

No. 689,435.

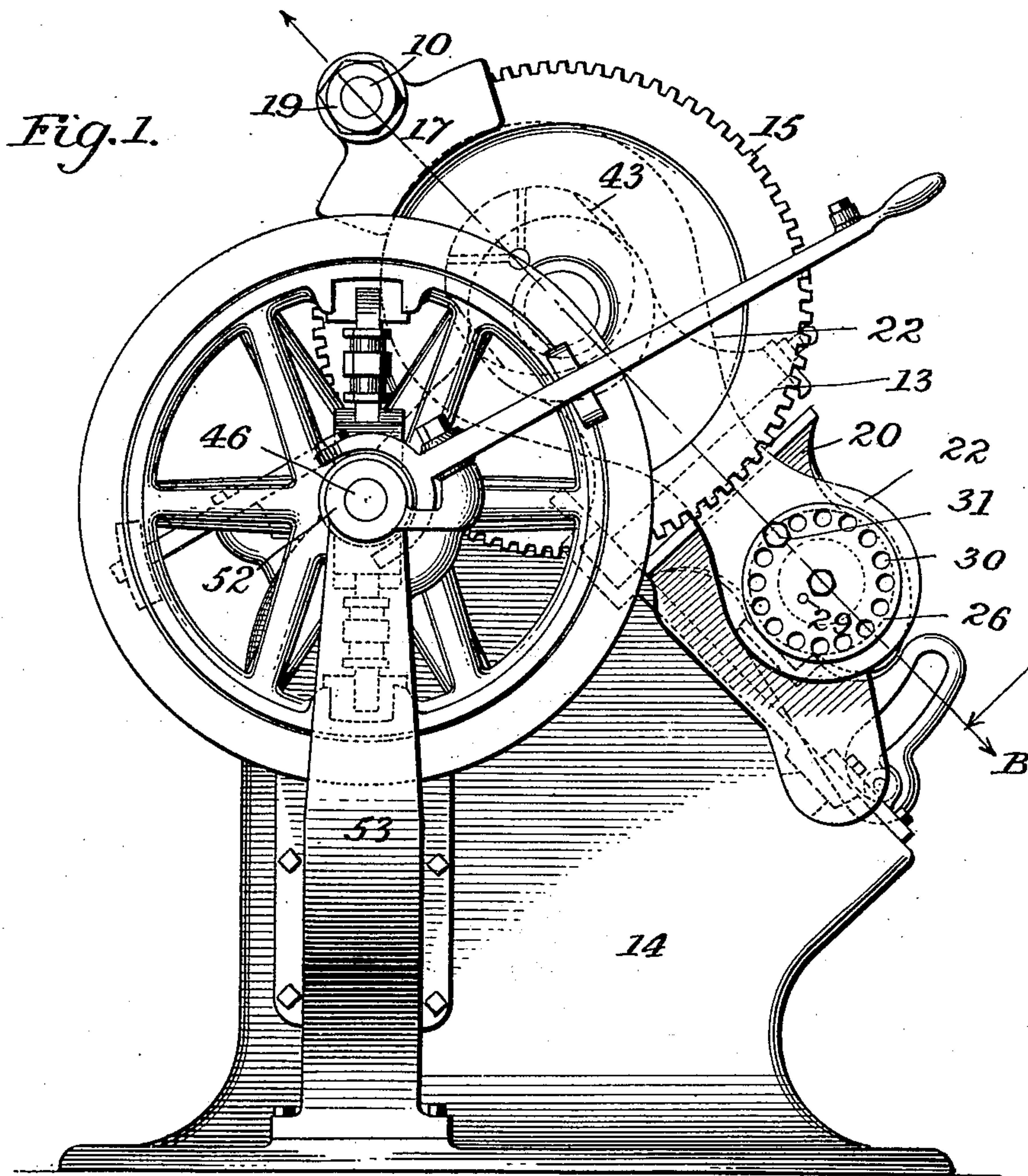
Patented Dec. 24, 1901.

J. THOMSON.
PRINTING AND EMBOSSING PRESS.

(Application filed Mar. 20, 1901.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses

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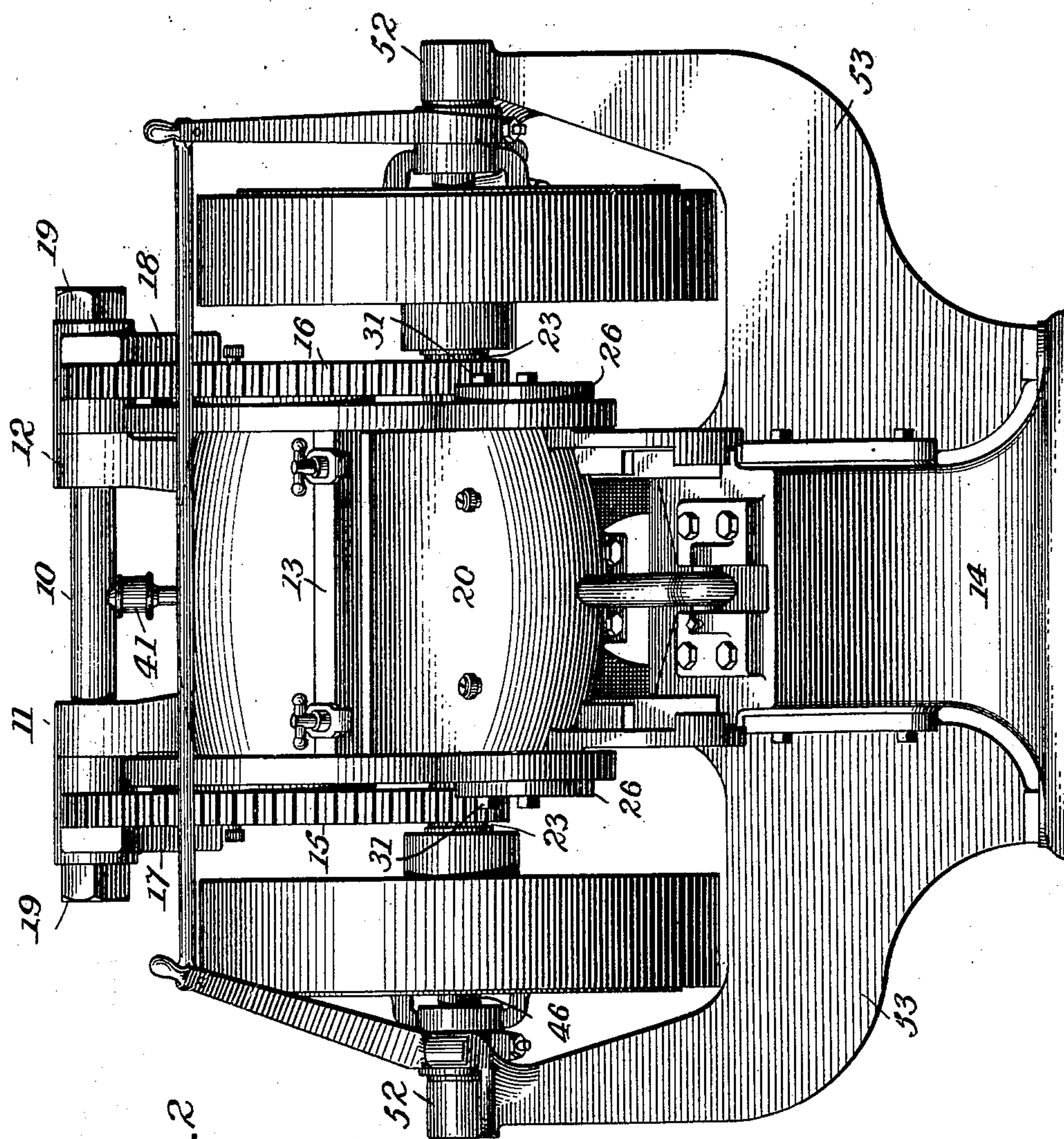



Fig. 2

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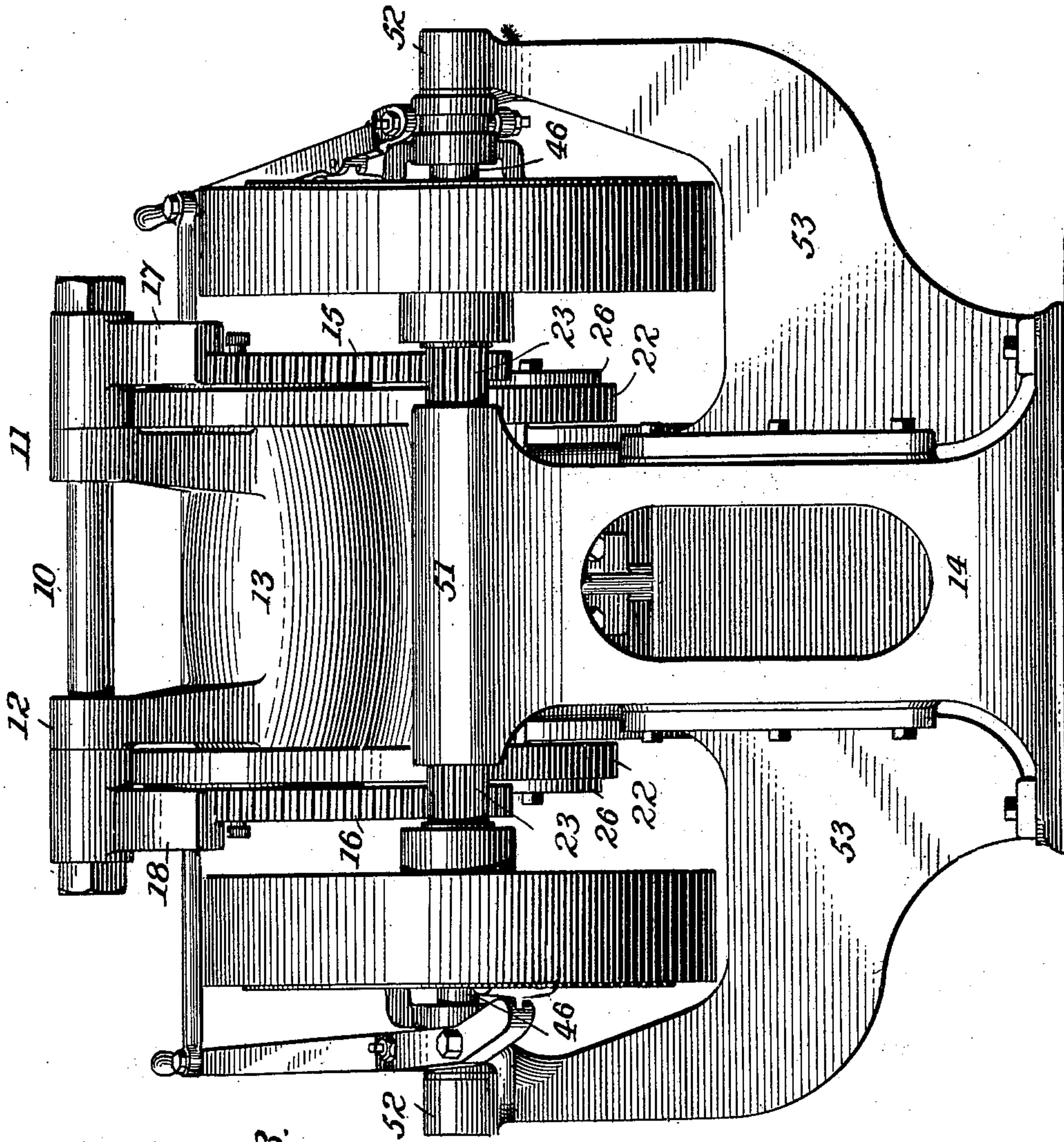


Fig. 3.

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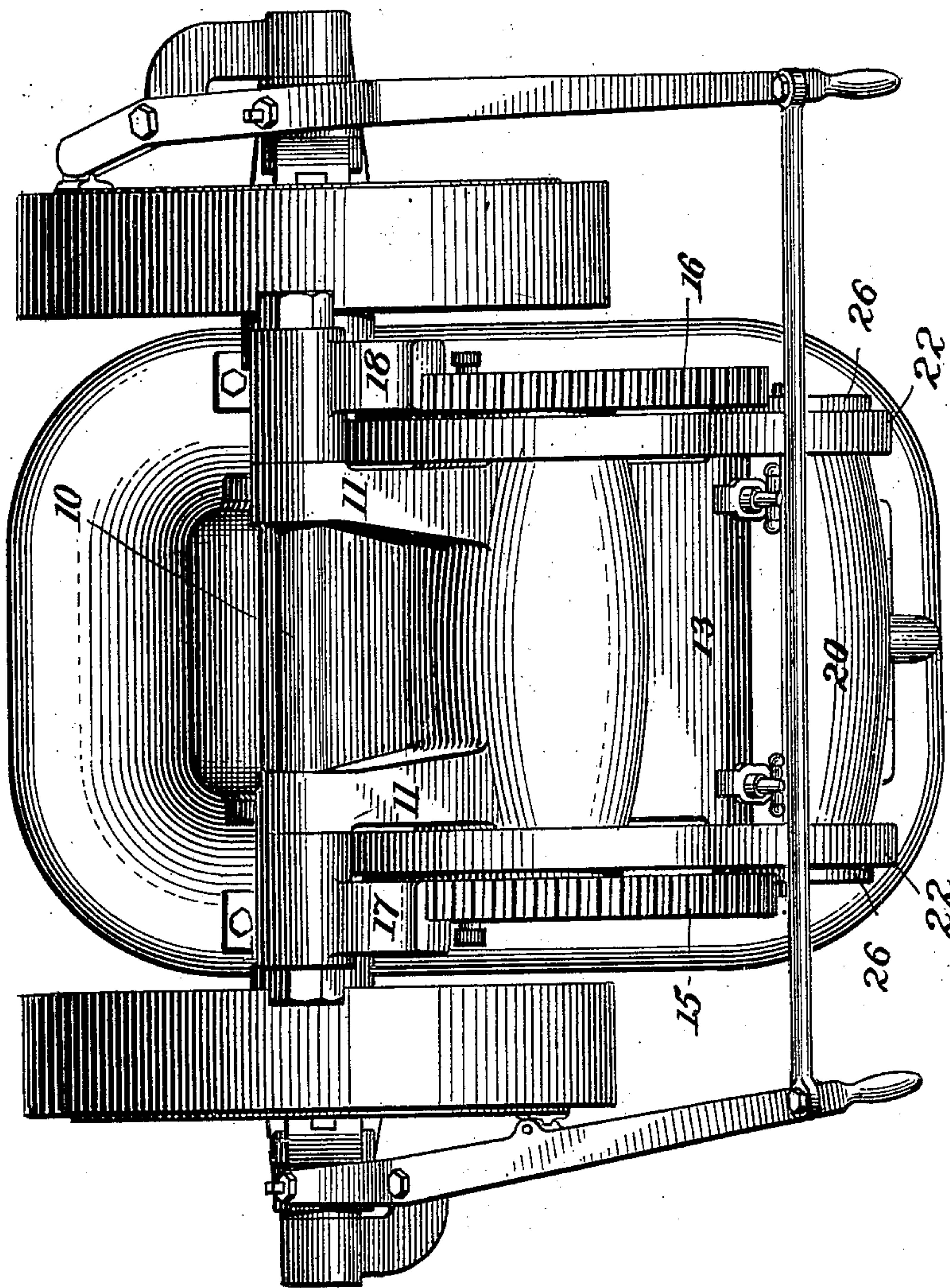
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Fig. 4.



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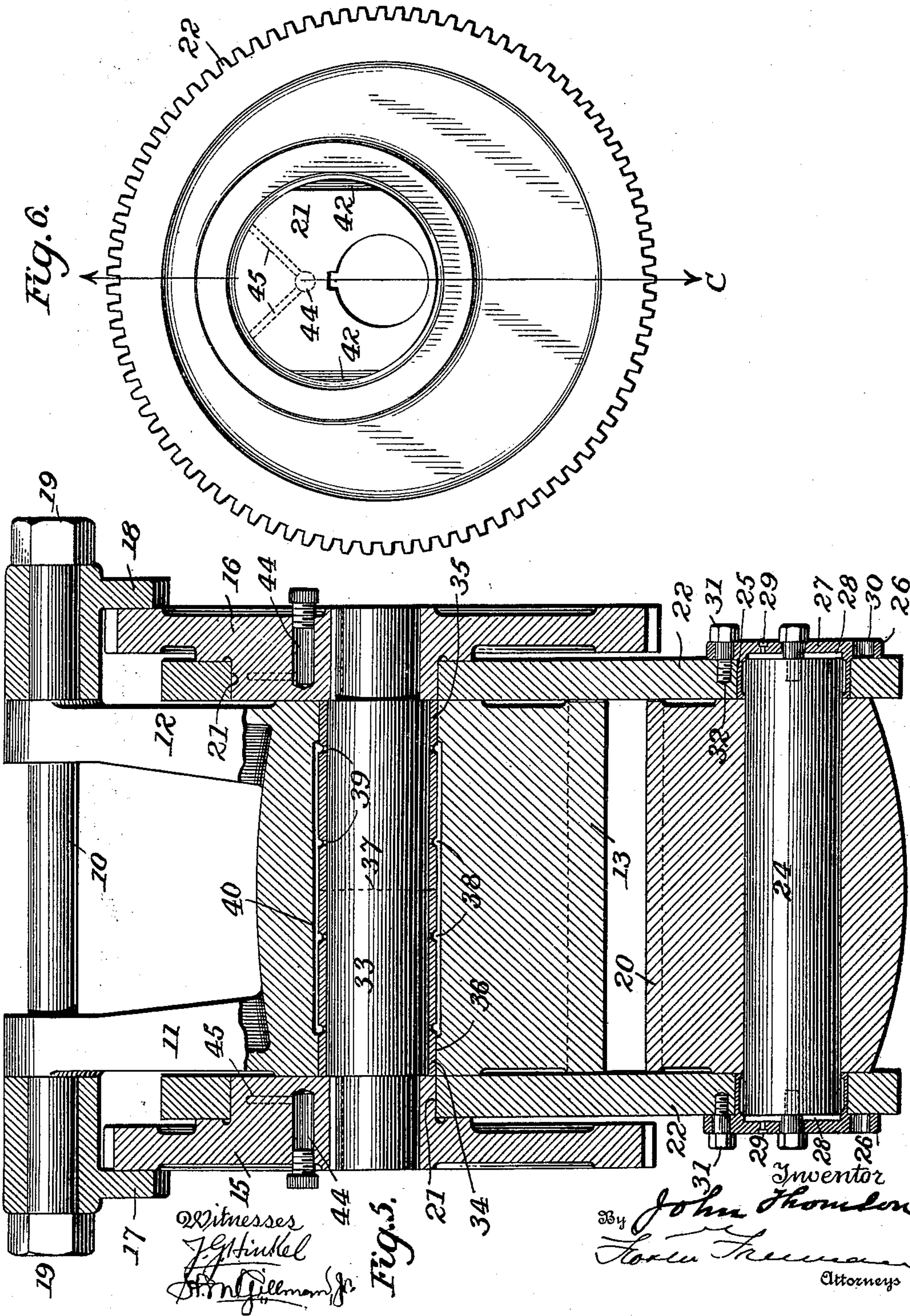
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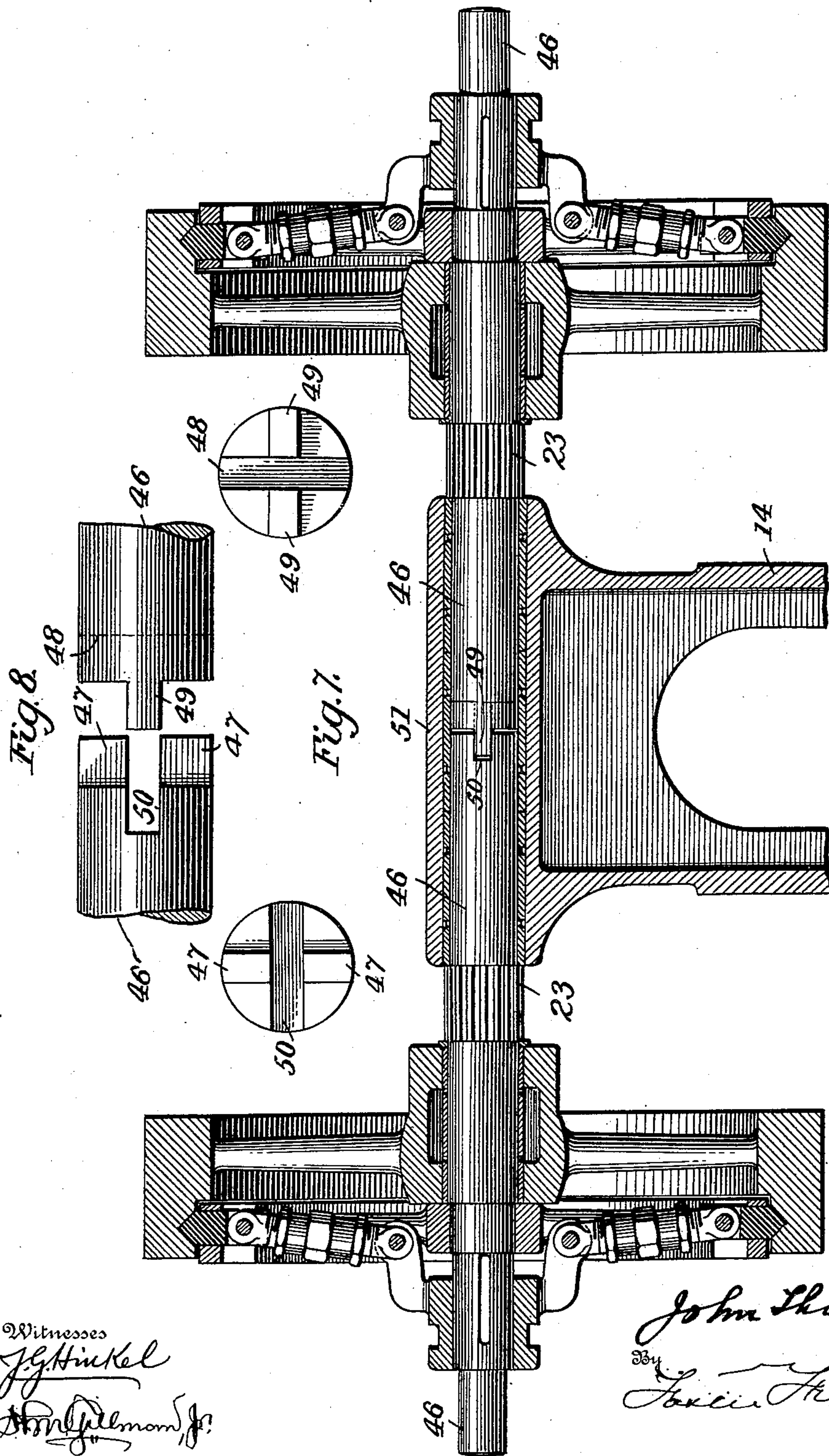
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6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO JOHN THOMSON PRESS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PRINTING AND EMBOSSING PRESS.

SPECIFICATION forming part of Letters Patent No. 689,435, dated December 24, 1901.

Application filed March 20, 1901. Serial No. 52,020. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Printing and Embossing Presses, of which the following is a specification.

My invention relates to printing and embossing presses, and has for its object to improve and simplify the construction of such presses with the view of increasing their rigidity, speed, convenience, safety, and durability; and my invention consists in the various features of construction and arrangement of parts having the mode of operation substantially as hereinafter more particularly set forth.

While the different details or features of my invention may be applied to presses of various characters, they are more especially intended for use in connection with presses adapted for embossing or for stamping paper sheets, cardboard, book-covers, advertising placards, and the like, which require heavy pressure and which in order to be profitable have to operate at a relatively high speed.

In order to explain the character of my invention, I have shown it embodied in a type of press which is well known commercially and in general trade as the "eccentric action" or "crank action" style of platen-press and one which has the general features of construction illustrated in my Patent No. 387,830, dated August 14, 1888, and in view of this I do not deem it necessary herein to describe the well-known features of construction embodied in a press of this character, but will confine my description more particularly to the improvements made therein.

Referring to the accompanying drawings, Figure 1 is a side elevation of a press of this general character. Fig. 2 is a front elevation of the same. Fig. 3 is a rear elevation. Fig. 4 is a top plan view. Fig. 5 is a horizontal center section on the line B of Fig. 1. Fig. 6 is a detached inside face view of one of the main gear-wheels and its eccentric. Fig. 7 is a detail sectional view of the pinion-shafts and bearings. Fig. 8 is an enlarged inside

detail view of the inner ends of the pinion-shafts or parts thereof.

One of the principal features of my present invention refers to the arrangement for preventing side deflection of the gear-wheels when the impression is being taken. As is well known, it is impracticable as well as theoretically impossible to devise a machine of this general character which under the exceedingly heavy pressures developed at the instant of impression shall not yield elastically in all its parts. In these machines the greatest amplitude of such flexure occurs at the peripheries of the gear-wheels on the dead-center line through the bridge and main shaft. At this point or location all of the spring of the bed and the shaft is multiplied, so that even when everything is fitted as tightly as they will operate there will be a perceptible side deflection when a heavy impression is taken. Heretofore in machines of this type—that is, presses in which the connecting-rods lie between the gears and the sides of the bed, the action being produced by eccentrics formed on the gear-wheels instead of through the medium of cranks on the outside of the gear-wheels—as, for instance, is illustrated in my prior patent, No. 387,830—I have obviated the difficulty referred to by taking the deflection of the gears first upon the connecting-rods and then through them to the sides of the bed. This arrangement, while entirely practicable and serving well the direct purpose, as proven through years of practice on hundreds of machines, is yet objectionable in one particular—namely, that as the rods during this deflection must be carried back and forth this action absorbs a considerable amount of power in friction which might otherwise be advantageously utilized. Then, too, when the bearing-surfaces become worn there is no convenient means of adjustment, and the present improvement is to obviate these objections, and it consists, generally stated, in providing a shoe or side-thrust bearing-piece which is mounted on a shaft supported in suitable brackets or otherwise and so arranged as to engage the outer face of each gear-wheel. Thus, referring to the drawings, there is a

shaft 10, mounted in brackets 11 and 12, connected to the back of the bed 13 and the frame 14, which shaft extends beyond the outer faces of the gears 15 and 16, and mounted upon the ends of this shaft are two shoes or side-thrust bearing-pieces 17 18, adapted to bear against the outside faces of the gears 15 16. The degree of intimacy of contact between the shoes or bearing-pieces and the gears is adjustably controlled in any suitable way, as by nuts 19, which also act to secure the shoes in position on the shaft. While these shoes or side-thrust bearing-pieces may be disposed in various ways, as shown in Fig. 1, they are arranged and mounted so as to be within or adjacent to the center line B, passing through the bed and platen of the press. When the platen 20 moves toward the bed 13 and makes heavy contact upon the die or form supported on the latter, (the platen being actuated in the present instance by the eccentrics 21 on the inner faces of the gears and the connecting-rods 22,) the gears 15 16 will have a tendency to deflect outwardly, and this deflection will be prevented by the shoes to the limit of their rigidity. The advantage of this is that the gear-teeth where they are in mesh with their driving-pinions 23 will maintain full-face contact, that the bearings of the eccentrics within the eyes of the connecting-rods will also be held "square to their work," and that the durability of the press as a whole and the intensity of pressure deliverable upon the form are thereby considerably enhanced.

Another feature of my invention relates to the platen-shaft and consists in forming the platen-shaft 24 of uniform diameter, both where it bears in the platen 20 and in the sleeves 25 of the connecting-rods 22. Heretofore this shaft has been forced into the opening in the platen, so as to fit very tightly; but in my present improvement this shaft is fitted as a free journal, both in the platen and in the sleeves or connecting-rods, through the medium of which the platen is moved. In previous constructions, as where the platen has been molded or cast upon the shaft or where the shaft has been made to fit tightly in the platen, being forced therein under heavy pressure, the ends of the shaft have been necked down where they were engaged by the connecting-rods. This construction involved some objections—as, for instance, where the bearings are from twenty to forty inches in length the disruptive or bursting strength applied to the iron of the bridge or platen is an unknown quantity and a disadvantage. Then, too, if the shaft is not pressed in with great tightness and the press is used on heavy work in which the dies or forms are considerably to one side or the other of the center there is set up a cramping strain which is liable to start the shaft to "creeping" endwise. While this creeping is relatively slight, when the cramping strain is released the shaft holds the strain it has taken, and

sooner or later this cramping strain produces such a condition of affairs as to render the accurate operation of the press imperfect or even require an adjustment of the shaft. Furthermore, such a construction requires that the assemblage of all the parts—that is, of the platen, the connecting-rods, and gears—should be simultaneous; but by simply inserting the platen-shaft so that it acts as a free journal both in the platen and in the sleeves or rods these disadvantages are overcome. The advantage of this free-journal construction is that by removing the sleeves the platen-shaft 24 may then be pushed entirely through and removed without pulling off the gears and connecting-rods, that the shaft, being free and of uniform diameter and also in consequence of the alternating thrust of the connecting-rods, together with their vibratory action, will slowly revolve within the platen. Thus its entire surface is presented to resist abrasion, greatly increasing the durability and the maintained accuracy of operation of the press.

Another feature of the improvement relates to the sleeves or connecting-rod bushings 25. Heretofore these have been formed like short open tubes or cylinders tightly pressed into the eyes of the rods, and by my improvement the sleeves or bushings 25 are provided with a flanged portion 26 and head portion 27, inclosing the outer end of the sleeve. The depth of the bushing inside is greater than the space required by the trunnion ends of the shaft-bearing therein. Consequently this provides a free space 28, which is utilized as an oil-reservoir for the supply in any suitable manner, as through a small oil-hole 29. By fitting the sleeves or bushings 25 so that they may revolve within the connecting-rods 22 and upon the ends of the shaft 24 and then providing the flanged portions 26 with suitable adjusting means, as the holes 30 and stud bolts or pins 31 or equivalent means, the sleeves may be turned in and locked to the rods, so that all portions of their bearing-surfaces may be adjusted and presented to resist strain and abrasion, thus greatly increasing the durability and the maintained accuracy of operation of the press.

Another feature of my invention consists in providing the main shaft 33 with a sleeve bearing or bushing 34 35, which is preferably made of hard bronze or similar material freely inserted into the main bearing 36 of the bed 13. This sleeve bearing or bushing is formed of a plurality of lengths, preferably equal lengths, being shown in the present instance as made up of two lengths 34 35, and by this construction on removing one of the gears and withdrawing the main shaft 33 the sleeves also may be readily removed and replaced and their abutting ends, as 37, may be reversed. So, too, the relative positions of the sleeves or sleeve-sections circumferentially may be shifted. In this wise unworn portions of the sleeves may be presented for duty, thus read-

ily and inexpensively largely maintaining for a long period of time the original efficiency of the main-shaft bearing.

Another element of this improvement consists in providing these sleeves with a series of circumferential grooves, as 38, on their outer surfaces and also having a number of small holes 39 piercing the bottom of the grooves. Then one or more longitudinal grooves 40 are formed in the main bearing of the bed, which are arranged to be connected with the source of oil-supply in any suitable way, as the cup 41. In this wise the main shaft is fed with oil under a pressure due to the head of the supply and with a degree of copiousness relative to the surface of the shaft not heretofore attainable.

Another feature of the invention relates to details of construction of the eccentrics 21, which, as best shown in Figs. 1 and 5, are provided with flattened portions 42, these portions being preferably disposed at a right angle to the line C, Fig. 6, through the centers of the eccentric and the main shaft. The object of this construction is to form spaces or chambers 43 to act both as oil-reservoirs and as receptacles for grit or particles of metal or other material which may work between the strain-resisting surfaces of the eccentrics and the connecting-rods 22. The removal of these portions of the eccentrics in the position shown does not reduce to any material extent the effective area of the bearing-surfaces when the impression is being delivered, and the liability of the bearings to cut or seize is thereby practically eliminated. The oil may be conducted to these eccentric bearing-surfaces, substantially as indicated in my prior patent, through the medium of a closed chamber 44 and the channels 45.

A further important feature of my invention relates to the construction and arrangement of the pinion-shaft 46. Heretofore pinion-shafts in presses of this character have been formed in one piece, the pinions being either applied separately and keyed thereto or cut out of the solid body of the shaft. In order to apply such a shaft and assemble its contiguous parts, it has been necessary to construct the bearings in the form of half-boxes, and if at any time it was necessary to remove the shaft all of the connecting parts on both sides of the machine required to be moved. I form the shaft in two parts, preferably of equal lengths and provided with interlocking ends, and, as shown more particularly in Figs. 7 and 8, each of the adjacent ends is a duplicate of the other. Thus the mutilated tongue 47 of one end enters the slot 48 and the mutilated tongue 49 enters, but at a right angle to the aforesaid slot 48, the corresponding slot 50, and this provides a coupling within the diameter of the shaft which is capable of transmitting nearly the full torsional capacity of the shaft. The advantages derived from this construction are that the shaft may be assembled within and be operated in a solid bored

bearing, as 51, in the frame. The outer bored bearing 52 of the brackets 53, Fig. 3, may also be of solid construction. Each side of the press may be separately assembled or pulled down, and as a whole the degree of rigidity and permanency of the parts is quite beyond the possibility of any type of half-box-bearing construction.

The above features of my invention thus described may be embodied in a single structure or may be used separately or independently or in connection with other features of construction, and it will be seen that when used they all conduce to the objects of my invention and aid in producing the results desired.

What I claim is—

1. The combination with the bed, platen, connecting-rods, and gears, of shoes or side-thrust bearing-pieces for preventing side deflection of said gears, substantially as described.

2. The combination with the bed, platen, connecting-rods, and gears, of a shaft mounted upon the bed, and shoes or thrust-bearings attached to the shaft and bearing against the outside faces of the gears for preventing side deflection thereof, substantially as described.

3. The combination with the bed, platen, connecting-rods, and gears, of brackets attached to the bed, a shaft mounted in the brackets, and shoes or thrust-bearings supported on said shaft and adapted to engage the gears for preventing side deflection thereof, substantially as described.

4. The combination with the bed, platen, connecting-rods, and gears, of a shaft of uniform diameter freely mounted in its bearings in said platen and in said connecting-rods, substantially as described.

5. The combination with the bed, platen, connecting-rods, and gears, of a shaft mounted in bearings in said platen and in said rods, and bearing sleeves or bushings having their outer ends inclosed to form oil-reservoirs, substantially as described.

6. The combination with the bed, platen, connecting-rods, and gears, of a shaft mounted in bearings in said platen and in said rods, and bearing sleeves or bushings arranged to form oil-reservoirs and having flanges arranged to be locked to the rods in various circumferential positions, substantially as described.

7. The combination with the bed, platen, connecting-rods, and gears, of a revoluble shaft mounted in a fixed bearing in said bed, and a plurality of sleeves or bushings interposed between the shaft and its fixed bearing and supporting said shaft, substantially as described.

8. The combination with the bed, platen, connecting-rods, and gears, of a revoluble shaft mounted in a fixed bearing in said bed, a sleeve or bushing provided with a series of circumferential oil-channels formed in the

outside surface thereof and having oil holes or channels to the shaft, and grooves or recesses extraneous to the sleeve connecting the oil-channels with a source of oil-supply, 5 said sleeve being interposed between said revoluble shaft and the fixed bearing in the bed, substantially as described.

9. The combination with the bed, platen, connecting-rods, and gears, of eccentrics for 10 operating said connecting-rods and platen, the eccentrics having portions thereof removed, substantially as described.

10. The combination with the bed, platen, connecting-rods, and gears, of a pinion-shaft 15 comprising two parts having interlocking ends mounted in the bed of the press, substantially as described.

11. The combination with the bed, platen,

connecting-rods, and gears, of a pinion-shaft mounted in said bed comprising two parts 20 having interlocking ends composed of a tongue and slot, each end being a duplicate of the other, substantially as described.

12. The combination with the bed, platen, connecting-rods, and gears, of a pinion-shaft 25 mounted in said bed and consisting of two parts provided with interlocking inner adjacent ends adapted to interlock within the bearing in said bed, substantially as described.

In testimony whereof I have signed my 30 name to this specification in the presence of two subscribing witnesses.

JOHN THOMSON.

Witnesses:

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