Dec. 23, 1941. W. C. RUPP 2,267,340

FEED TABLE FOR PRINTING PRESSES AND THE LIKE

Filed May 20, 1940 4 Sheets-Sheet 1

FIG. 1.

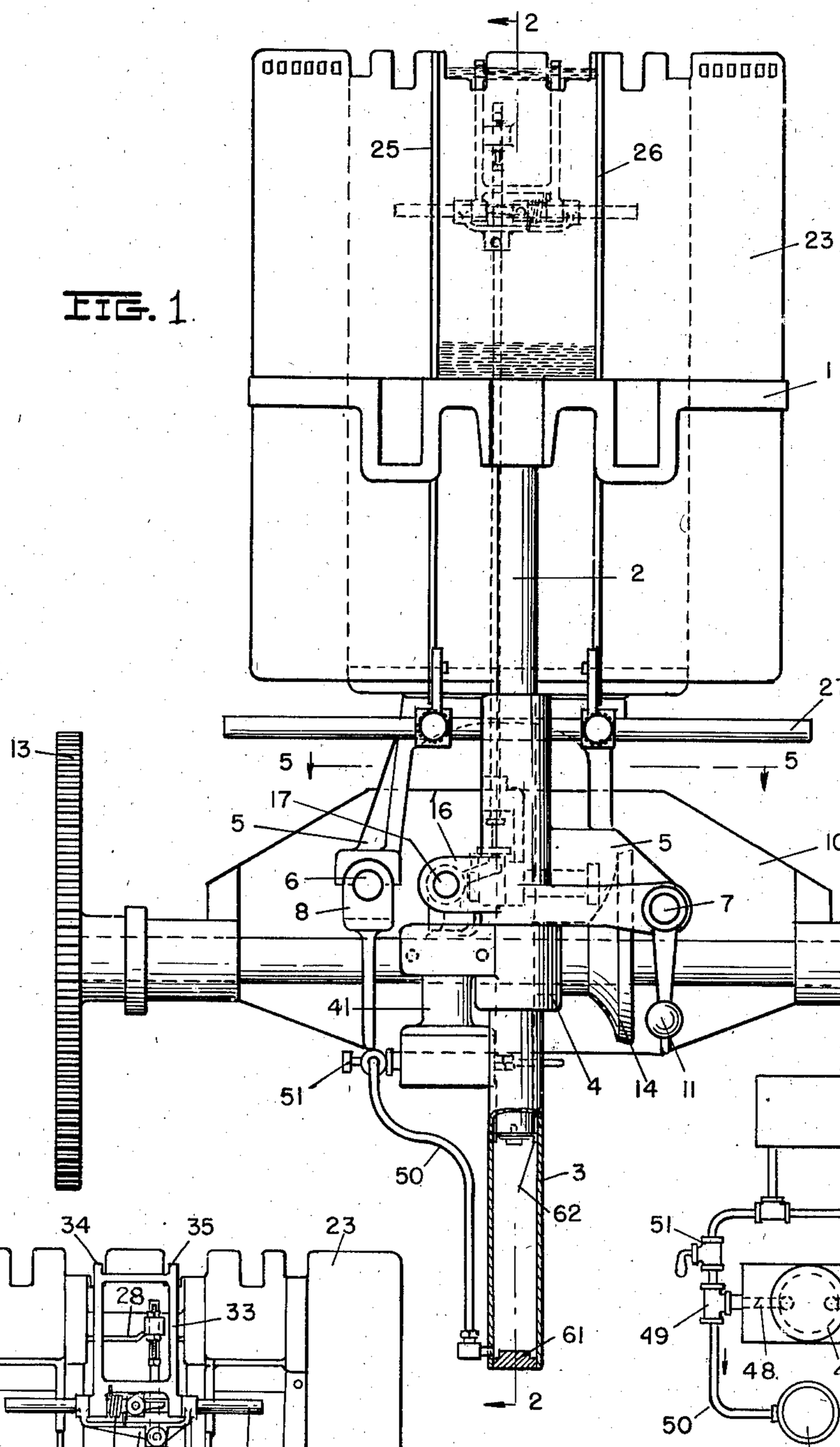

FIG. 4

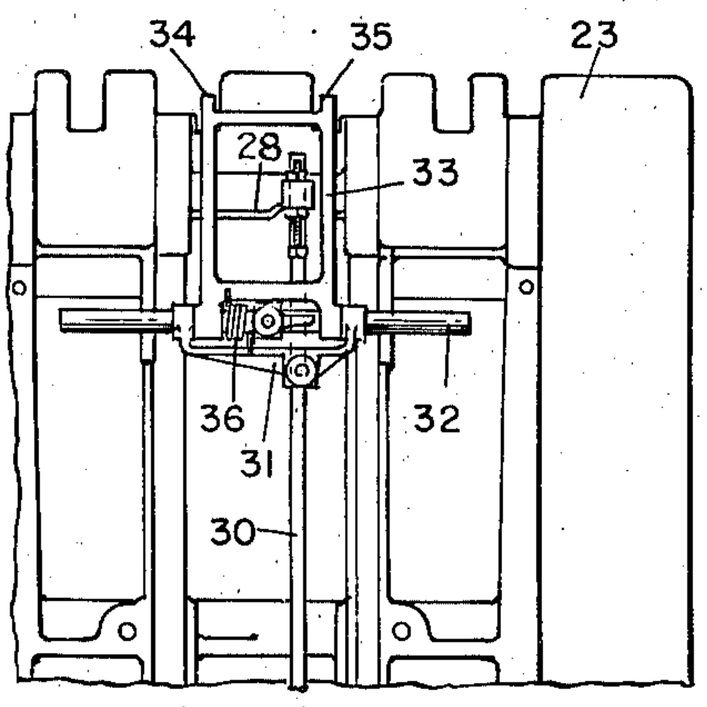

FIG 14.

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FEED TABLE FOR PRINTING PRESSES AND THE LIKE

Filed May 20, 1940 4 Sheets-Sheet 2

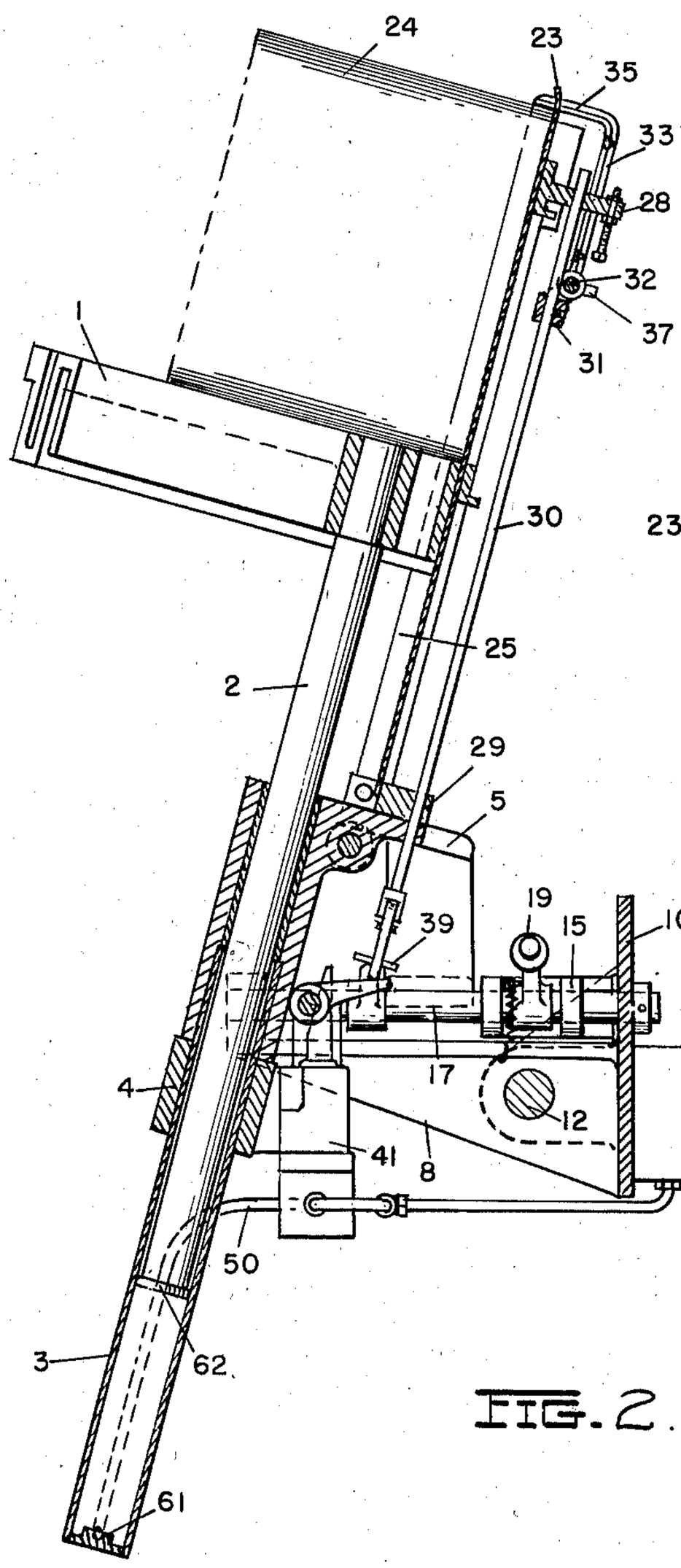

FIG. 2.

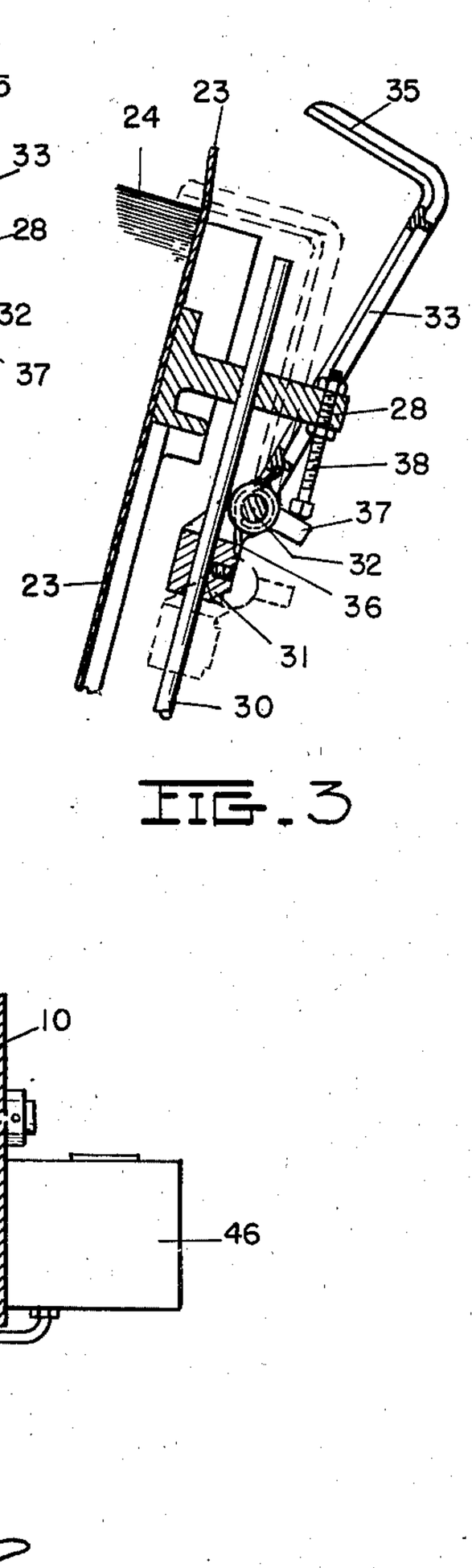

FIG. 3

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FEED TABLE FOR PRINTING PRESSES AND THE LIKE

Filed May 20, 1940 4 Sheets-Sheet 3

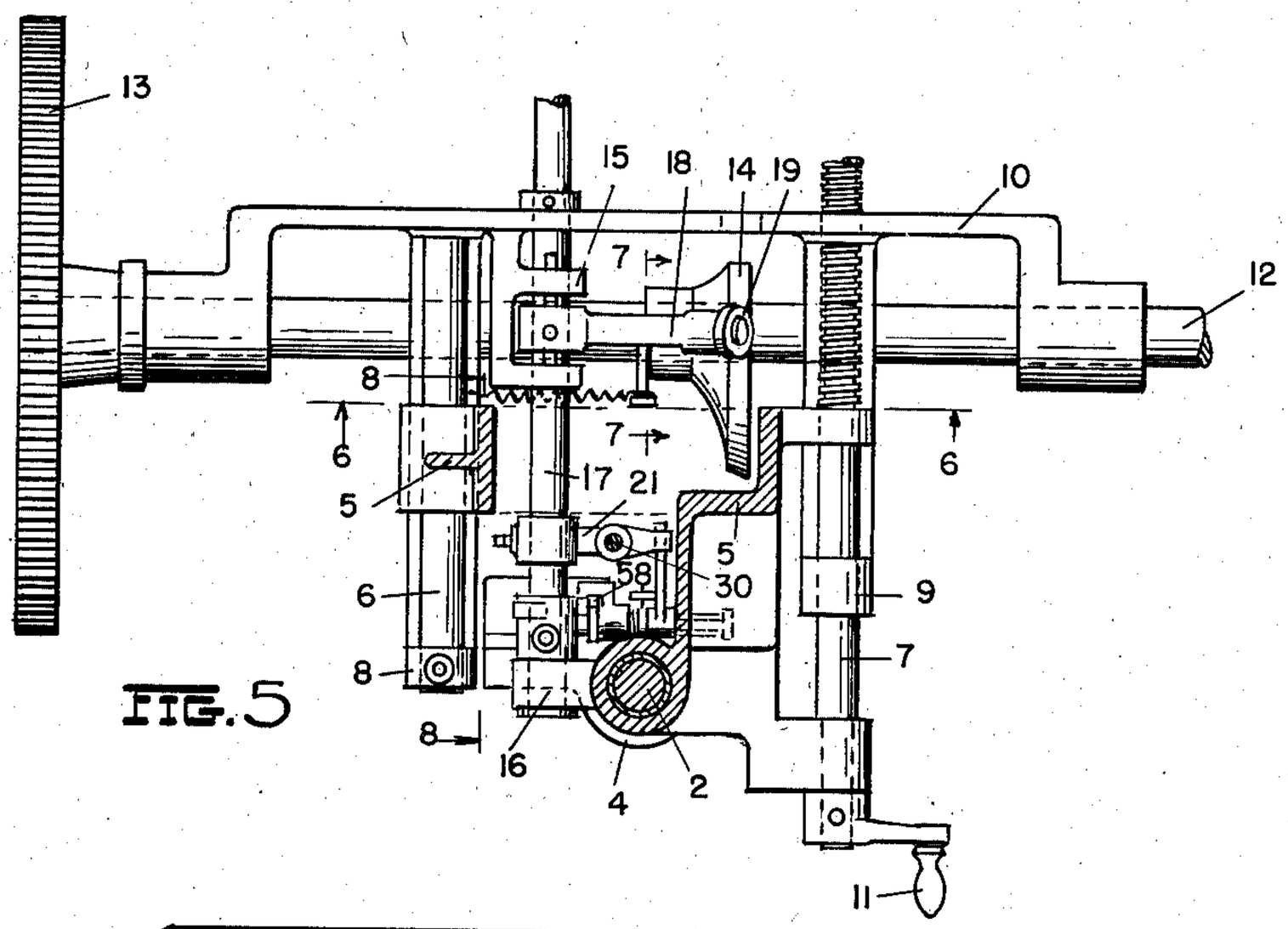

FIG. 5

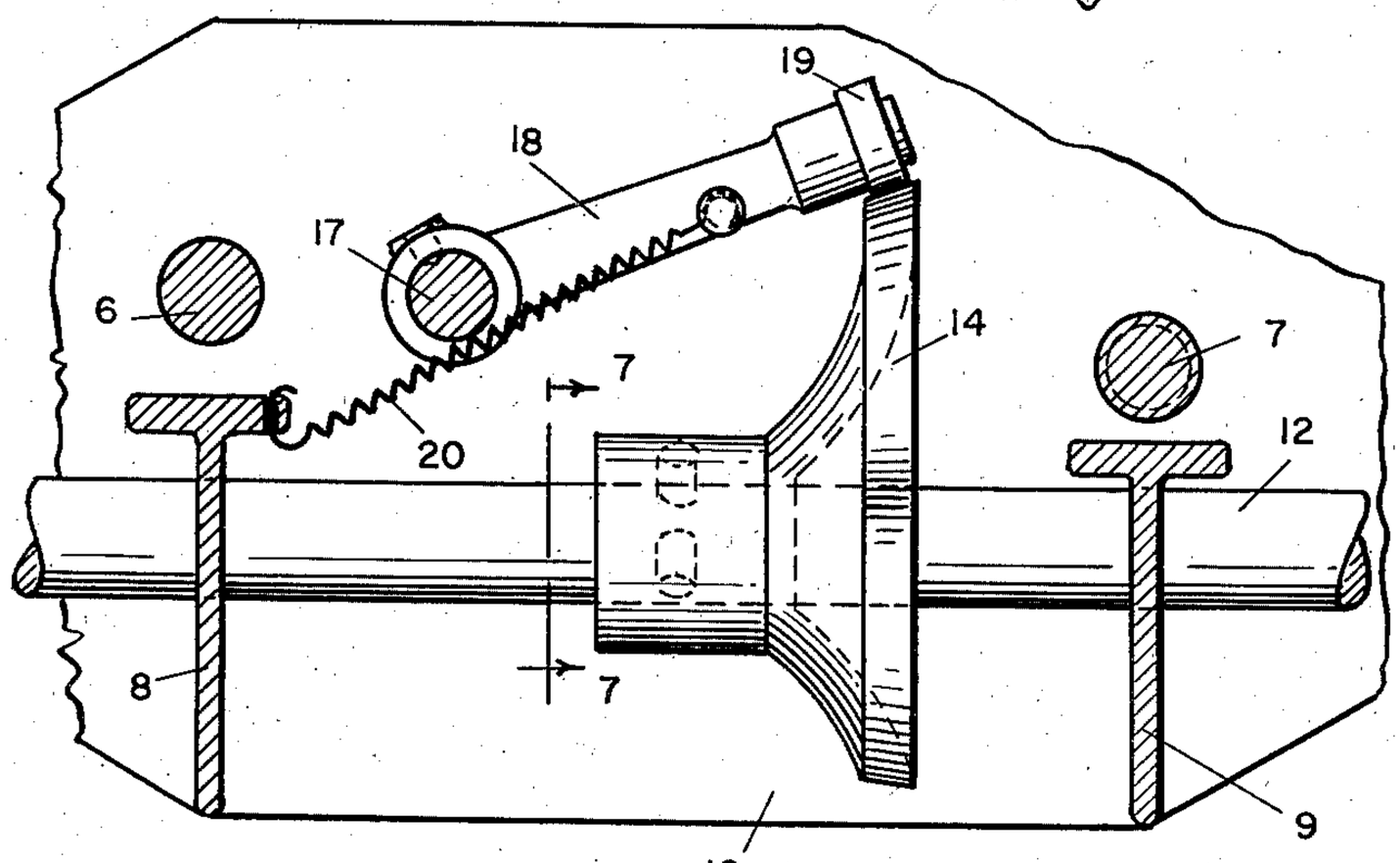

FIG. 6

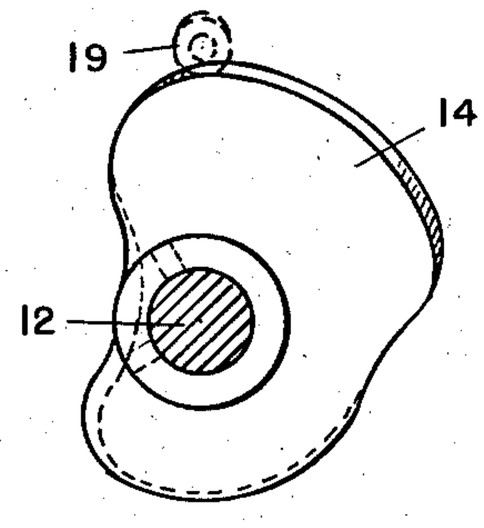

FIG. 7

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FEED TABLE FOR PRINTING PRESSES AND THE LIKE

Filed May 20, 1940 4 Sheets-Sheet 4

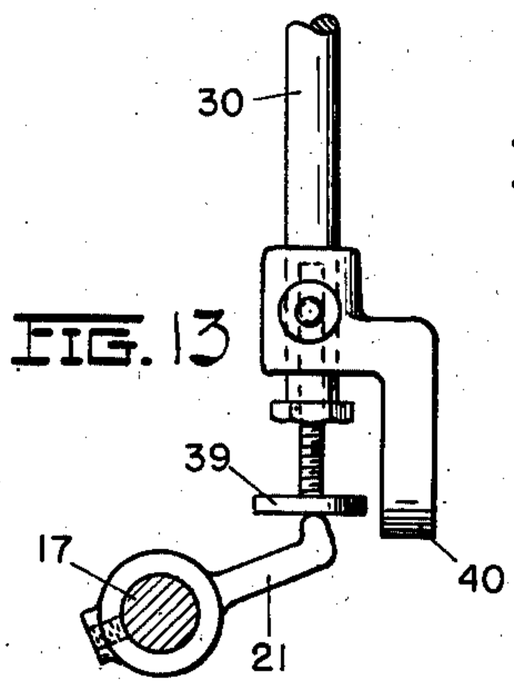

FIG. 13

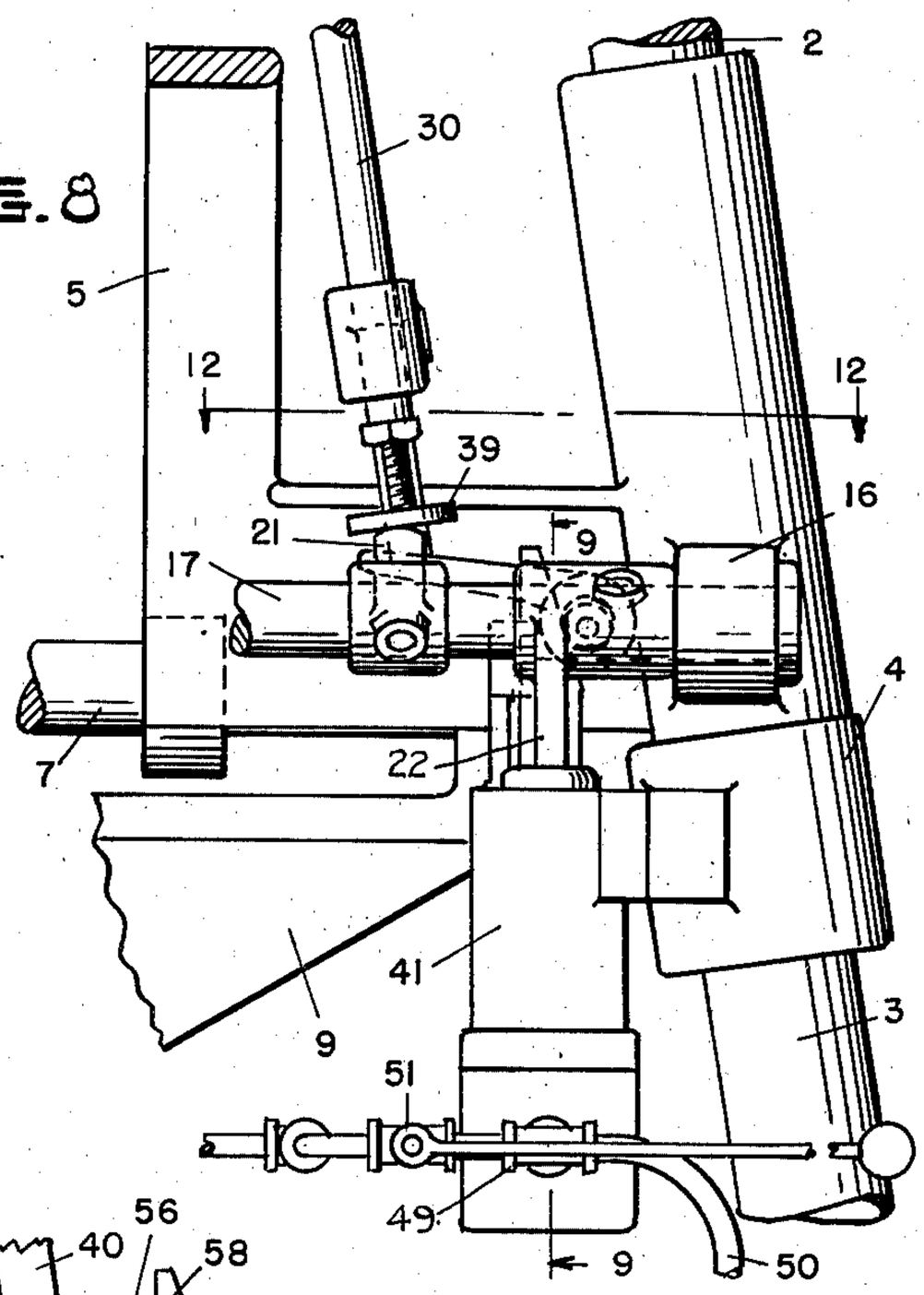

FIG. 8

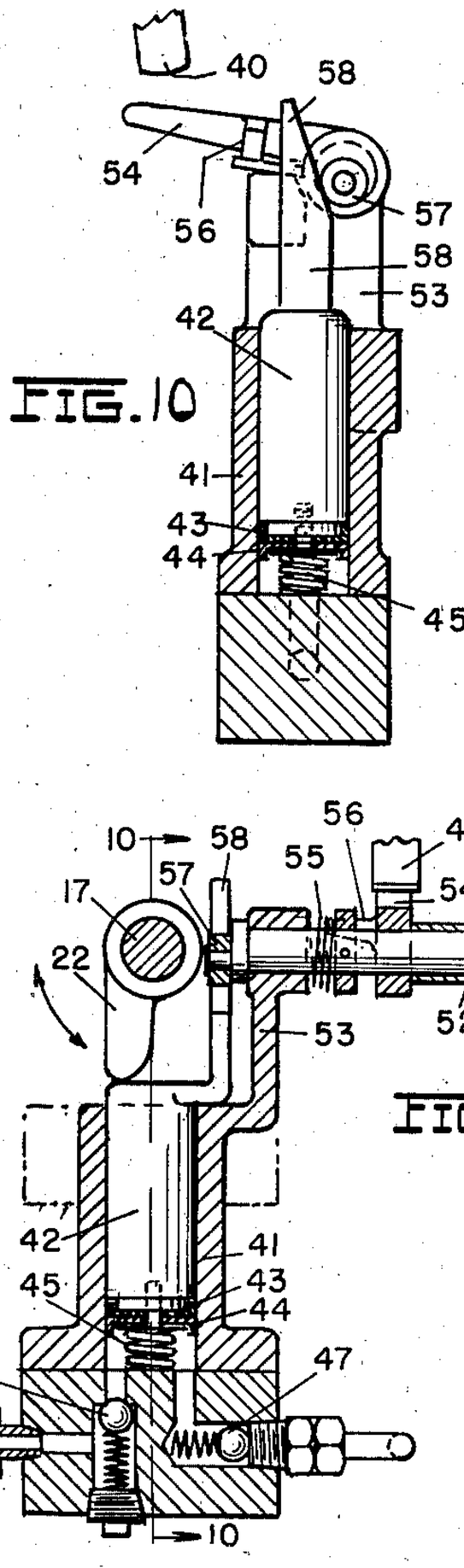

FIG. 10

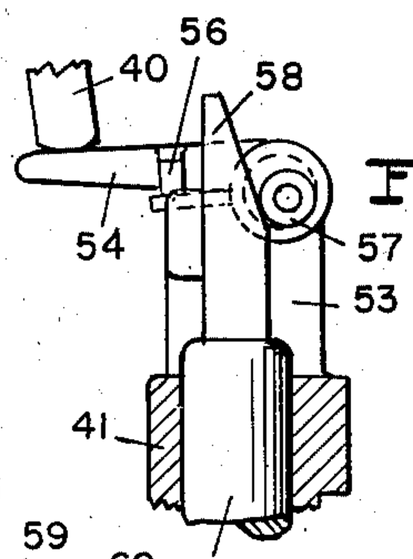

FIG. 11

FIG. 9

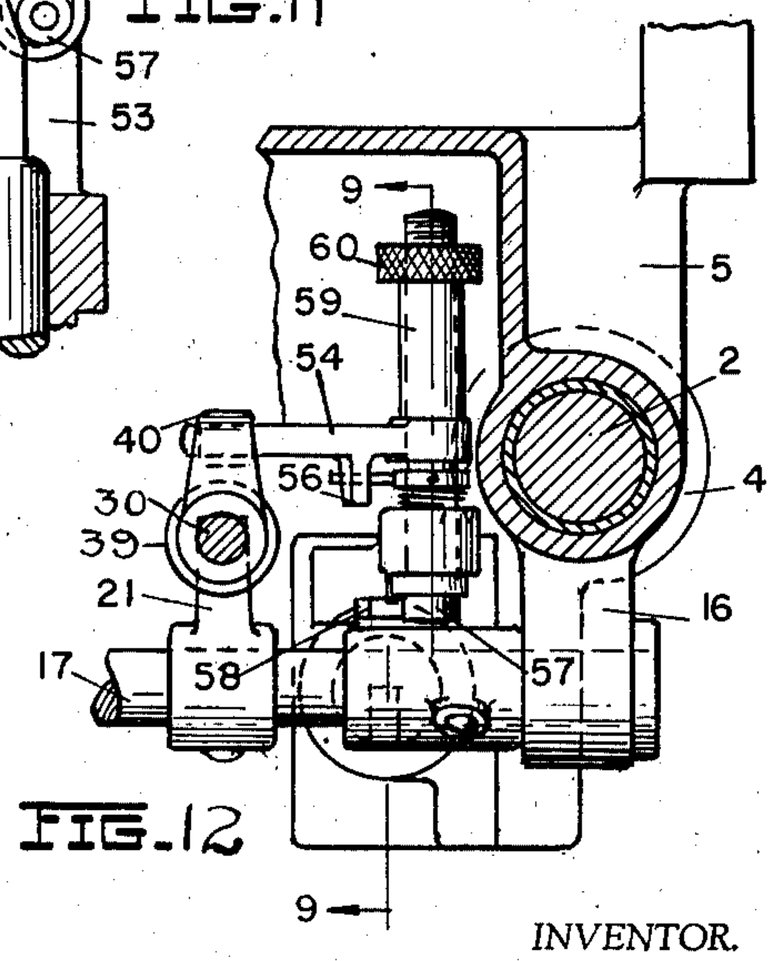

FIG. 12

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Patented Dec. 23, 1941

2,267,340

UNITED STATES PATENT OFFICE

2,267,340

FEED TABLE FOR PRINTING PRESSES AND THE LIKE

William C. Rupp, Parma, Ohio, assignor to The Chandler & Price Company, Cleveland, Ohio, a corporation of Ohio

Application May 20, 1940, Serial No. 336,154

10 Claims. (Cl. 271—62)

This invention relates as indicated to feed tables for printing presses and the like and more particularly to a novel type of stack elevating device which is responsive to the removal of even very thin sheets of paper.

In conjunction with the well-known platen or Gordon type presses, for example, it has been found desirable to employ feed tables which may be intermittently elevated as sheets are removed from the stack in order to maintain the top of the stack at a substantially predetermined level and so facilitate the operation of the sheet feeding mechanism. Various rack and gear means as, for example, that illustrated and described in Root Patent No. 2,081,958, have been utilized in the past to provide for the elevation of the feed table, such means being responsive through rather complicated pawl and ratchet mechanism, to the movement of feeler fingers periodically resting upon the upper surface of the stack. In addition to being mechanically complex, such means is only effective to periodically elevate the stack when a sufficient number of sheets have been removed therefrom to cause quite a noticeable lowering of the upper surface of the stack. The top of the stack is then abruptly elevated to its former level. Any attempt to render the mechanism more sensitive and responsive to the removal of thin sheets obviously requires a multiplication of gear and rack teeth, more accurate machining and a general tendency toward more delicate parts.

It is therefore an object of this invention to provide a feed table elevating mechanism which will be smoothly and immediately responsive to an even very slight decrease in the height of the stack as by the removal of very thin sheets of paper but which may also be effectively employed when a stack of thicker sheets, such as cardboard, is being handled.

Other objects of this invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a front elevational view of the feed table and feed table elevating means of this invention;

Fig. 2 is a side view in section along line 2—2 on Fig. 1;

Fig. 3 is a detail sectional view of the stack feeler finger mechanism illustrated in Fig. 2;

Fig. 4 is a fragmentary view of the feed table back;

Fig. 5 is a top view along line 5—5 on Fig. 1 of the stack elevating mechanism;

Fig. 6 is a front view (enlarged) of the master cam mechanism taken along line 6—6 on Fig. 5;

Fig. 7 is a detail view of such cam taken on line 7—7 on Figs. 5 and 6;

Fig. 8 is a fragmentary side view showing the feeler oscillating rod and plunger release means taken on line 8—8 on Fig. 5;

Fig. 9 is a vertical section of the hydraulic cylinder taken along line 9—9 on Fig. 8;

Fig. 10 is a vertical section of said cylinder taken along line 10—10 on Fig. 9;

Fig. 11 is a fragmentary view of the same section showing the plunger advanced;

Fig. 12 is a fragmentary top view taken along line 12—12 on Fig. 8;

Fig. 13 is a detail view of the foot of the feeler finger operating rod and reciprocating cam lever; and

Fig. 14 is a diagrammatic top plan view of the hydraulic system.

Referring now more particularly to the drawings, and especially Figs. 1 and 2, the new device of my invention comprises a stack supporting table 1 carried by a column 2 fitting in a hydraulic cylinder 3. Such cylinder is held within a boss 4 of frame member 5 which is sleeved on a horizontally disposed trackway composed of bars 6 and 7 respectively supported in brackets 8 and 9 on frame-piece 10 (see Fig. 5). Bar 7 is threaded where it passes through frame-piece 10 so that by turning handle 11 frame member 5 and thus the table may be caused to move forwardly or rearwardly as desired. Journalled in said frame-piece 10 which may be attached to the main frame of a platen press, for example, is a drive shaft 12 adapted to be driven through gear 13 by the main drive shaft of the press. Carried by said shaft 12 is a master cam 14 (see Figs. 5, 6 and 7). Rockably mounted in double bracket 15 of frame-piece 10 and bracket 16 of frame member 5 is a shaft 17 disposed above and at right angles to said drive shaft 12. A rocker arm 18 is fixed against rotation on shaft 17 and carries at its end a cam roller 19 adapted to ride on the periphery of said master cam 14. As the

distance from the center of shaft 12 to a point on the periphery of said cam varies, it is obvious that upon rotation of shaft 12 shaft 17 will be continuously rocked back and forth by action of said lever arm 18. Cam roller 19 is held in close engagement with cam 14 by means of tension spring 20 extending between said lever arm and bracket 8. Also mounted on shaft 17 and rocking therewith are lever arm 21 and cam 22 (see Figs. 8, 9 and 13).

Also carried by frame member 5 is a back member 23 which, together with said table 1, serves to support the stack of sheets 24. Side gauges 25 and 26, adjustably mounted on rod 27, serve to laterally position the sheets. Journalled in bracket 28 attached to said back member 23 and bracket 29 supported by frame member 5 is a rod 30 to which a yoke 31 is tightly attached (see Figs. 2, 3 and 4). Journalled in said yoke is a horizontally disposed rod 32 on which is pivotally mounted a frame 33 with feeler fingers 34 and 35 operative to protrude through slots in the top of said back 23 and rest on the upper surface of the stack. A torsion spring 36 bearing on said yoke and frame piece acts to keep said fingers in advanced position except when rod 30 is elevated, at which time lug 37 on such yoke will engage adjustable stop 38 carried by bracket 28 and cause frame-piece 33 to be tilted rearwardly, thus retracting the fingers.

The lower end of rod 30 carries a vertically adjustable foot 39 adapted to rest upon the extremity of lever arm 21. It is thus apparent that, as the shaft 17 and such lever arm rock, rod 30 will be reciprocated and the feeler fingers 34 and 35 alternately brought forward to rest on the stack and raised and retracted. Also carried by the lower end of rod 30 is a finger 40, the purpose of which will be explained below.

Carried by an extension of boss 4 is a hydraulic cylinder 41 (see Figs. 8 and 11) in which a plunger 42 is adapted to move. Oppositely disposed cup washers 43 and 44 serve to provide a tight seal while compression spring 45 tends to force said plunger upward. As best shown in Fig. 9, as cam 22 is rocked it bears on the outer end of the plunger and together with compression spring 45 is operative to reciprocate the same in the cylinder. Cylinder 41 communicates with a hydraulic fluid reservoir 46 by way of a one-way valve 47 and through a similar valve 48 to a T fitting 49, one arm of which communicates through tube 50 with cylinder 3 while the other arm leads back to the reservoir 46 through shut-off valve 51. It will thus be seen that as plunger 42 is reciprocated by action of the cam 22 and spring 45 it acts as a pump, liquid flowing from the reservoir into cylinder 41 and then as cam 22 moves counterclockwise, as viewed in Fig. 9, into tube 50 and cylinder 3 forcing column 2 upward together with table 1 carried thereby. Valve 51 is of course closed at such time.

To render such pumping means responsive to depletion of the stack of sheets, a shaft 52 is provided journalled in an extension 53 of the wall of cylinder 41. Tightly mounted on said shaft 52 is a lever arm 54 which is urged toward contact with the end of finger 40 by means of a torsion spring 55 bearing on a lug 56 on said lever arm. On the end of shaft 52, however, adjacent piston 42 and shaft 17, a cam roller 57 is eccentrically mounted operative to engage the cam face of an offset extension 58 of plunger 42. A sleeve 59 and nut 60 serve to properly position lever arm 54 on the shaft and since the lower side of lug 56 slopes to provide an inclined cam surface a final delicate adjustment of the contact between lever arm 54 and finger 40, and thus the level of the stack top, may be made, the stack top being set higher for thick paper or cardboard than for thin paper, for example.

Having thus described the component parts of the assembly comprising the stack elevating device of this invention, I shall now describe the operation of the same in detail. As the sucker tips of the sheet feeding mechanism (not shown) approach the top of the stack, lever arm 21 is rocked upward causing the feeler fingers 34 and 35 to be raised and retracted and thus permitting the withdrawal of a sheet. If no sheet is removed, as lever arm 21 rocks downward fingers 34 and 35 will rest on the upper surface of the stack and as the end of said lever arm continues to descend, foot 39 and finger 40 will remain suspended at a predetermined elevation. Such elevation will have been chosen so that finger 40, while touching lever arm 54, fails to depress the latter so as to move eccentric cam roller 57 and permit plunger 42 to rise (see Fig. 10). However, if a sheet has been removed, foot 39 and finger 40 will descend below such predetermined level and finger 40 depressing lever 54 will move cam roller 57 and permit plunger 42 to rise proportionately to such movement (see Fig. 11). Then as shaft 17 rocks again cam 22 will force the plunger down and an amount of fluid proportionate to the degree of previous upward movement of said plunger will be forced into cylinder 3. The column bearing table and stack is thus forced up a distance proportionate to the drop of rod 30 below a predetermined level, or, in other words, proportionate to the thickness of the sheet removed. When all of the sheets have been removed, the table may be lowered by action of its own weight upon opening valve 51 which permits return of the hydraulic fluid to the reservoir. A center rest 61 is provided in the bottom of cylinder 3 to support the end of column 2 so that the rubber cup washer 62 may not be damaged.

It will be seen that a very sensitive device has been provided for causing an elevation of the stack proportionate to the thickness of the sheet removed. The maximum thickness of the sheet which may be handled will of course depend upon the capacity of the pump and the maximum reciprocation of rod 30, while the depth of the slots in the back 23 through which the feeler fingers protrude in fact limits the maximum distance such fingers may descend. As the feeler fingers oscillate and rest intermittently on the upper surface of the stack of sheets the hydraulic means described immediately responds to the degree of movement of the fingers to elevate the column, and thus the stack, proportionately whenever such movement exceeds a prodetermined amount.

It will be understood, of course, that the feed table of this invention may be employed in conjunction with any machine handling sheets of paper and the like automatically, such as envelope machines, and is not limited to printing presses in its application, although particularly useful therewith.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. In a feed table for printing presses and the like, the combination of a table, a column supporting said table, feeler fingers operative to rest intermittently on the upper surface of a stack of sheets carried by said table, a rod mounted so as to be supported by said fingers when the latter rest upon such stack, and hydraulic means responsive to the downward movement of said rod beyond a predetermined point to elevate said column proportionately to the degree of such downward movement.

2. In a feed table for printing presses and the like, the combination of a table, a cylinder, a column supporting said table and fitting in said cylinder, feeler fingers operative to rest intermittently on the upper surface of a stack of sheets carried by said table, a rod mounted so as to be supported by said fingers when the latter rest upon such stack, a hydraulic cylinder and plunger, means for reciprocating said plunger, means operative to lock said plunger against reciprocation, and cam means responsive to the downward movement of said rod beyond a predetermined point operative to release said locking means and permit a degree of reciprocation of said plunger proportionate to the extent of such downward movement, forcing fluid into said first-named cylinder and thus elevating said column.

3. In a feed table for printing presses and the like, the combination of a table, a column supporting said table, hydraulic means operative to elevate said column, and means responsive to the depletion of a stack of sheets carried by said table effective to actuate said hydraulic means comprising a rockably mounted shaft, a lever arm fixed thereto, a rotatable shaft, a cam thereon effective to engage said lever arm and rock said first named shaft when said last named shaft is rotated, a slidably mounted rod, fingers carried thereby operative to rest on the upper surface of such stack, a second lever arm fixed to said first named shaft effective to reciprocate said rod and thus said fingers as said shaft is rocked, means for locking said hydraulic means, and means for releasing said hydraulic means and thus elevating said table operative by said rod whenever the lower end of the latter drops below a predetermined level, as when a sheet is removed permitting said fingers to reach a lower level in their reciprocation.

4. In a feed table for printing presses and the like, the combination of a table, a cylinder, a column fitting in said cylinder, a hydraulic cylinder communicating with said first named cylinder, a plunger therein, means operative to reciprocate said plunger and thus pump fluid to said first named cylinder to elevate said column, and means making said last named means responsive to the depletion of a stack of sheets carried by said table comprising an outer extension of said plunger bearing an inclined cam face, eccentric means operative to engage such cam face and thus prevent reciprocation of said plunger, and means operative to intermittently depend from the upper surface of such stack and effect the retraction of said eccentric means when such surface is lowered, thus permitting a proportionate reciprocation of said plunger and elevation of said column and table.

5. In a feed table for printing presses and the like, the combination of a table, a cylinder, a column fitting in said cylinder and supporting said table, feeler means operative to rest intermittently on the upper surface of a stack of sheets carried by said table, and hydraulic means responsive to the downward movement of said feeler means below a predetermined level operative to pump fluid to said cylinder and elevate said column proportionately to the degree of such downward movement.

6. In a feed table for printing presses and the like, the combination of a table, a column supporting said table, feeler fingers operative to rest intermittently on the upper surface of a stack of sheets carried by said table, a rod mounted so as to be supported by said fingers when the latter rest upon such stack, hydraulic means responsive to the downward movement of said rod beyond a predetermined point to elevate said column proportionately to the degree of such downward movement, and means for varying the point beyond which movement of said rod will actuate said hydraulic means.

7. In a feed table for printing presses and the like, the combination of a table, a column supporting said table, feeler means operative to rest intermittently on the upper surface of a stack of sheets carried by said table, a rod mounted so as to be supported by said feeler means when said feeler means rest upon the surface of such stack, and hydraulic means responsive to downward movement of said rod beyond a predetermined point to elevate said column proportionately to the degree of such downward movement.

8. In a feed table for printing presses and the like, the combination of a table, a column supporting said table, feeler means operative to rest intermittently on the upper surface of a stack of sheets carried by said table, control means adapted to be supported by said feeler means when said feeler means rests upon the surface of such stack, and hydraulic means responsive to downward movement of said control means below a predetermined point operative to elevate said table a proportionate amount.

9. In a feed table for printing presses and the like, the combination of a table, a feeler finger operative to oscillate intermittently from a position laterally adjacent said table to a position of rest on the upper surface of a stack of sheets carried by said table, control means adapted to be raised when said feeler finger is in such laterally removed position and lowered when said feeler finger is in such position of rest on the upper surface of such stack, the amount such control means is lowered depending on the level of the upper surface of such stack, and hydraulic means responsive to downward movement of said control means to elevate said table whenever such downward movement exceeds a predetermined amount.

10. In a feed table for printing presses and the like having sheet feeding means, the combination of a table, feeler means operative to rest intermittently on the upper surface of a stack of sheets carried by said table during only that portion of the cycle of operation when the sheet feeding means is at a distance from such stack, control means supported by said feeler means when said feeler means rests upon the surface of such stack, and hydraulic means responsive to downward movement of said control means beyond a predetermined point to elevate said table proportionately to the degree of such downward movement.

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