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PATENTED MAY 12, 1908.

H. T. MEYER & G. F. C. LAMAR.
PRESS.

APPLICATION FILED APR. 22, 1907.

2 SHEETS—SHEET 1.

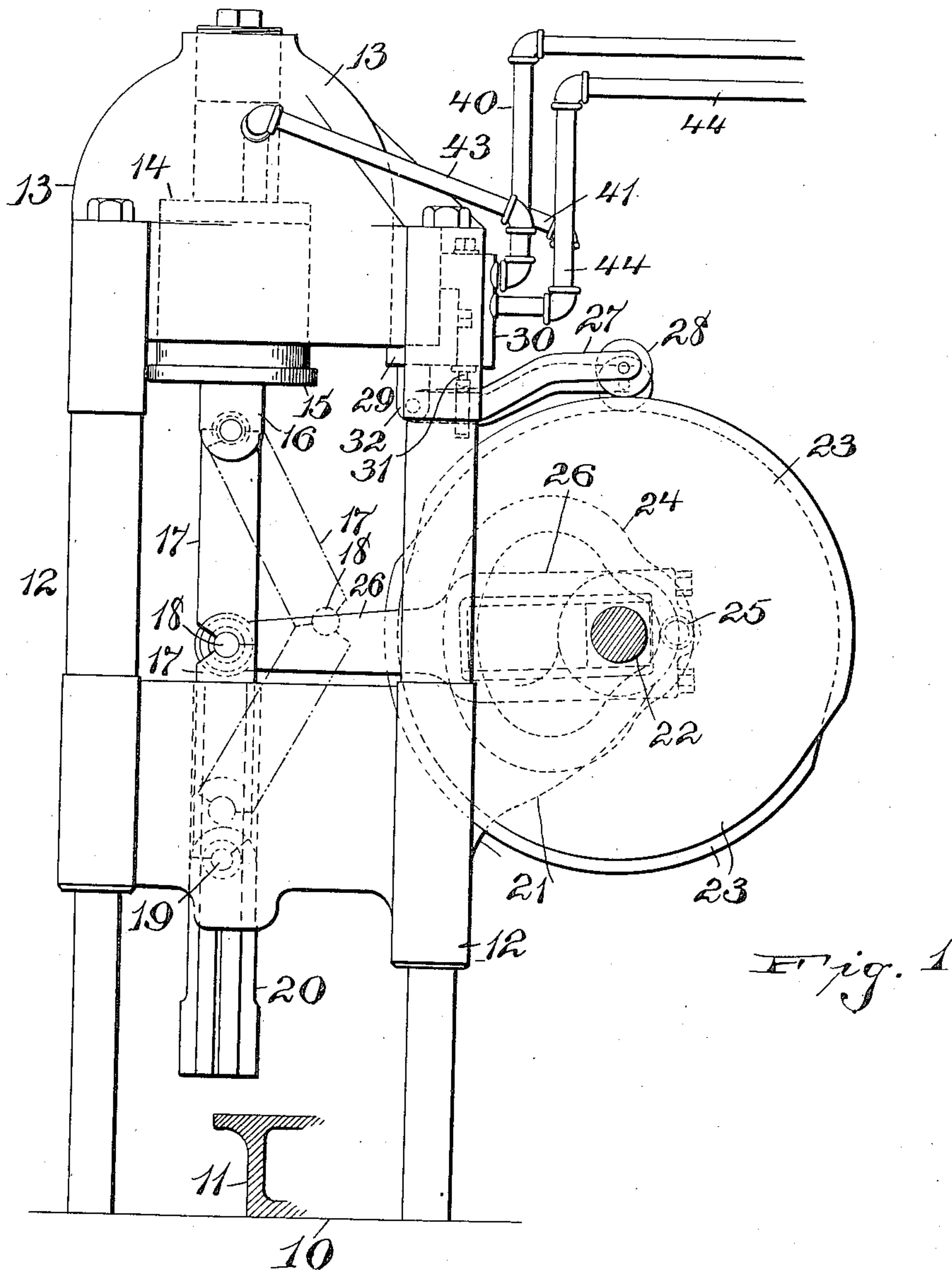


Fig. 1

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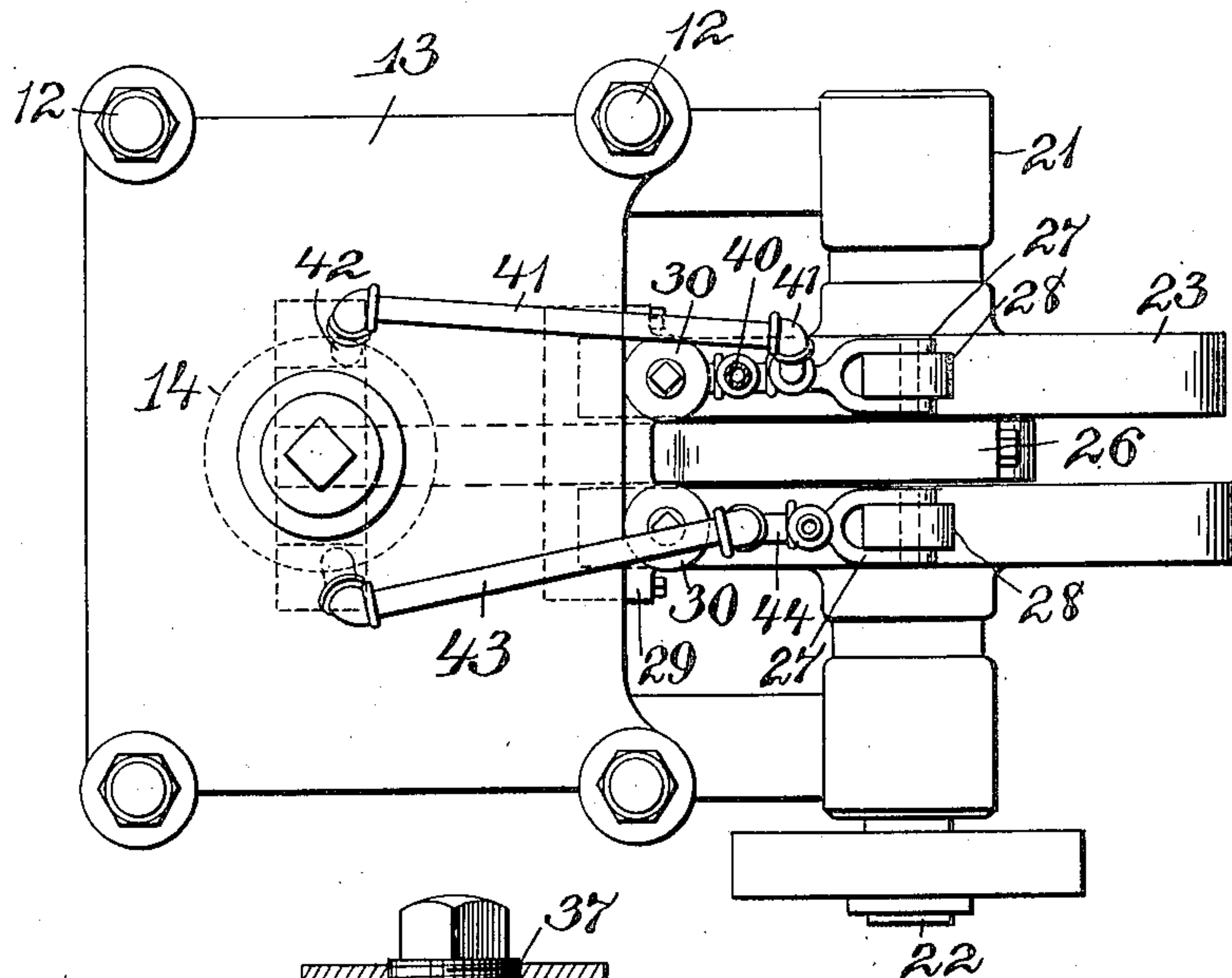


Fig. 2

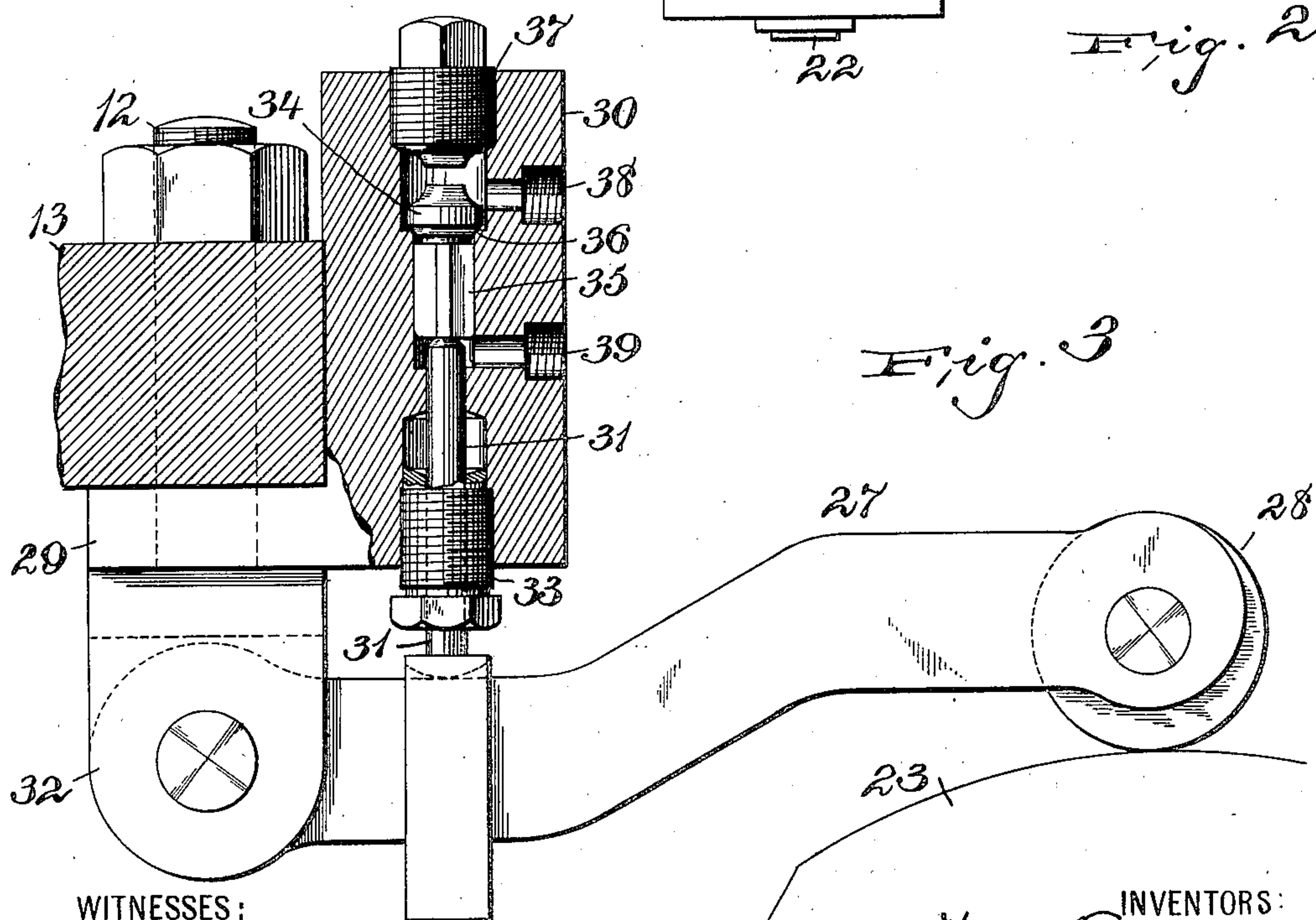


Fig. 3

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UNITED STATES PATENT OFFICE.

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PRESS.

No. 887,109.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed April 22, 1907. Serial No. 369,559.

To all whom it may concern:

Be it known that we, HENRY T. MEYER and GEORGE F. C. LAMAR, citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Presses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of machines that employs a knuckle-joint for imparting pressure by alining a set of arms that are hinged together, and hinged on one end to a support, and actuating on the other end a suitable pressure plate that acts against an anvil to shape material, and is particularly designed for machines of this kind that are used to compress plastic material between dies to form hardened compact devices. In machines of this kind, when this is done simply with a knuckle-joint, it has been found that if too much material is placed between the dies there is an excess that cannot be compressed sufficiently, and the result has been that there being no way of regulating the pressure, the knuckle-joint has been straightened out, and fractures in the machines have been caused by this undue strain, if the amount of material to be placed between the dies is not accurately estimated.

This device is designed to provide a knuckle-joint that when it is alined imparts enough pressure to the material between the dies, or the material being compressed, to partly form it, and when the knuckle-joints are alined they are given a longitudinal movement by means of a suitable press arranged in the head of the machine, this press being actuated by a compressed fluid, and preferably consisting of a hydraulic press.

A further object of the invention is to automatically admit pressure to this hydraulic or other fluid press, at the instant or immediately after the alinement of the members making up the knuckle-joint, and to relieve the pressure from the press immediately before the knuckle-joint is broken, so that there is no strain on the machine beyond the pressure determined to be injected into the hy-

draulic or other press which moves the knuckle-joint longitudinally.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a side view of a machine showing the means for automatically regulating the operation of the press, the machine for the purpose of clearness having removed therefrom the means for operating it, any usual means being employed. Fig. 2 is a top view of the machine, and Fig. 3 is a view of one of the valves for injecting and exhausting the fluid to and from the press.

Any suitable machine is used in this construction, and we show a machine having a bed-plate 10 and a suitable anvil 11. Supports 12 are placed to support a head 13. In the head 13 is a press 14 which has a plunger 15 projecting therefrom. The press 14 can be a compressed air press or a hydraulic press, or other similar form of pressure imparting mechanism. Underneath the piston and the plunger is a pivotal support 16 which supports the upper end of a pair of arms 17 which are pivoted at 18 to form a knuckle-joint, the lower end of the lower arm 17 being pivotally secured at 19 to a sliding or reciprocating member 20 which can have suitable mechanisms or dies to cooperate with the anvil 11 or the bed-plate 10 to do the work required of the machine, whether it be forming plastic material, cutting, stamping, or any of the functions to which a machine of this kind is adapted. On the supports 12 are a pair of bearings 21 which have journaled therein a shaft 22, and a pair of cams 23 and 23^a are placed on the shaft 22, and they have, on their opposed faces, a cam slot 24 shown in dotted outline in Fig. 1, the cam slots operating rollers 25 that are placed on the arm 26 which straddles the shaft 22, and this arm 26 projects out and is pivoted between the arms 17, forming the knuckle-joint at 18, and thus the knuckle-joint is operated to alternately make and break it so as to give a reciprocating movement to the member 20. This movement, in itself, is the one usually employed in machines of this kind, and if too much material is placed underneath the member 20, if it is not compressible material or compressible only to a slight degree, any excess of material getting into the machine causes an undue strain and results in a breakage of the parts. To obviate this difficulty,

the press 14 is installed, and the construction for utilizing the press consists of a pair of levers 27 and 27^a having the rollers 28 and 28^a bearing on the cams 23 and 23^a respectively, the peripheries of these cams acting to alternately lower and raise the rollers, one roller being raised as the other is down, and one going up as the other comes down, so that they are normally in reversed positions.

Fastened to the head 13 is a plate 29 which has valve casings 30 and 30^a secured thereto, each valve having a stem 31 that is operated by either the lever 27 or 27^a caused by the rollers 28 and 28^a, and cams 23 and 23^a, these levers 27 and 27^a being mounted in suitable standards 32. Each of the valves is made as in Fig. 3, the stem 31 passing through a suitable stuffing box 33, and each valve having a valve disk 34 with the guide wings 35, and being seated as at 36. A plug 37 makes a closure for the top of the valve casing, and when the valve disk 34 is raised by the valve stem 31 being pushed up, it opens communication between a port 38, above the valve disk, and a port 39 below the same, the valve disk 34, when lowered, normally cutting off communication between these two ports. Compressed fluid, preferably hydraulic pressure, is led in through a pipe 40 which is connected up in the inlet 38 of the inlet valve casing 30, and when the inlet valve 34 is raised, communication is established between the inlet 38 of the valve casing 30 and the outlet 39, of the same valve casing, into a pipe 41 which passes up and connects at 42 with the hydraulic or other press. The exhaust from the press passes out through the pipe 43 and enters the inlet 38 of the outlet valve casing 30^a, and the outlet 39 of the valve casing 30^a is connected with the exhaust outlet pipe 44 which affords relief to the press.

The cams 23 and 23^a are so placed that when the cam slot 24 has just alined the arms 17 of the knuckle-joint, which has imparted part of the necessary pressure to the article being worked, the cam 23 and the inlet valve act to raise its roller 28, and the lever 27 will push up the stem 31, in the inlet valve, and allows pressure from the pipe 40 to pass into the inlet of the valve and out through the outlet of the valve, through the pipe 41 into the hydraulic press. This forces the alined arms 17 down with a predetermined pressure, the outlet valve of the press being kept closed by the pressure from the press imparted on top of its valve disk 34, this being permitted because at this point in the rotation the cam 23 of the outlet valve permits the lowering of its roller 28.

When the cams have rotated, and just before the arms 17 are broken so as to be placed out of alinement and withdraw the member 20, the cams 23 and 23^a arrive at a point to permit the roller 28 of the inlet valve casing

30 to drop, closing the inlet valve, shutting off the pressure from the pipe 40, and confining the pressure to the press. Simultaneously or immediately after this movement, the cam 23^a of the outlet valve casing 30^a raises its roller 28^a with the lever 27^a, forces up its valve stem 31 and opens the valve disk 34 of the outlet valve 30^a, and the pressure is immediately taken off of the press 14 and passes out through the pipe 43 and through the outlet valve 30, and escapes through the pipe 44.

In a hydraulic press it will be seen that the loss or the use of very little water is necessary, as but a small quantity will escape at each release of the press. The pressure in the machine is regulated by the pressure imparted to the press, and no excess binding when the members 17 are alined, is caused.

Having thus described our invention, what we claim is:—

1. A press comprising a knuckle-joint, means for alternately making and breaking the knuckle-joint, a fluid pressure press to force the knuckle-joint longitudinally, and means for automatically admitting fluid under pressure to the press when the knuckle-joint is alined, and for relieving the pressure before the knuckle-joint is broken.

2. A press comprising a knuckle-joint, a fluid pressure press attached to one end of the knuckle-joint, means for making and breaking the knuckle-joint, valves for admitting and exhausting fluid to the press, means for opening the inlet valve when the knuckle-joint is alined, and means for opening the outlet valve when the knuckle-joint is about to be broken.

3. A press comprising a support, a head thereon, a fluid pressure press in the head, a mechanical pressing device of limited movement suspended from the head, and means for automatically forcing the pressing device when it has gone to its limit of movement, and relieving the forcing before the pressing device is relaxed.

4. A press comprising a support, a head thereon, a fluid pressure press in the head, a knuckle-joint suspended from the head, a pipe system to convey fluid to and from the press, a pair of cams for forcing the knuckle-joint into and out of alinement, an arm connecting the cams and the knuckle-joint, and valves in the pipe system, the knuckle-joint operating cams having cam surfaces for actuating the valves to force the knuckle-joint longitudinally by means of the press, when the knuckle-joint is alined, and for relieving the forcing before the knuckle-joint is broken.

5. A press comprising a support, a head thereon, a fluid pressure press in the head, a plunger in the press, a knuckle-joint suspended from the plunger, a pair of cams with grooves in their opposed faces, a roller in the grooves, an arm carrying the rollers and piv-

5 oted to the knuckle-joint to make and break it, pipes for conveying fluid to and from the press, valves in the pipes, a cam for operating the inlet valve of the press when the knuckle-joint is alined, and a cam for operating the exhaust valve when the knuckle-joint is about to be broken.

10 6. A press comprising a support, a fluid pressure press suspended therein, a plunger in the pressure press, a knuckle-joint suspended from the plunger, a pair of cams for making and breaking the knuckle-joint, a pair of valves mounted on the head, one an inlet and the other an outlet valve for the fluid pressure press, cam surfaces on the

peripheries of the cams, rollers riding on the peripheries, levers supporting the rollers and pivoted to the support, a stem in each valve for operating it and each stem resting on a lever, and pipes connecting the valves to the fluid pressure press. 20

In testimony, that we claim the foregoing, we have hereunto set our hands this 20th day of April 1907.

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Witnesses:

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