for controlling sheets on said surfaces and a rotary valve concentric with said cylinder governing said pneumatic means.

13. In a press as described a series of printing couples having contact lines corresponding to elements of a cylinder, fixed supporting surfaces between the couples corresponding to segments of the cylinder, gripper means movable externally of said surface to draw a sheet along the same and brushes for holding the sheet against said surfaces displaceable by said means.

14. In a press as described a series of printing couples having contact lines corresponding to elements of a cylinder, fixed supporting surfaces between the couples corresponding to segments of the cylinder, gripper means movable externally of said surface to draw a sheet along the same and series of brushes adjustably spaced lengthwise of the cylinder for holding the sheet against said surfaces and displaceable by said means.

15. In a press as described a series of printing couples having contact lines corresponding to elements of a cylinder, fixed supporting surfaces between the couples corresponding to segments of the cylinder, gripper means movable externally of said surface to draw a sheet along the same, radially movable bars adjacent the couples extending lengthwise of the cylinder, brushes carried thereby and means associated with the gripper means for reciprocating said bars.

16. In a press as described a series of printing couples having contact lines corresponding to elements of a cylinder, fixed supporting surfaces between the couples corresponding to segments of the cylinder, gripper means movable externally of said surface to draw a sheet along the same, radially movable bars adjacent the couples extending lengthwise of the cylinder, brushes mounted thereon for longitudinal adjustment therealong and means associated with the gripper means for reciprocating said bars.

17. In a press a plate cylinder, means for engaging the leading edge of a sheet to advance it beneath the cylinder, means for supporting the sheet inwardly thereof during its travel, a bar exterior of the sheet extending parallel to the cylinder and brushes adjustable along said bar.

18. In a press a plate cylinder, means for engaging the leading edge of a sheet to advance it beneath the cylinder, means for supporting the sheet inwardly thereof during its travel, a bar exterior of the sheet extending parallel to the cylinder and brushes adjustable along said bar and also adjustable inwardly and outwardly.

19. In a printing press, a printing couple, a cylindric surface for supporting the sheet and defining a path through the contact line of the couple, a gripper bar movable over said surface for advancing a sheet by engagement with its leading edge, means for pressing the sheet against the surface and cam means on the gripper bar to bring said means into contact with the sheet.

20. In a printing press, a printing couple, a cylindric surface for supporting the sheet and defining a path through the contact line of the couple, a gripper bar movable over said surface for advancing a sheet by engagement with its leading edge, brushes spring pressed toward said path and cams on the gripper bar to raise the brushes and lower them into contact with the sheet.

21. A press comprising, in combination, printing means, a support for a sheet advancing to said printing means, a gripper cooperating with the leading edge of the sheet, devices for holding the sheet against the support and cam means moving with the gripper for lifting said devices and lowering them against the sheet.

22. A press comprising, in combination, a rotary carrier having gripper means for engaging sheets, a plate cylinder substantially tangent to the path of the sheet, brush carriers fixed adjacent the path of the sheet but movable toward and from the same and means movable with the carrier for lifting the brush carriers and thereafter lowering the brushes into contact with the sheet.

23. In a press as described, means for supporting the sheet inwardly, gripper means for engaging the front edge of the sheet, a bar reciprocable adjacent the path of the sheet, brush holders adjustable along the bar and cam means adjacent the gripper means and movable therewith for operating the bar.

In testimony whereof, I have signed my name to this specification.

CHARLES A. MEISEL.