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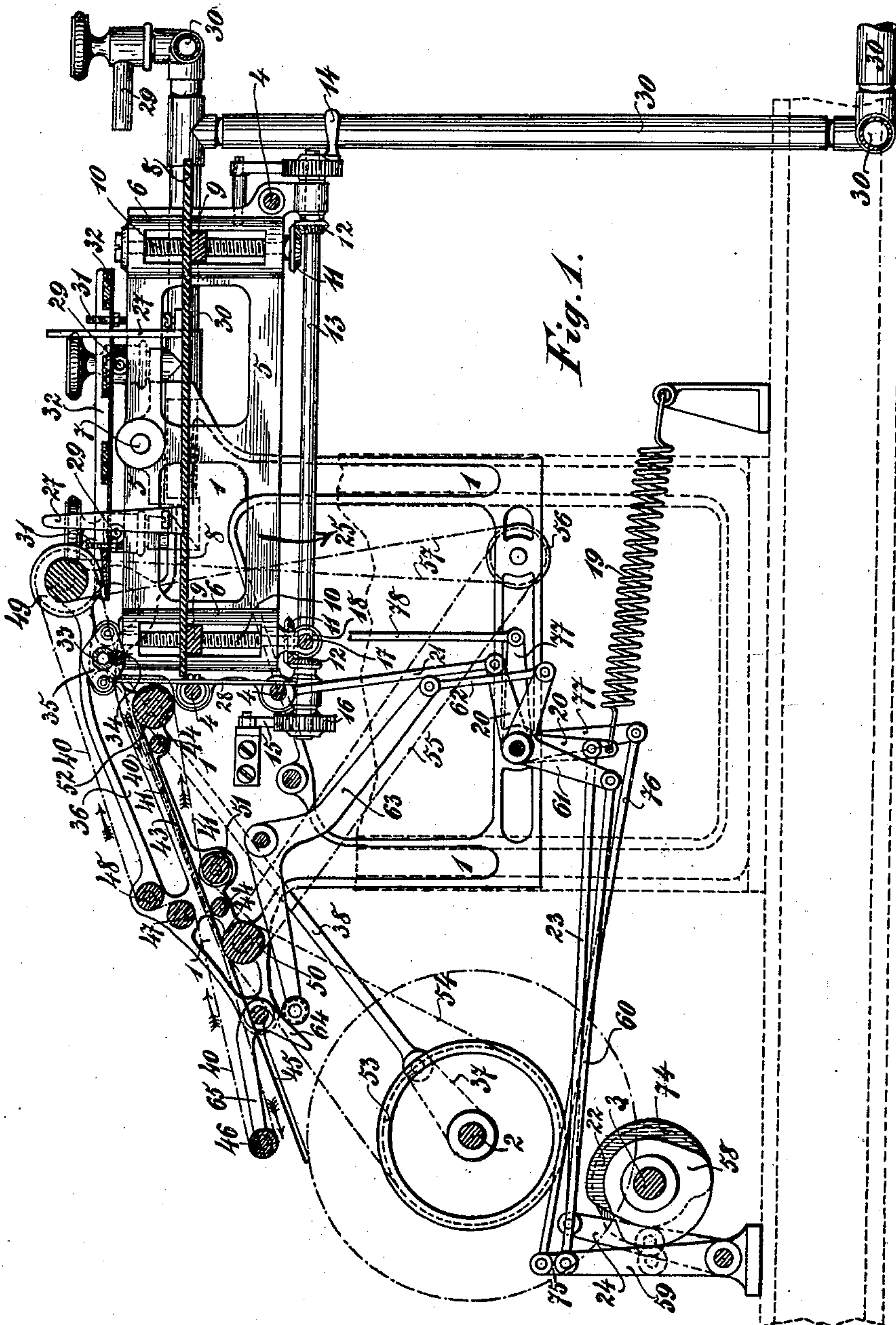
Patented June 11, 1901.

A. WEISS, F. HELL & K. OBERDING.
PNEUMATIC SHEET FEEDING APPARATUS.

(No Model.)

(Application filed Apr. 3, 1900.)

3 Sheets—Sheet 1.



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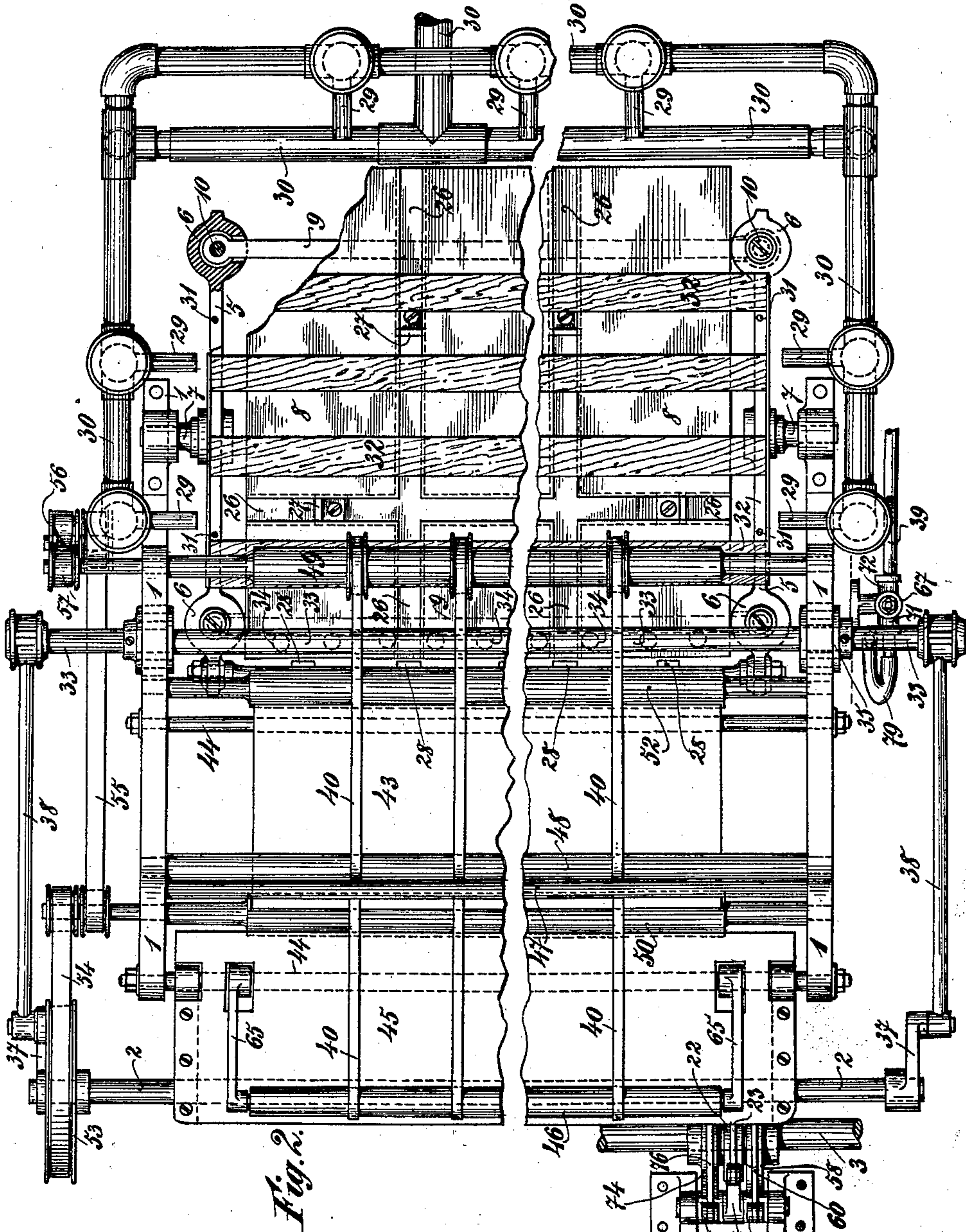
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3 Sheets—Sheet 2.



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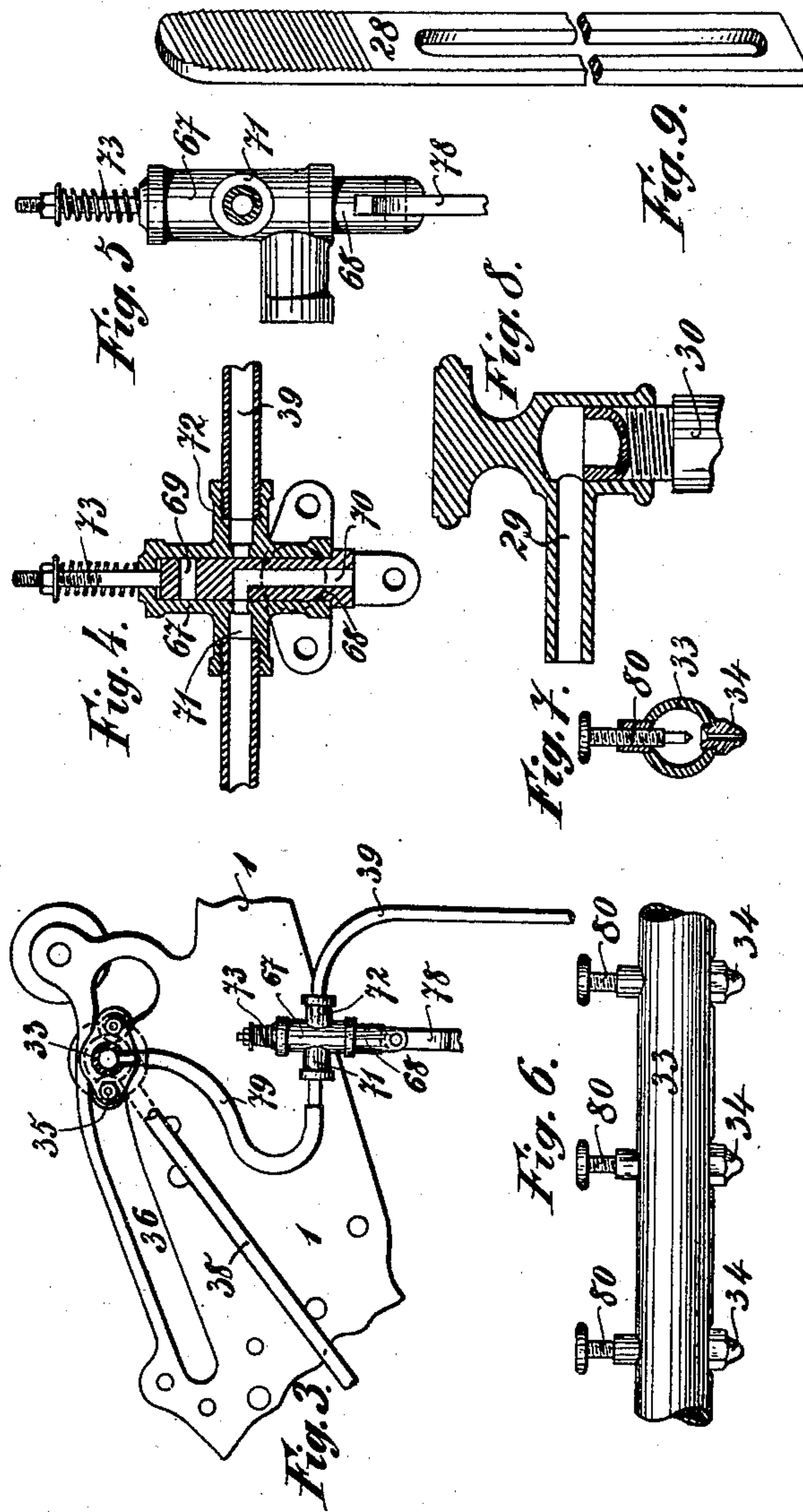
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(Application filed Apr. 3, 1900.)

(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ANTON WEISS, FRANZ HELL, AND KRISTOF OBERDING, OF BUDAPEST,
AUSTRIA-HUNGARY.

PNEUMATIC SHEET-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 676,291, dated June 11, 1901.

Application filed April 3, 1900. Serial No. 11,327. (No model.)

To all whom it may concern:

Be it known that we, ANTON WEISS, manufacturer, FRANZ HELL, machinist, and KRISTOF OBERDING, machinist, subjects of the Emperor of Austria-Hungary, and residents of V. K. Váci-út 102, Budapest, in the Empire of Austria-Hungary, have invented a certain new and useful Improved Pneumatic Sheet-Feeding Apparatus, of which the following is an exact, full, and clear description.

This invention relates to an automatic pneumatic paper-sheet-feeding apparatus for book-printing and lithographic presses and book-folding and other machinery, to which paper must be fed in sheets. In such apparatus the single sheets of paper are safely lifted from the pile of paper of any suitable height by the coaction of suction and compressed air, the uppermost sheets being first raised by a lateral blowing against the pile of paper, whereupon a suitable device sucks in the uppermost of these loosened sheets, lifts it from the pile, and passes same over to the transport or feeding device, which feeds such sheet to the respective machine, (printing-cylinder, folding-machine, and the like.)

In the accompanying drawings is shown, by way of example, such a sheet-feeding apparatus adapted for a printing-press.

Figure 1 is a vertical longitudinal section, and Fig. 2 a plan of the sheet-feeding apparatus. Fig. 3 is a side elevation of the suction air-feeding arrangement. Figs. 4 and 5 are vertical and side elevations, respectively, of the regulating-valve for the suction-air of the sheet-sucking device, drawn on a larger scale. Figs. 6 and 7 are elevation and cross-section, respectively, of a piece of the sheet-sucking device, likewise drawn on a larger scale. Fig. 8 is a vertical section of the blowing-nozzle of the compressed-air pipe. Fig. 9 is a view of the scraper.

The sheet-feeding apparatus consists of two cooperating parts—namely, the single-sheet lifter and the transport device for the singly-lifted sheets. Both parts are arranged in two common side walls 1 and are operated by the intermittently-moving cylinder-shaft 2 of the printing-press and partly by the main shaft 3 of the machine.

The sheet-lifter consists of the suction de-

vice and a table for the pile of sheets, such table oscillating in a longitudinal direction in the machine.

The table consists, on the one hand, of two rectangular frames 5, connected together by horizontal bars 4, the vertical edges being in form of hollow pillars 6, which by means of their horizontal pivots 7 oscillate in the side walls 1, and, on the other hand, of the horizontal table plate or slab 8, which is arranged between such frames 5 and carried by means of two transverse beams 9 of the vertical spindles 10, mounted in the hollow pillar edges 6 of the frames 5. The said spindles 10 are provided at the lower ends with bevel-wheels 11, which engage with the bevel-wheels 12 of the horizontal shafts 13, mounted at the lower edges of the frames 5. The one shaft 13 can now be rotated by hand by means of the crank 14 or by means of the ratchet mechanism 15 16 and transmits its rotary motion by means of a transverse shaft 17 and its bevel-wheels 18 to the other side, so that all four spindles 10 can be rotated simultaneously in the same direction and allow of a suitable adjustment of the table plate or slab 8 in an upward direction.

The whole table is tightened or tensioned in the horizontal position by a spring 19 by means of a bell-crank lever 20 and the draw-rod 21, engaging with the front end of the table at one of its connecting-rods 4, whereas a cam-disk 22 of the main shaft 3 of the machine tilts, at every rotation of the shaft 3 in the direction of the arrow 25, Fig. 1, the table forward, so that its front end descends by means of the lever 24 abutting against the cam on shaft 3 and coupled with the bell-crank lever 20 by means of a draw-rod 23. On the table returning to its horizontal position the ratchet mechanism 15 16 is operated, the ratchet-pawl 15 being secured onto the support 1 and the ratchet-wheel 16 keyed onto the shaft 13. The ratchet mechanism is so arranged that after the tilting movement of the table the table plate or slab 8 is raised by the extent of the thickness of one sheet of paper. The pile of paper now lies upon the table plate or slab in such a manner that the front edges of the sheets lie in a vertical plane with the front edge of the table plate or slab. The accurate

adjustment of the pile is now effected by the bevels 27, adjustable in the longitudinal and transverse grooves 26 of the table plate or slab 8, and by the vertical scrapers 28, secured to the front connecting-rods 4 of the table, but not adjustable in an upward direction. The scrapers 28, Fig. 9, are cut like files on the side opposite to the pile of paper and are chiefly adapted to retain the bottom or lower sheets which are not sucked in by the suction apparatus, but likewise released from the pile by the compressed air. The table plate or slab must now be so adjusted, by means of the crank 14, that the top sheet of the pile of paper lies in a horizontal position close to the suction apparatus. At the height of this uppermost sheet are now arranged on three sides of the table nozzles 29, Fig. 8, which being fed with compressed air from a common compressed-air pipe 30 blow against the pile of paper laterally in a horizontal direction, and thus release the top sheet from the pile. A horizontal lath frame 32, mounted above the pile on vertical bolts 31 of the frames 5 of the table, but not allowed to come in contact with the pile, prevents, on the one hand, the flying or fluttering of the lifted sheets and effects, on the other hand, since it serves as abutment for the top sheet, to hold in isolation the latter from the other lifted sheets, which are separated from the said top sheet by the air blown between same. The sheets released by the compressed air are now lifted from the pile singly by means of the suction device and fed to the transport device.

The suction device consists of a horizontal suction-tube 33, which is closed at the ends and provided at its lower side, Figs. 6 and 7, with numerous uniformly-distributed suction-nozzles 34, which can be regulated or cut off by valve-screws 80, Figs. 6 and 7. This tube is guided by means of two guide-heads 35, secured thereon parallelly to the front edge of the table in the slots 36 of the support 1, ascending toward the table. The said tube is at each rotation of the shaft 2 reciprocated in the slots 36 by means of the cranks 37 of the shaft 2 and the connecting-rods 38. When the suction-tube 33 assumes its highest position, the table adjusts itself in a horizontal position and the suction-nozzles 34 are brought exactly above the front edge of the top sheet of the pile. In this position of the suction-tube 33 the same communicates with the suction-pipe 39 of an air-rarefying apparatus and the nozzles 34 suck in the top sheet. At this moment the table is tilted downwardly, so that the sucked-in sheet is completely lifted from the pile, the scrapers 28 now operating to retain the flying or fluttering sheets by means of their teeth, while such sheet is fed by the nozzles 34 or the tube 33 forward between the straps 40 and 41 of the transport or feeding device. When the tube 33 has reached its foremost position, its inner chamber communicates with the exterior air and the nozzles 34 discharge the sheet, which is

now fed by the straps 40 and 41 onto the inclined feeding-table 43 to the printing-cylinder. The transport device for the sheets discharged by the suction-tube 33 consists of two groups or series of transport-straps 40 and 41 and of the table 43, arranged in front of the paper-table and on the horizontal connecting-rods 44, parallel to the guide-slots 36. The straps 40 of the one group or series are so passed around the horizontal rollers 46 47 48 49, mounted in the supports 1 above the table 43, that they surround the whole track of the suction-tube 33, thus not preventing the motion of the latter. The straps 41 of the second group or series pass around the horizontal rollers 50 51 52, mounted below the table 43, and embrace such rollers. The single straps of both groups are arranged above each other in pairs, so that the bottom ends of the straps 40 of the upper group exactly cover the top ends of the straps 41 of the lower group passing on the table. Both groups of straps are driven by a pulley 53 of the cylinder-shaft 2 in such a manner that this shaft operates by means of the belt (or chain) 54 the bottom roller 50 of the lower group of straps, such roller 50 then driving a gearing 56 by means of a belt (or chain) 55, from which gearing the top roller 49 of the upper group of straps is operated by means of a crossed belt (or chain) 57. The moving direction of the straps is indicated by arrows. The covering ends of both groups of straps also move in the same direction against the printing-cylinder and at the same speed at which the suction-tube 33 moves. The latter feeds the sheets with its front edge between the ends of the straps 40 and 41, passing to the front, which while the suction-tube 33 returns feed the sheet to the foldable front part 45 of the table 43, where it is released from the roller 46 for the purpose of further treatment, such roller 46 being lifted at this moment from the table 43 by a cam 58 of the main shaft 3 by means of the levers 59, 60, 61, 62, 63, 64, and 65, which has for its object to release the sheet in order to enable the known apparatus to straighten the sheet. The accurate or proper regulation of the suction of the tube 33 can be attained by the mechanism shown, by way of example, in Figs. 3, 4, and 5. This regulating mechanism consists of a cylindrical casing 67, closed above and having two lateral socket-pieces 71 and 72. In the casing 67 is mounted a piston-valve 68, actuated by the spring 73. The suction-pipe 39 communicates with the one socket-piece 72 of the casing, and the other socket-piece 71 communicates with the suction-tube 33 by means of a flexible pipe 79.

On the main shaft 3 is keyed a cam 74, which by means of the levers and rods 75, 76, 77, and 78 actuates the piston-valves 68 in such a manner that the latter, if the suction-tube has reached its highest position and the table for the pile is in its horizontal position, is drawn downwardly, and thus establishes,

through its transverse bore 69, a communication between the suction-pipe 39 and the suction-tube 33. In this position the piston-valve 68 is held by the cam 74 until the suction-tube 33 is again in the lowest or foremost position, at which moment the cam 74 releases the piston-valve 68. The latter assumes the normal position, as shown in Fig. 4 of the drawings, in which it shuts off the suction-pipe 39 and allows the exterior air to pass through its bore 70 into the suction-tube 33.

Having now particularly described and ascertained the nature of the said invention, we declare that what we claim, and wish to secure by Letters Patent, is—

1. In a pneumatic sheet-feeding apparatus for printing-presses, a horizontally-disposed tilting table, a plurality of blowing-nozzles in proximity to the sides and back of said table, a suction device at the forward edge of the table, and means for tilting the table to complete the separation of the sheet, substantially as described.

2. In combination, the tilting table for sup-

porting the pile of sheets, blowing-nozzles at the sides and rear of said table, a suction device at the forward edge of said table, means for tilting the table to complete the separation of the sheet, and a lath frame above the table for limiting the rise of the sheets, substantially as described.

3. In combination, the table for supporting the pile of sheets, a plurality of blowing-nozzles, a periodically-acting suction-tube having a plurality of nozzles in proximity to the forward edges of said sheets, and needle-valves for regulating the passage of air through said nozzles, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

ANTON WEISS.

FRANZ HELL.

KRISTOF OBERDING.

Witnesses:

RELIUR RCIR,

RAYMOND WILLEY.