No. 789,744. PATENTED MAY 16, 1905.

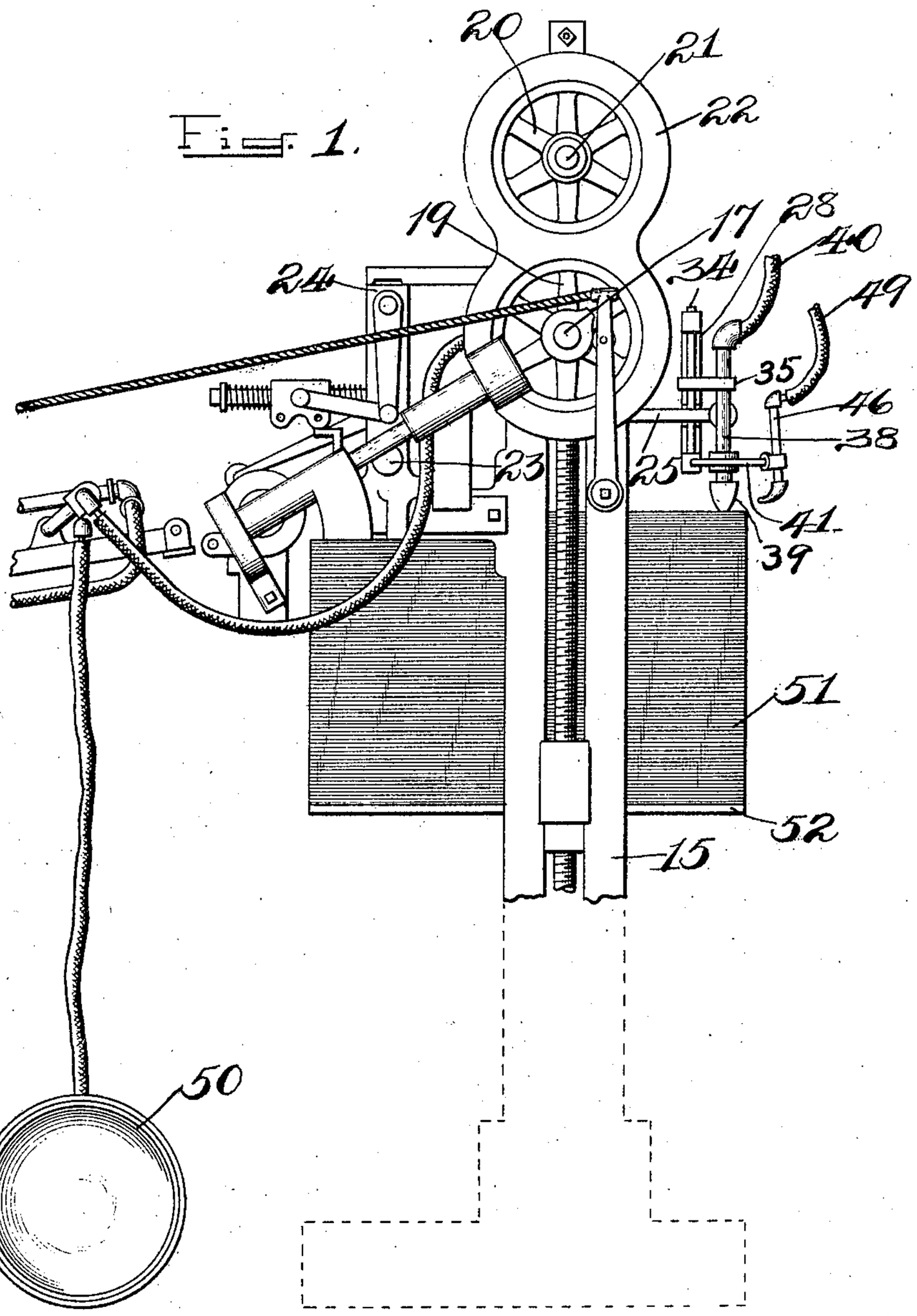
G. F. LEIGER.

PNEUMATIC SHEET FEEDING APPARATUS.

APPLICATION FILED FEB. 20, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 3.

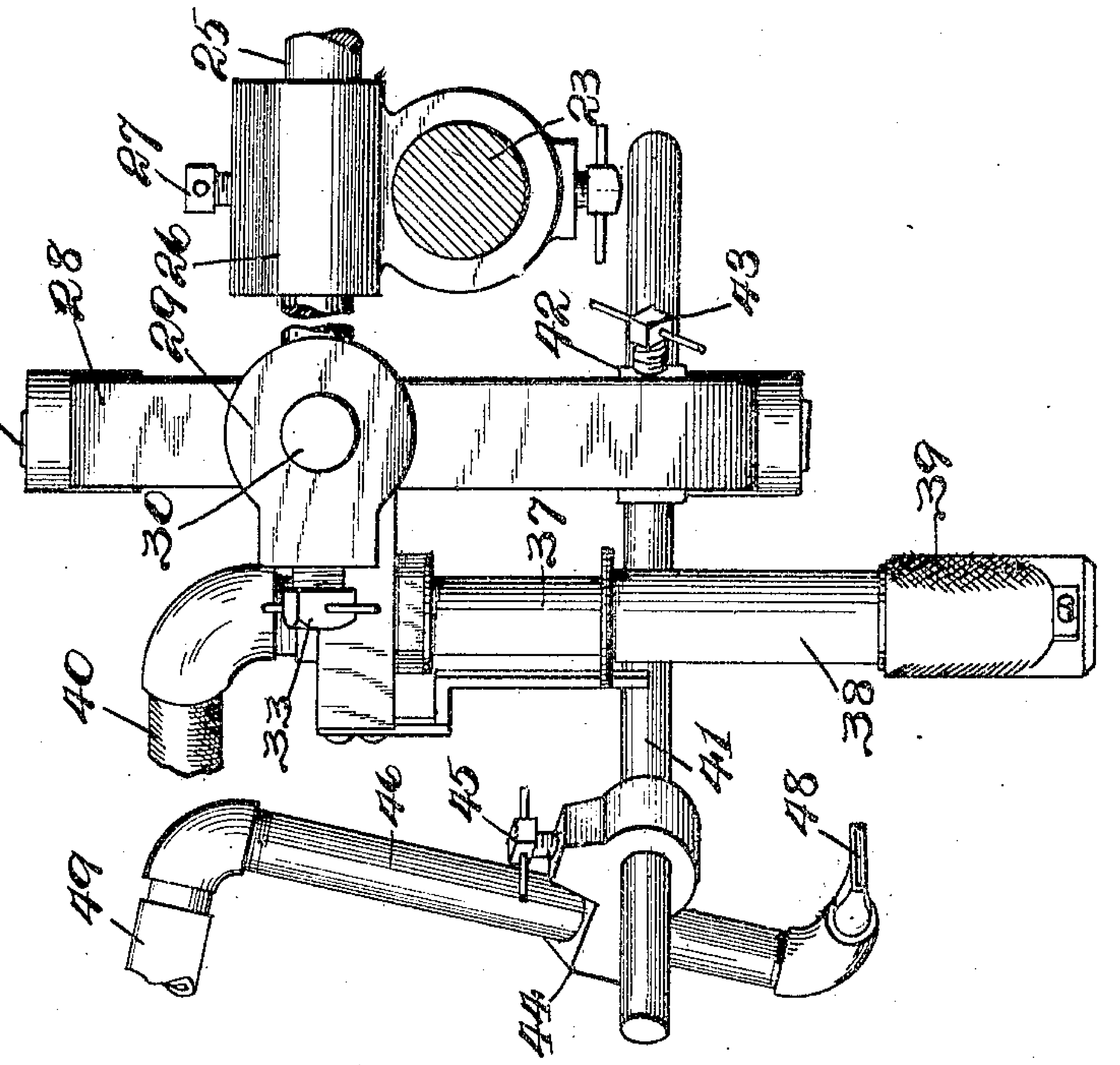
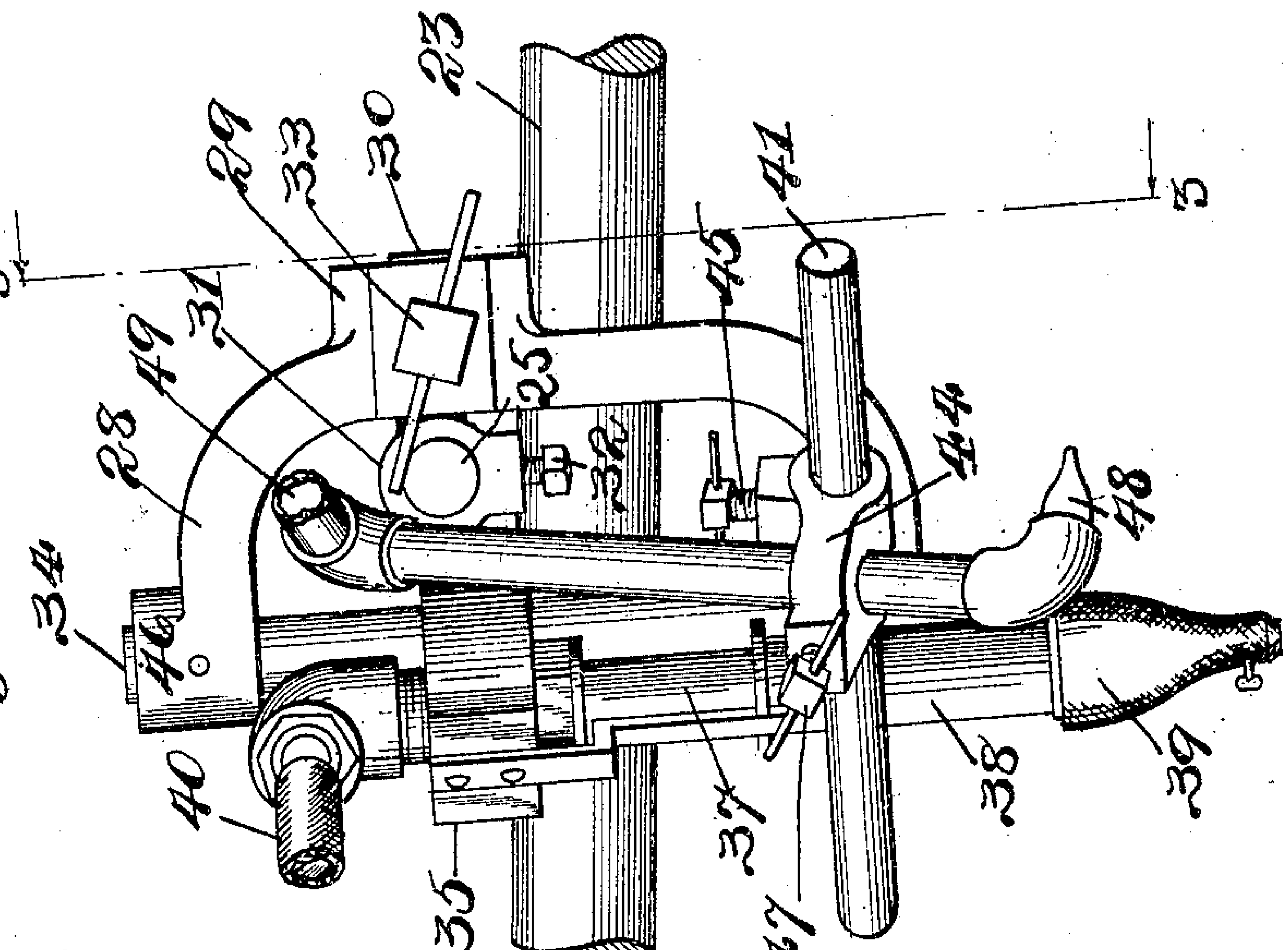


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 5.

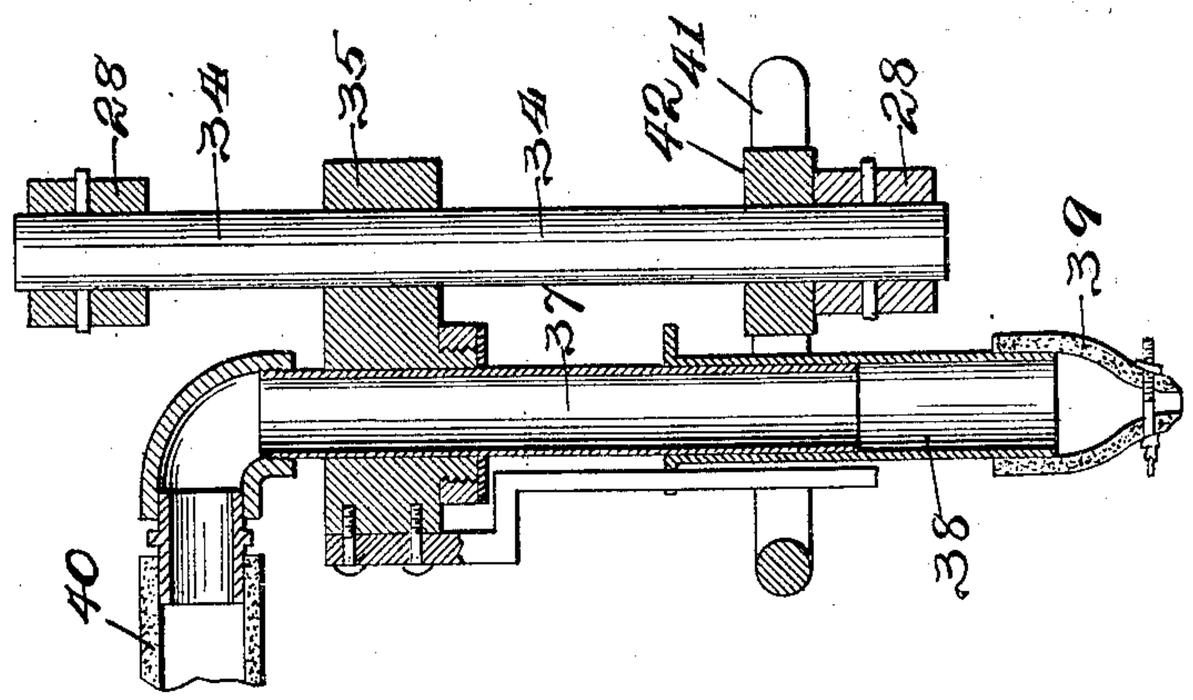
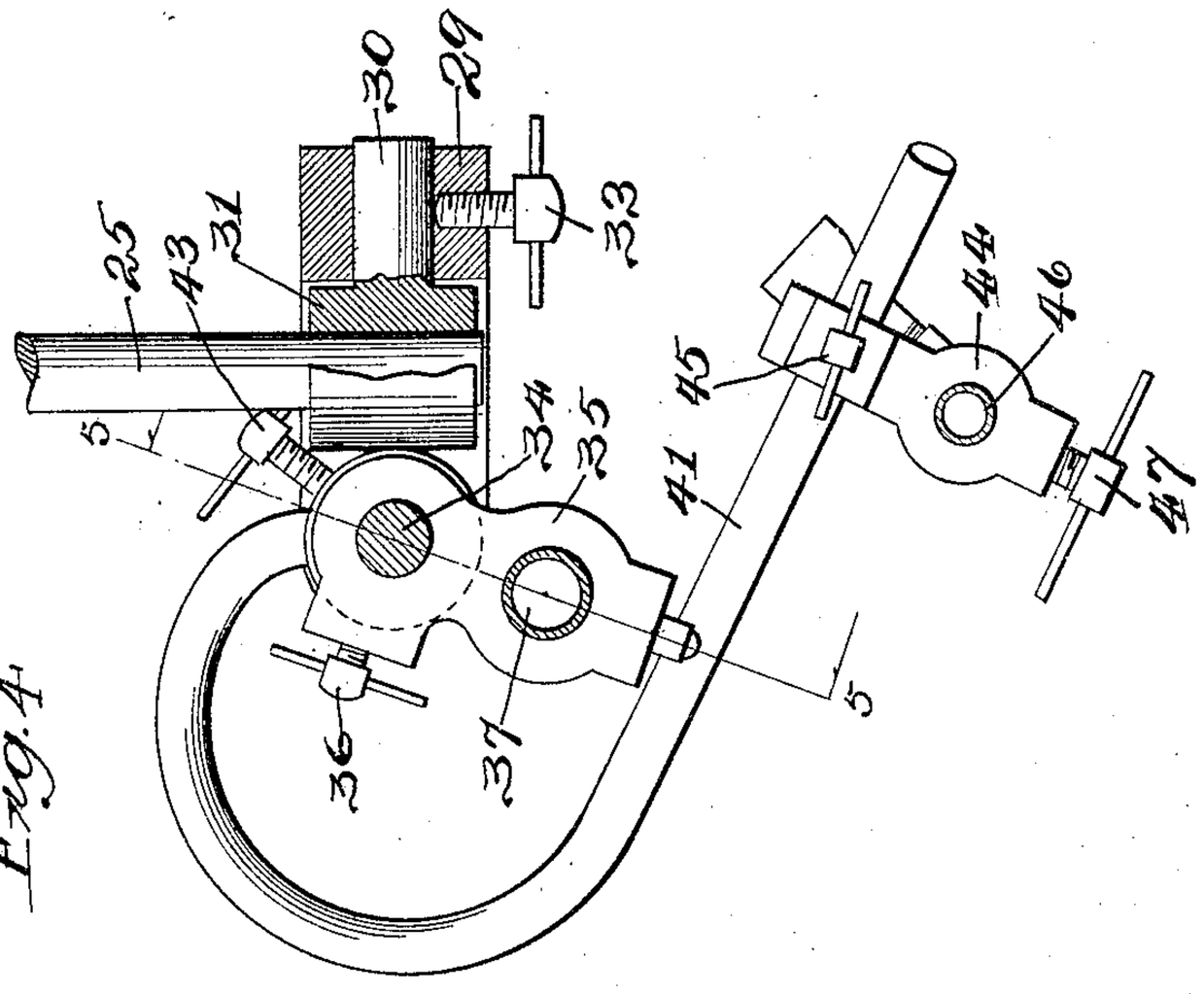


Fig. 4



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UNITED STATES PATENT OFFICE.

GEORGE F. LEIGER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE L. BENEDICT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PNEUMATIC SHEET-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 789,744, dated May 16, 1905.

Application filed February 20, 1904. Serial No. 194,620.

To all whom it may concern:

Be it known that I, GEORGE F. LEIGER, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic Sheet-Feeding Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in machinery for feeding single sheets of paper to printing-presses or other machines, such sheets being successively lifted from a pile of sheets by means of pneumatically-operated picker-fingers, the machine being of the same general type as the machines shown and described in Letters Patent No. 557,279, dated March 31, 1896, No. 588,451, dated August 17, 1897, and No. 624,228, dated May 2, 1899, heretofore granted upon my applications.

The present invention has for its objects more particularly to provide improved means for mounting the telescopic pickers that lift the rear of each sheet preparatory to its being fed forward, so that the position of such pickers and the angle at which they stand with relation to the pile of sheets can be adjusted quickly and easily to any one of a large number of positions, to provide in connection with such picker-supporting means improved means for supporting the devices through which air is forced beneath each sheet at its rear edge as such sheet is raised by the pneumatic pickers, and to improve generally the construction and operation of machinery of this class. I attain these objects by the means shown in the drawings and hereinafter specifically described, and those things which I believe to be new will be set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation, a portion of the framework being indicated by dotted lines. Fig. 2 is a detail, being a rear elevation of one of the pneumatic pickers and the devices which carry it, showing also the manner of mounting the device for blowing air beneath the sheet of paper as the rear end of such sheet is raised by the pneumatic picker. Fig. 3 is a view taken at line 3 3 of Fig. 2 in the direction indicated by the arrows. Fig. 4 is a detail, being a top view, partly in section, of the devices shown in Fig. 2. Fig. 5 is a section taken at line 5 5 of Fig. 4.

Referring to the several figures of said drawings, 15 indicates one of the standards of the main frame, from the upper end of which a heavy cross-bar (not shown) extends, its opposite end being suitably supported by another standard similar in all respects to the standard 15.

17 indicates the main driving-shaft, extending across the main frame of the machine and supported thereby, which shaft may be driven in any suitable manner. On this shaft 17 is secured a gear-wheel 19, which meshes with another gear-wheel 20, mounted on a suitable shaft 21, through the turning of which shaft 21 and through the employment of suitable gears a conical valve, such as shown in my Letters Patent No. 734,466, dated July 21, 1903, is rotated, and thereby the desired vacuum intermittently formed and destroyed at the proper times in the various pipes and devices, all as hereinbefore described in my said patents.

22 indicates a casing surrounding the gear-wheels 19 and 20.

23 indicates a heavy rod extending across the machine and secured in forwardly-extending brackets 24 formed with the vertical portions of the main frame, one of which brackets is shown in Fig. 1.

25 indicates a rod extending back from the rod 23 and adjustably clamped to such rod 23 by means of a short sleeve 26 carried on the rod 23, the rod 25 being held in such sleeve by means of a set-screw 27.

28 indicates a yoke having a head portion 29 with an opening therethrough to adapt the yoke to fit upon a short trunnion 30, that is formed integral with and extends laterally from a collar 31, that fits over the rear end of the rod 25, said collar being adjustably secured to such rod by a set-screw 32. The yoke is adjustably secured to the trunnion 30 by a set-screw 33.

34 is a short rod passing through openings in the enlarged ends of the yoke 28 and suitably secured therein.

35 indicates a block having two openings therethrough, through one of which the short rod 34 passes, said block being secured in place upon such rod by a set-screw 36. Through the other opening in the block 35 passes a short air-pipe 37, upon which is mounted, so as to telescopically slide thereon, a picker-tube 38, carrying at its lower end a cup 39 of suitable compressible material. The short air-pipe 37 has attached at its upper end in any suitable manner a tube 40, preferably a section of flexible tubing, which, through a suitable valve or valves, (not herein shown, but which may be of the character described in any of my said former patents,) is put in communication intermittently with a vacuum-chamber, whereby a vacuum will be caused in said pipe 37 and its picker at the proper time. As explained in my former patents, such vacuum will be caused when the cup 39 is resting on the sheet to be raised, and by reason of such vacuum the telescopic picker and its cup with the sheet attached thereto will be raised at its rear end, it being understood that a telescopic picker of this description is employed over each rear corner of the pile of sheets. It is of great advantage in separating the sheet being raised from the pile of sheets to have blown beneath it a blast or blasts of air, and provision has heretofore been made for that purpose. In my present construction I preserve that feature, but provide means whereby the pipe through which the air passes is carried in a more convenient manner than heretofore and by means that permit it to be readily and quickly adjusted. In this construction I provide a rod 41, that by means of a collar 42, to which the rod 41 is attached, allows the rod to be secured to the short vertical rod 34, the rod 41 being adjustably affixed to said rod 34 by means of a set-screw 43 passing through said collar 42. This rod 41 is curved, as is best shown in Fig. 4, to adapt its free end to be brought around in rear of the pneumatic picker.

44 indicates a block having an opening therethrough to adapt the block to be secured to the rod 41, a set-screw 45 permitting such block to be adjustably secured to such rod in any desired position. Through the said block 44 is another opening at right angles to the one through which the rod 41 passes, through which second opening passes a short tube 46, that is adjustably secured in place by a set-screw 47. The lower end of this tube 46 is provided with a discharge-nozzle 48, that is turned inward so as to be directed toward the pile of sheets, and by reason of the adjustability of the tube 46 upward and downward such nozzle can be properly directed, so that a blast of air forced from the nozzle will be directed beneath the upper sheet of the pile as such upper sheet is raised by the telescopic pickers.

49 indicates a flexible tube affording a communication between the upper end of the tube 46 and a suitable air-supply.

50 indicates a vacuum-chamber of any ordinary description and which may be located beneath the machine, as indicated, or in any other convenient place.

It is found in practice that in order to secure the best results in the way of lifting the rear end of a sheet of paper from the pile by means of the pair of pneumatic pickers that such pickers should stand at a slight angle, as thereby wrinkling or buckling of the paper when being lifted is avoided, which of course is important in the rapid operation of the machine. By my improved construction I provide suitable supporting means for the pneumatic pickers, which allows of such pickers being adjusted to any position required, so as to properly handle different sizes and thicknesses of paper, and when adjusted as desired the parts can be readily locked in place. At the same time while accomplishing this result the pneumatic action of the pickers is in no wise disturbed, as will be readily understood.

The pile of sheets of paper is indicated by 51, and such pile rests upon a suitable table 52, that is very gradually moved upward automatically by any suitable mechanism; but as such mechanism forms no part of my present invention and as such devices are well known no description of the same is here given.

In my said former patents are given descriptions of devices for raising the forward end of sheets of paper and for giving them their initial forward movement, and such devices or others may be employed, in connection with the means herein specifically described, that have relation to the lifting of the rear ends of the sheets; but as my present invention is entirely distinct from any such devices that are employed at the forward ends of the sheets I have not deemed it necessary to particularly illustrate the same nor to here describe them.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a pneumatic sheet-lifting mechanism, the combination with a longitudinally-movable telescopic picker and means for creating a vacuum therein, of means for supporting said picker at any desired angle to the sheet to be lifted, substantially as described.

2. In a pneumatic sheet-lifting mechanism, the combination with a pivoted yoke, a rod extending across said yoke, and a block pivotally supported by said rod, of a longitudinally-movable picker supported by said block, and means for producing a vacuum in said picker, substantially as described.

3. In a pneumatic sheet-lifting mechanism,

the combination with a pivoted yoke, a rod extending across said yoke and a block movable longitudinally of said rod and adapted to be swung laterally thereon, of a longitudinally-movable picker supported by said block, and means for producing a vacuum in said picker, substantially as described.

4. In a pneumatic sheet-lifting mechanism, the combination with a rod, a trunnion extending therefrom, a yoke pivoted upon said trunnion, a rod carried by the said yoke and a block secured upon said rod, of a pneumatic picker supported by said block, means for permitting said picker to be moved laterally to stand at any desired angle with relation to the sheet to be lifted, and means for producing a vacuum in said picker, substantially as described.

5. In a pneumatic sheet-lifting mechanism, the combination with the supporting-rod 25 having the collar 31 movably secured thereon, said collar carrying the trunnion 30, the yoke 28 having an apertured head 29 adapted to be rotatably secured on said trunnion, the rod 34 secured in the ends of said yoke, and the block 35 movable up and down on said rod 34, of a pipe 37 supported by the outer end of said block, a longitudinally-movable picker carried by said pipe, and means for producing a vacuum in said pipe and picker, substantially as described.

6. In a pneumatic sheet-lifting mechanism, the combination with a longitudinally-movable picker and means for creating a vacuum therein, of means for supporting said picker at varying angles, and a pipe through which air is adapted to be blown beneath the sheet raised by the picker, said pipe being carried by and movable with said picker-supporting means, substantially as described.

7. In a pneumatic sheet-lifting mechanism, the combination with a longitudinally-movable picker and means for creating a vacuum therein, of means for supporting said picker at varying angles, a pipe through which air is adapted to be blown beneath the sheet raised by the picker, said pipe being carried by and movable with said picker-supporting means, and other means for permitting an independent adjustment of said pipe, substantially as described.

8. In a pneumatic sheet-lifting mechanism, the combination with a longitudinally-movable picker and means for creating a vacuum therein, of means for supporting said picker at varying angles, a pipe through which air is adapted to be blown beneath the sheet raised by the picker, said pipe being carried by and movable with said picker-supporting means, and other means for permitting an independent longitudinal and swinging adjustment of said pipe, substantially as described.

9. In a pneumatic sheet-lifting mechanism, the combination with a longitudinally-movable picker and means for creating a vacuum therein, of means for adjustably supporting said picker at varying angles, a rod carried by said picker-supporting means and movable therewith, a block movable on said rod, and a pipe movably carried by said block and adapted to have a blast of air blown through it and beneath a sheet raised by said picker, substantially as described.

10. In a pneumatic sheet-lifting mechanism, the combination with a picker adapted to engage and raise a sheet from a pile, of a rod secured at one of its ends, an air-pipe adjustable along said rod, and means for permitting an independent longitudinal movement of said pipe, substantially as described.

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