

No. 766,030.

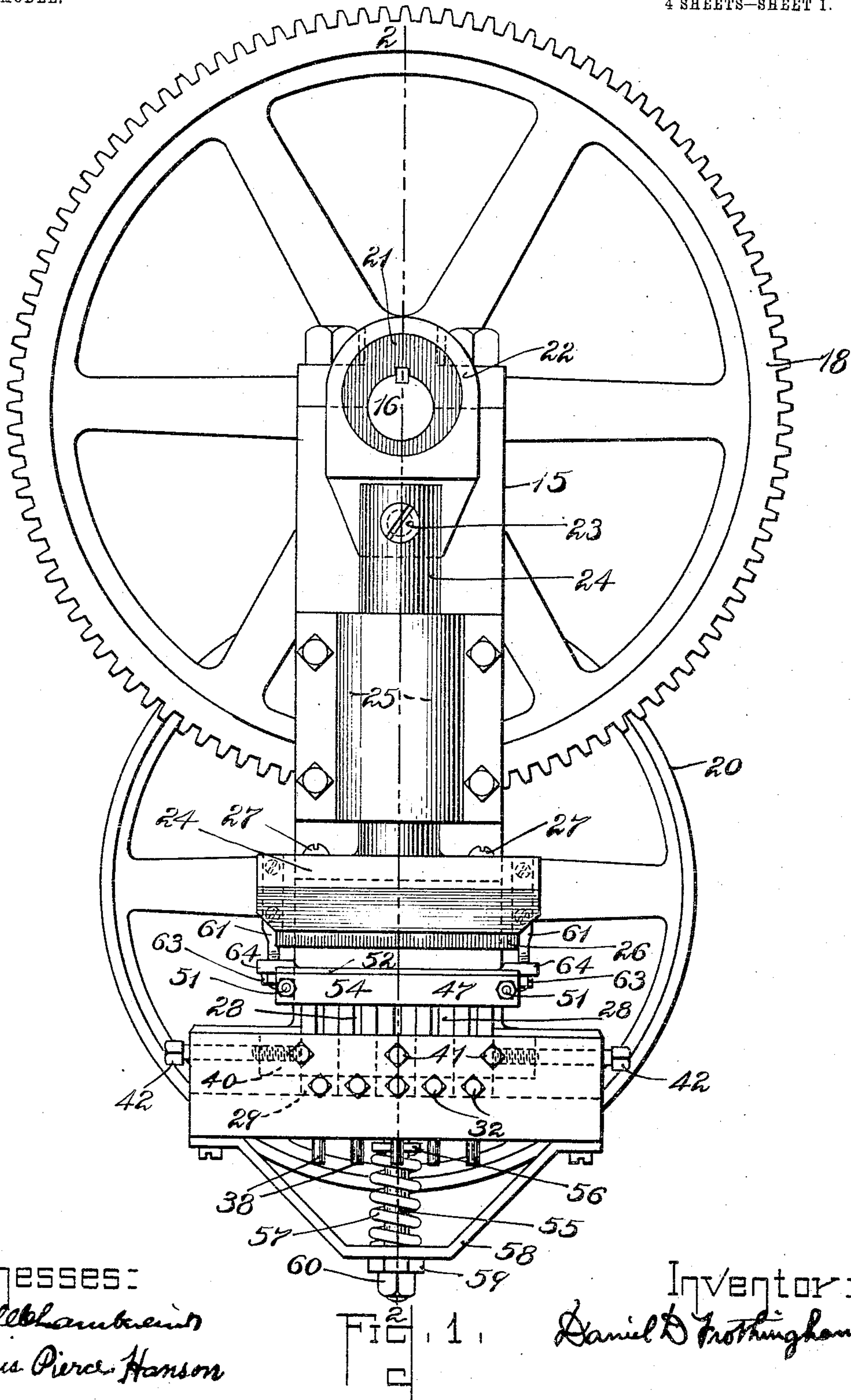
PATENTED JULY 26, 1904.

D. D. FROTHINGHAM.  
PUNCHING MACHINE.

APPLICATION FILED JULY 21, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses:

*Frederick Lamborn*  
*Rufus Pierce Hanson*

Inventor:

*Daniel D. Frothingham*

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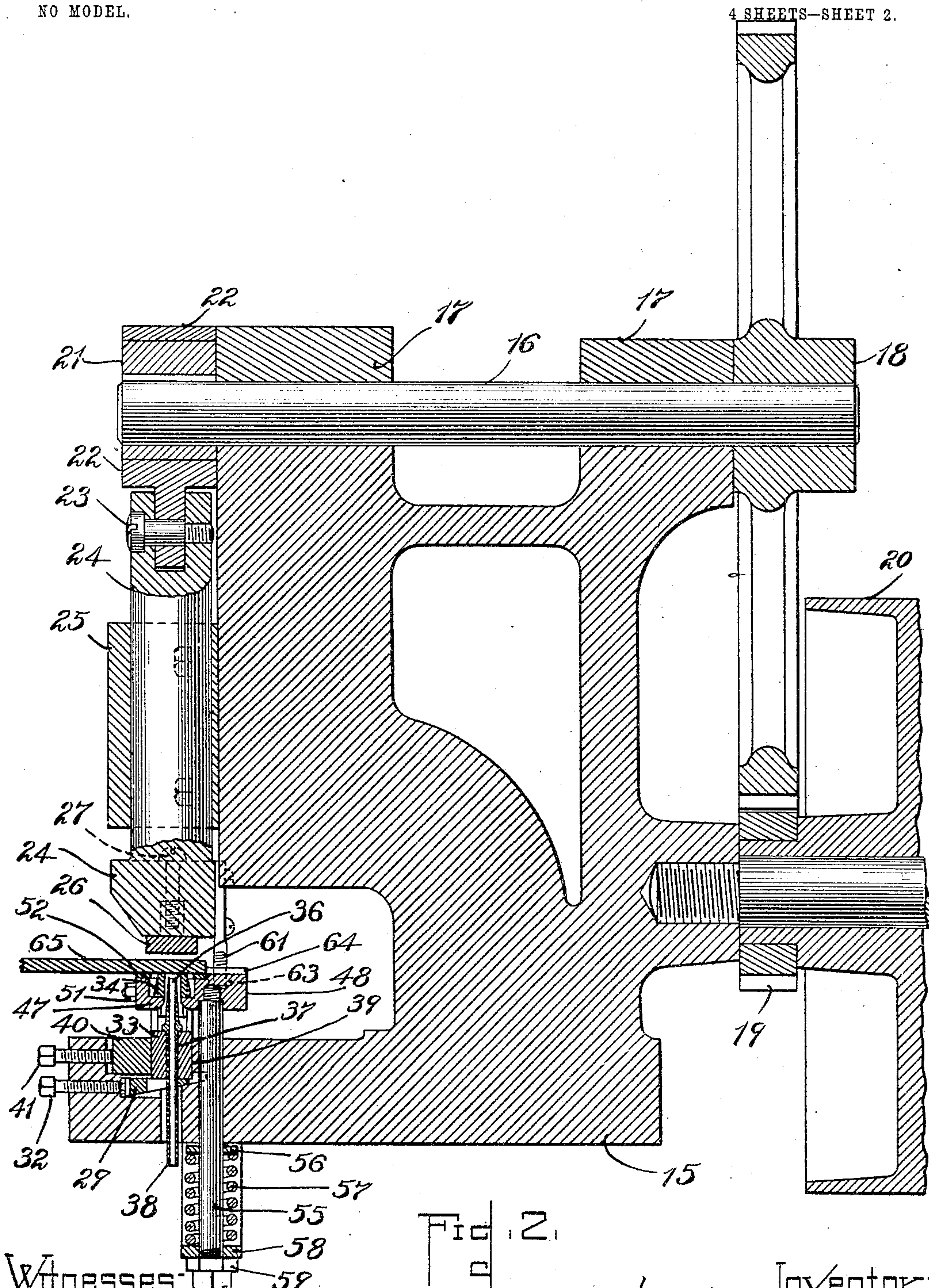


Fig. 2.

Witnesses:  
Fred Chamberlain  
Rufus Pierce Hanson

Inventor:  
Daniel D. Frothingham



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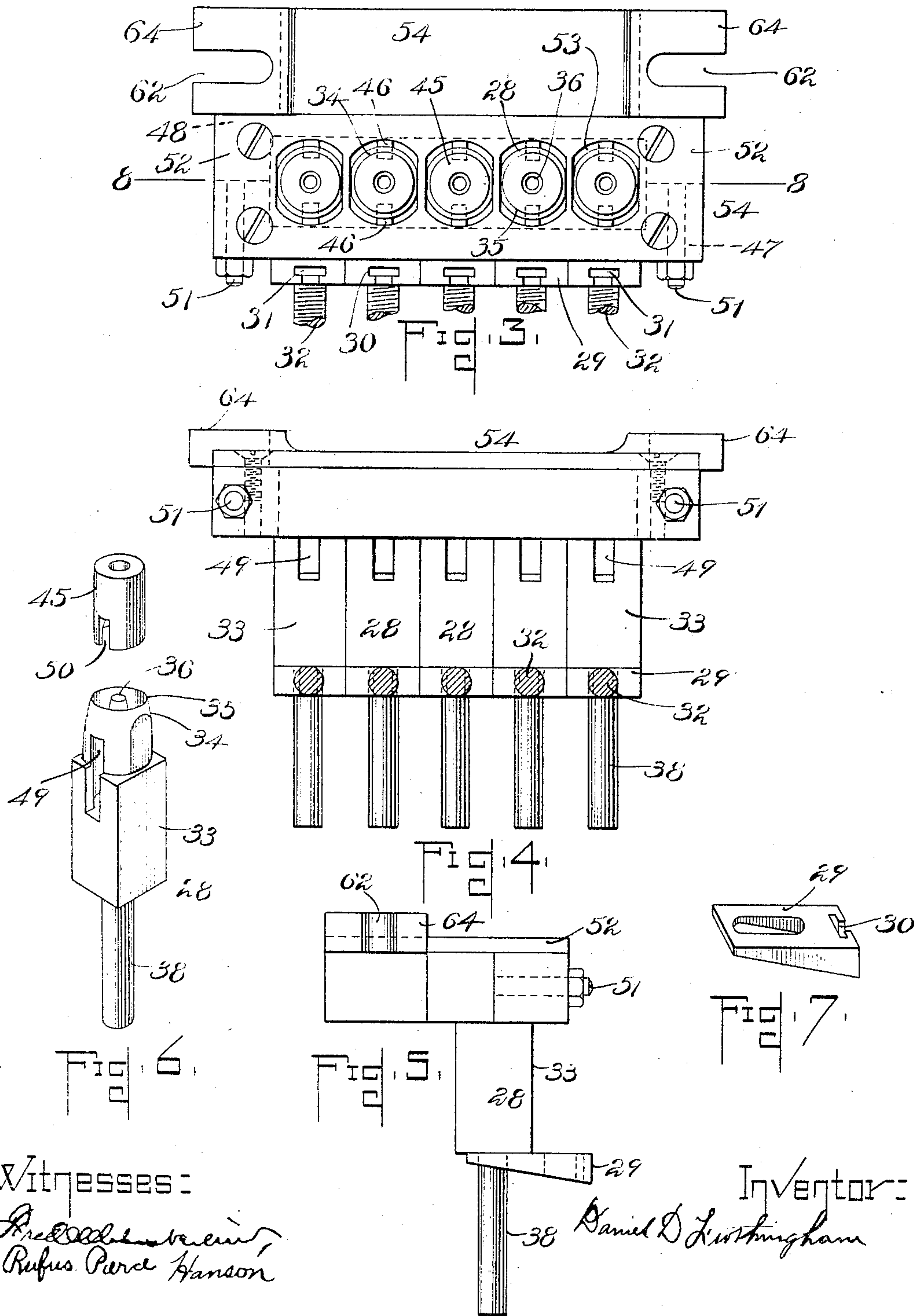
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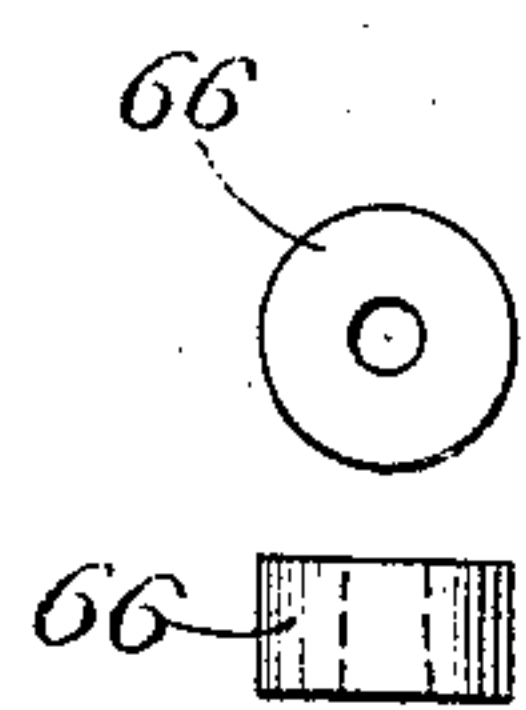
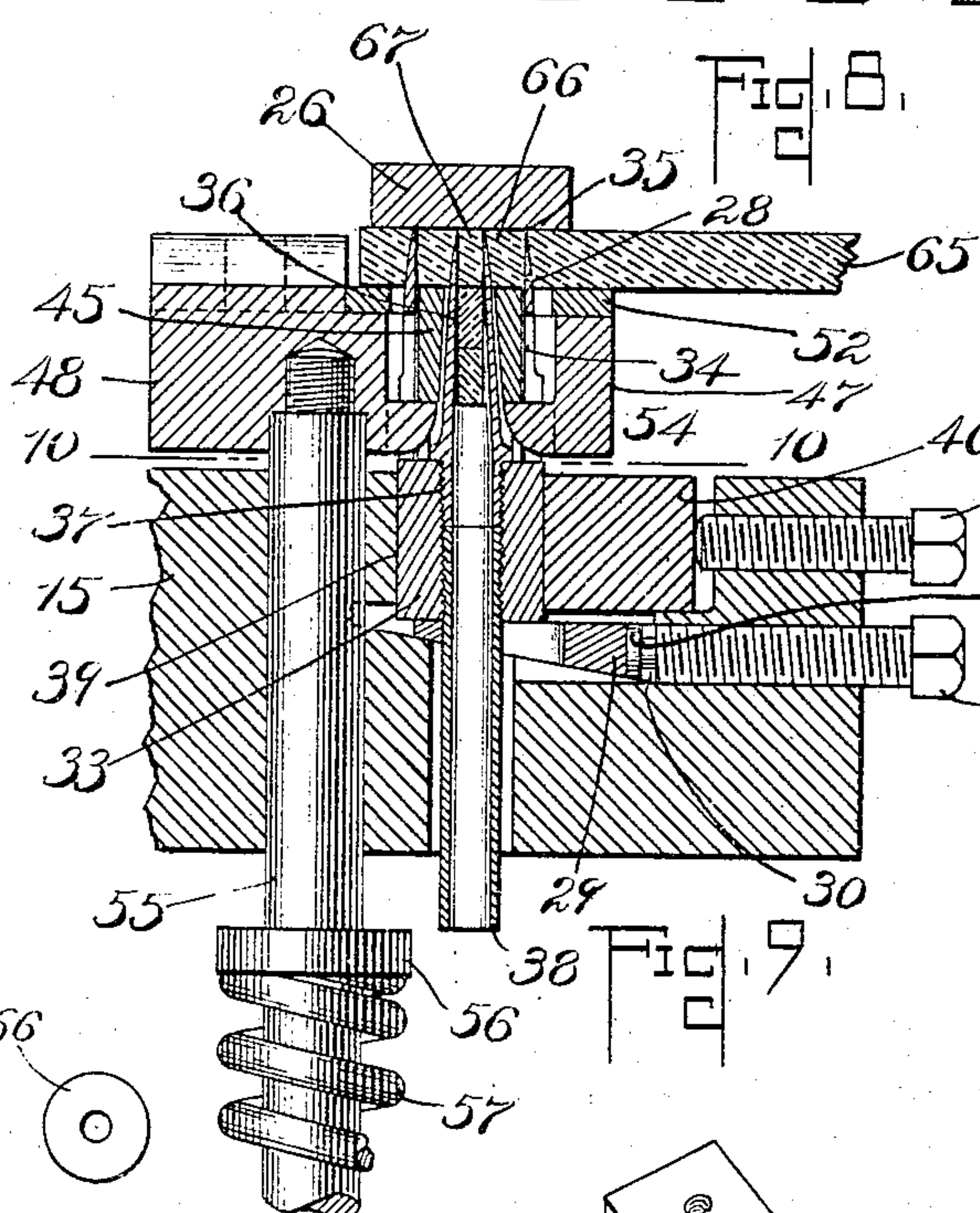
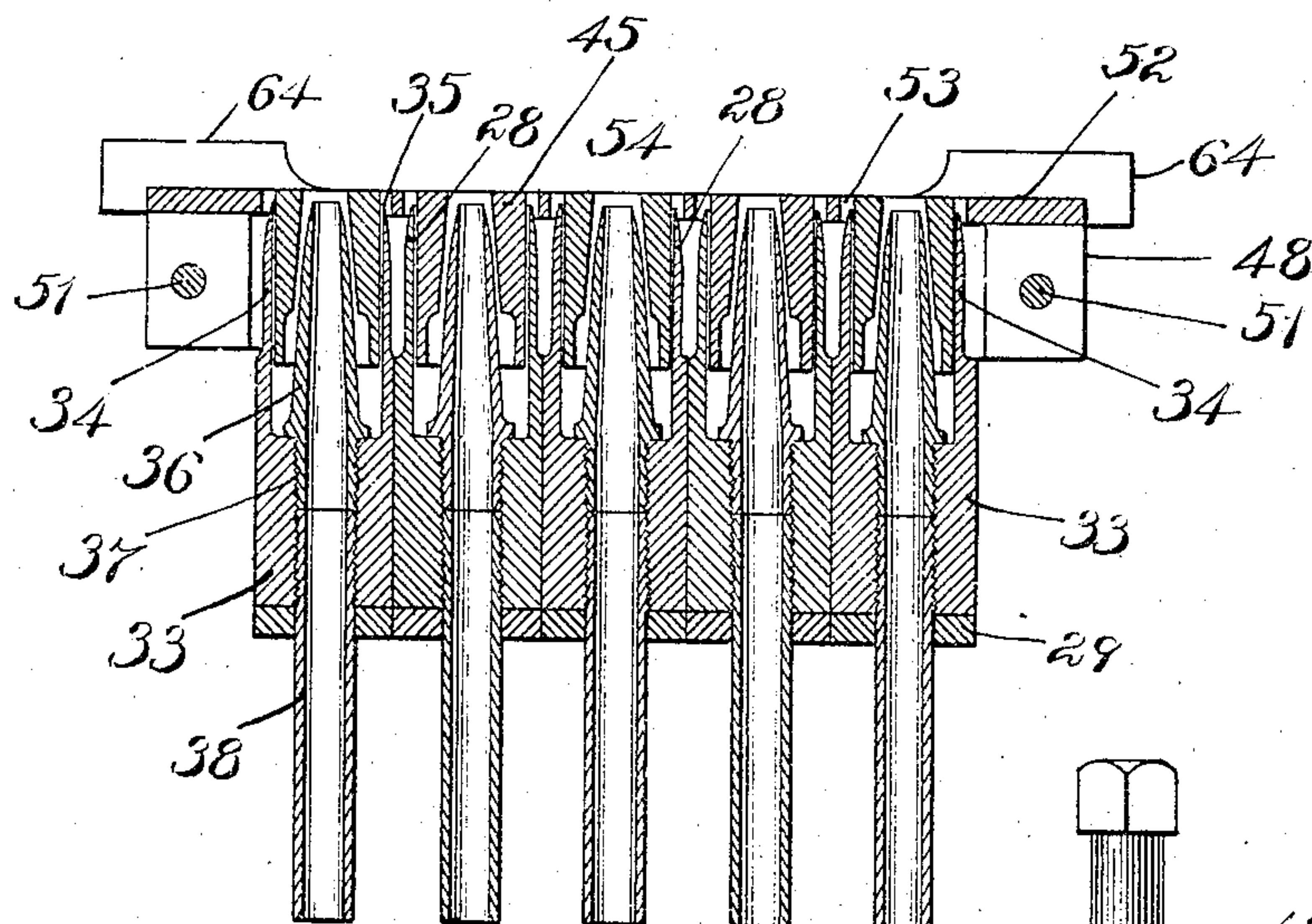


Fig. 12.

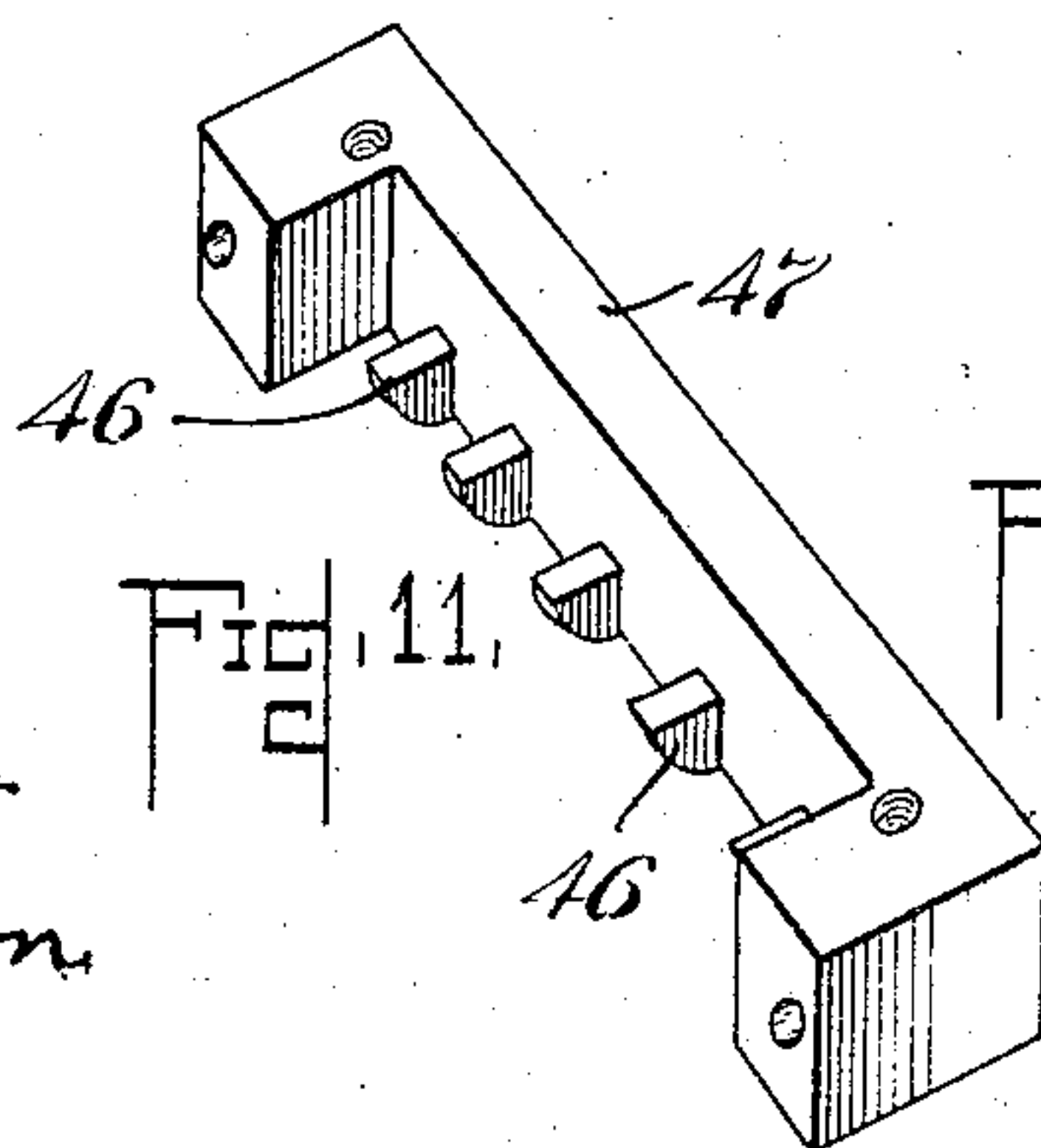


Fig. 11.

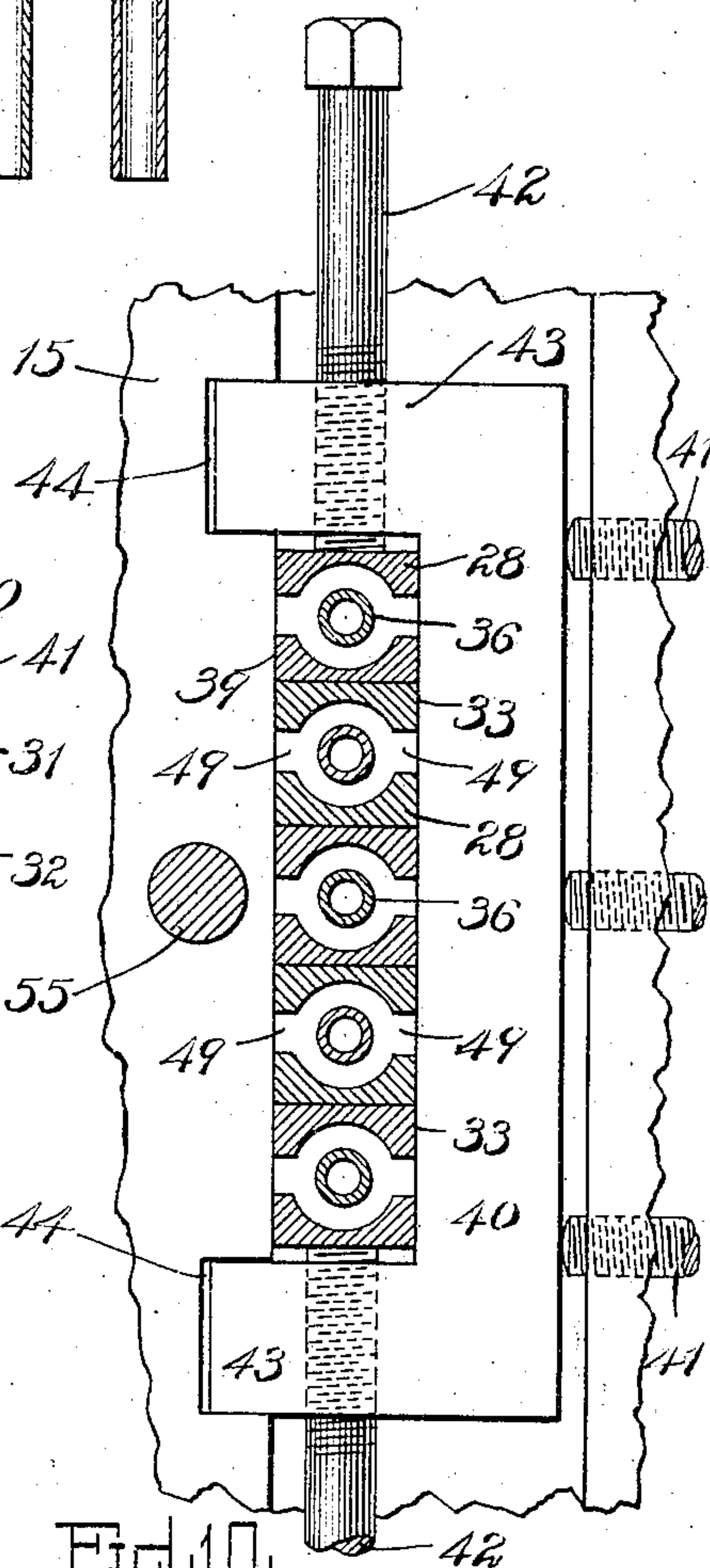


Fig. 10.

Witnesses:  
*Frederick H. ...*  
*Rufus Pierce Hanson*

Inventor:  
*Daniel D. Frothingham*



# UNITED STATES PATENT OFFICE.

DANIEL D. FROTHINGHAM, OF SALEM, MASSACHUSETTS.

## PUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 766,030, dated July 26, 1904.

Application filed July 21, 1903. Serial No. 166,429. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL D. FROTHINGHAM, a citizen of the United States, residing at Salem, Essex county, State of Massachusetts, have  
5 invented a new and useful Improvement in Punching-Machines, of which the following is a specification.

My invention relates to improvements in punching-machines, and more particularly to  
10 machines for punching sheet material.

My invention consists in improved female punching-dies and followers for clearing the stock and article punched from said dies and in the forms and combinations as hereinafter  
15 fully set forth in the specification and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a front elevation of my improved punching-machine. Fig. 2 is a vertical longitudinal section taken on  
20 line 22 of Fig. 1, the same being partly broken away to save space in the drawings. Fig. 3 is a detail plan of the follower-plate and dies, together with the adjusting-plates, for adjusting said dies longitudinally and a portion of the  
25 screws by which said adjusting-plates are moved. Fig. 4 is a front elevation of the parts illustrated in Fig. 3, the adjusting-screws being shown in section. Fig. 5 is a side elevation of the parts illustrated in Fig. 4 look-  
30 ing toward the right in said Fig. 4, the adjusting-screws being omitted. Fig. 6 is a perspective view of the die and inside follower. Fig. 7 is a perspective view of one of the female-punch-adjusting plates. Fig. 8 is a sec-  
35 tional elevation taken on line 8 8 of Fig. 3 looking from the front of the machine. Fig. 9 is a section taken on line 2 2 of Fig. 1 looking toward the right in said figure, the outside follower-plate being illustrated in its lower-  
40 most position, a section of leather and a die-plate being shown in connection therewith. Fig. 10 is a section taken on line 10 10 of Fig. 9, the frame being partly broken away to save space in the drawings. Fig. 11 is a perspec-  
45 tive view of the front comb-plate, and Fig. 12 is a plan and side elevation of a blank cut from a sheet of material by my improved punching-machine.

Like numerals refer to like parts through-  
50 out the several views of the drawings.

In the drawings, 15 is the frame of a punch-

ing-machine, 16 the main driving-shaft thereof, journaled to rotate in bearings 17 17 and having rotary motion imparted thereto by a gear 18, driven by a pinion 19, fast to a clutch-pul-  
55 ley 20. The clutch-pulley 20 may be operated by any of the various clutch mechanisms well known to those skilled in the art.

Upon the forward end of the shaft 16 is fastened an eccentric 21, encircled by an eccen-  
60 tric-strap 22, pivotally connected at its lower end by a pin 23 to a plunger 24, arranged to slide in ways 25, formed in the frame 15. The lower end of a plunger 24 has a die-plate 26 fastened thereto by screws 27 27. Said die-  
65 plate is formed of soft metal, preferable copper. Beneath the die-plate 26 is a series of female punching-dies 28 28, each of said dies supported upon a wedge-shaped adjusting-plate 29, having a horizontal upper surface and  
70 a beveled lower surface. The beveled lower surfaces of the adjusting-plates 29 rest upon a corresponding beveled surface formed in the frame 15 of the machine. Each of the adjust-  
75 ing-plates 29 is slotted at 30 to receive a cylindrical head 31, formed upon an adjusting-screw 32, having screw-threaded engagement with the frame 15 of the machine.

Each of the female punching-dies 28 28 consists of a rectangular body portion 33 and a  
80 hollow cylindrical upper portion 34, provided with a cutting edge 35 upon the top thereof. The bottom of the rectangular body portion 33 of each of the punching-dies 28 rests upon the horizontal or upper face of the adjust-  
85 ing-plate 29, and it will be seen that by turning the adjusting-screw 32 in the proper direction the adjusting-plate 29 will be moved toward the right or the left, as the case may be, Fig. 2, thus raising or lowering, respectively, the  
90 punching-die which rests thereon. In the interior of each of said punching-dies 28 and concentric therewith is located a smaller female punching-die 36, provided with a screw-threaded shank 37, which is screwed down-  
95 wardly into the rectangular body portion 33. A tube 38, also having screw-threaded engagement with the rectangular body portion 33, extends downwardly from the lower end of the punching-die 36, the upper end of said  
100 tube bearing against the lower end of said inner punching-die, so that when said tube is



screwed firmly against the lower end of said inner punching-die it forms a lock to hold said inner punching-die in fixed relation to said outer punching-die.

- 5 The rectangular body portions 33 of the punches 28 28 are clamped against a vertical plane surface 39, formed in the frame 15 by a clamp-plate 40, which is forced against said rectangular body portions by screws 41 41.
- 10 The rectangular body portions 33 33 are also forced one against the other by clamp-screws 42 42 having screw-threaded engagement with the lateral projections 43 43 upon the clamp-plate 40. Said lateral projections 43 43 extend into slots 44 44, formed in the frame 15,
- 15 and thus guard against longitudinal displacement of the clamp-plate 40. (See Figs. 9 and 10.)

In the interior of the female punching-dies 20 28 28 is located a follower 45, which consists of a hollow cylinder filling the space between the interior of said punching-die 28 and the exterior of the punching-die 36. The follower 45 is moved longitudinally of the punching-dies 28 and 36 by fingers 46 46, formed upon the front comb-plate 47 and the rear comb-plate 48. Said fingers project through slots 49 49 in the punching-dies 28 and into slots 50, formed in the follower 45. The comb-plates 47 and 48 are fastened together by bolts 51 51 and by a tie-plate 52, extending entirely over the top of said comb-plates and fastened thereto by screws, Figs. 3 and 4. The tie-plate 52 is provided with holes 53 53, and through these holes the dies 28 28 project. The comb-plates 47 48 and tie-plate 25 form as a whole an outside follower-plate 54, to which is rigidly attached a downwardly-projecting guide-rod 55, arranged to slide vertically in the frame 15. Said guide-rod has a collar 56 fast thereto and bearing against the upper end of a spiral spring 57, the lower end of said spring resting upon a supporting-bracket 58, fast to the frame 15. Upon the lower end of the rod 55 is an adjusting-nut 59 and a set-nut 60, by means of which the height to which the follower-plate 54 can be raised by the spring 57 is regulated. The follower-plate 54 is positively raised by means of the rods 61 61, fast at their upper ends to the plunger 24 and projecting at their lower ends through slots 62 62 in the follower-plate 54. The lower ends of the rods 61 61 are screw-threaded to receive nuts 63 63, and as the plunger 24 ascends the nuts 63 63 will abut against the under face of the ears 64 64 upon the follower-plate 54 and positively raise said follower-plate, together with the comb-plates 47 and 48, to the position shown in Fig. 2.

- 60 The machine hereinbefore described and illustrated in the drawings is adapted to punch from a sheet of material a series of disk-shaped washers with a hole in the center thereof, the general operation of the machine being as follows: The piece of sheet mate-

rial 65 is placed upon the top of the plate 52, as illustrated in Fig. 2. The operator then places his foot upon the treadle, operating a clutch, (not shown in the drawings,) which rotates the clutch-pulley 20, pinion 19, gear 70 18, shaft 16, and eccentric 21, lowering the plunger 24 and driving the die-plate 26 downwardly in contact with the upper face of the sheet material 65. Said sheet material is upon a continued downward movement of the die-plate 26 forced downwardly upon the punching-dies 28 and 36, the follower-plate 54 and follower 45 descending from the position shown in Fig. 2 to that shown in Fig. 9. It will thus be seen that a disk-shaped piece 80 of sheet material 66 is punched by each of the dies 28 from the sheet of material 65 and a hole punched through said disk 66, as illustrated in Fig. 9. Upon the ascent of the plunger 24 the sheet of material 65 is carried 85 upwardly by the follower-plate 54, and the portion of material 67 punched out of the disk 66 remains in the interior of the punch 36. As the follower-plate 54 ascends, being carried upwardly by the rod 61 and nut 63, 90 the projections 46 46 upon the comb-plates 47 48 carry the inside follower 45 upwardly, ejecting the disk 66 from the interior of the punching-die 28. The portion 67 punched from the center of said disk remains in the 95 interior of the punching-die 36 until the next descent of the plunger, when it is forced downwardly, and as successive disks are punched from the sheet of material these portions 67 pass downwardly through the interior of the punching-dies 36 and tubes 38 100 and fall out at the lower end of said tubes. The spiral spring 57 holds the follower-plate 54, together with the sheet of material 65, in the position shown in Fig. 2 during the 105 first portion of the downward motion of the plunger 24 until the die-plate 26 contacts with the upper surface of the sheet material 65. It will be seen that each of the punching-dies is independently adjustable, so that 110 said dies 28 may be ground and then adjusted until the cutting edges are all in the same horizontal plane.

Having thus described my invention, what I claim is— 115

1. In a punching-machine, a stationary female punching-die, a follower therein, a follower-plate outside thereof, a finger fast to said follower-plate projecting through a slot provided in said female die and adapted to engage said follower, and mechanism to move said follower-plate longitudinally of said punching-die. 120

2. In a punching-machine, a stationary female punching-die, a follower therein, a follower-plate outside thereof, a reciprocatory plunger, a die-plate fast to said plunger, and means connecting said plunger to said follower-plate. 125

3. In a punching-machine, a stationary fe- 130



male punching-die, a follower therein, a follower-plate outside thereof, a reciprocatory plunger, a die-plate fast to said plunger, and means adjustably connecting said plunger to said follower-plate.

4. In a punching-machine, a stationary female punching-die, a follower therein, a follower-plate outside thereof, a reciprocatory plunger, a die-plate fast to said plunger, means connecting said plunger to said follower-plate and means to move said follower-plate toward said die-plate with a spring-pressure.

5. In a punching-machine, two stationary female punching-dies, one located within the other, a follower located between said dies, a

follower-plate outside said dies, and mechanism to move said follower and follower-plate longitudinally of said punching-dies.

6. A punching-machine comprising in its construction a female punching-die, said die consisting of a hollow cylindrical upper portion and a rectangular body portion provided with slots extending longitudinally thereof and diametrically opposite to each other.

In witness whereof I have hereunto subscribed my name this 20th day of July, 1903.

DANIEL D. FROTHINGHAM.

In presence of—

RUFUS PIERCE HANSON,  
FRED C. CHAMBERLIN.