No. 865,429. PATENTED SEPT. 10, 1907.

J. M. RETTIG.

OIL HOISTING APPARATUS FOR WELLS.

APPLICATION FILED NOV. 19, 1906.

2 SHEETS—SHEET 1.

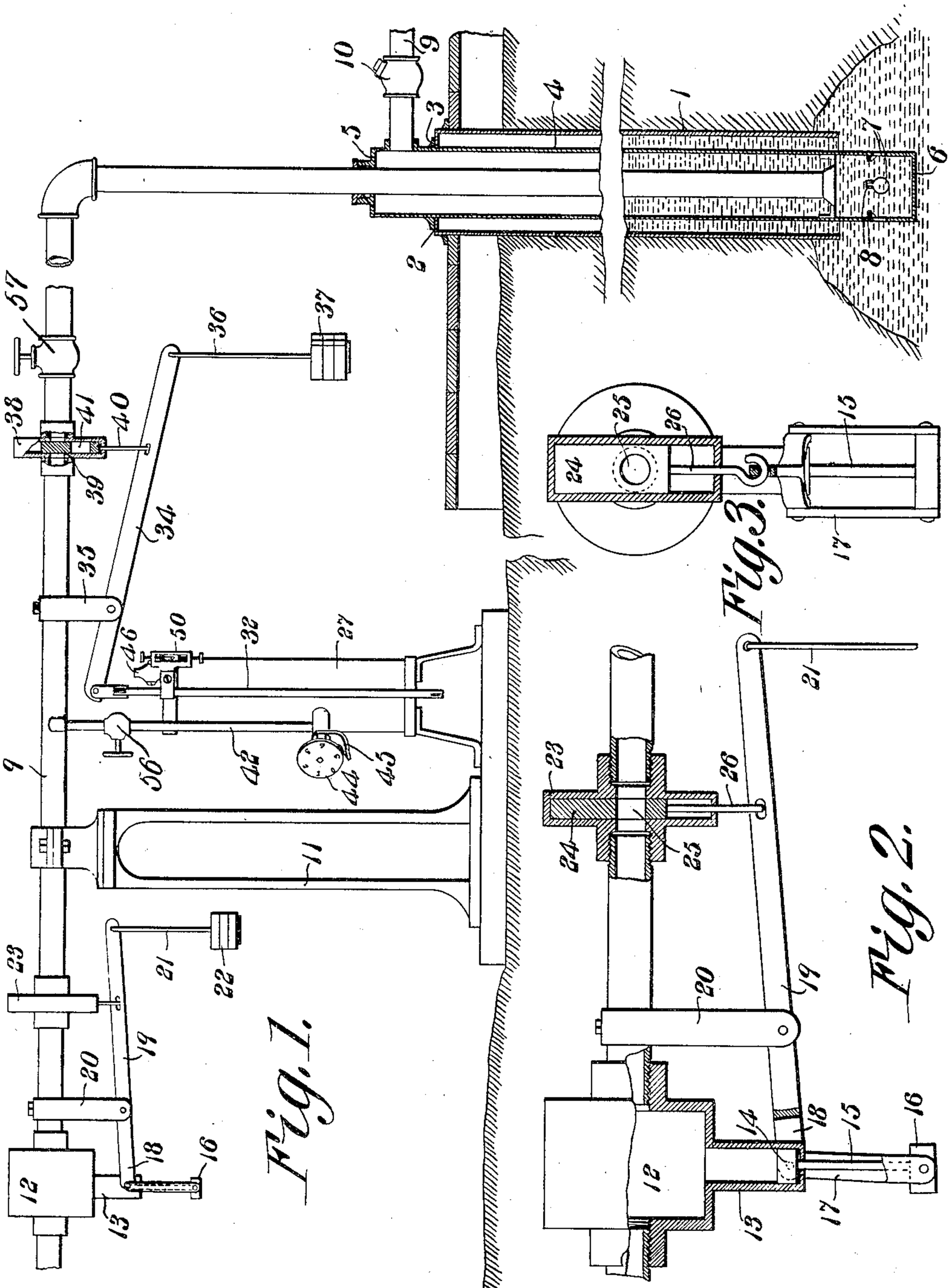

Fig. 1.

Fig. 3.

Fig. 2.

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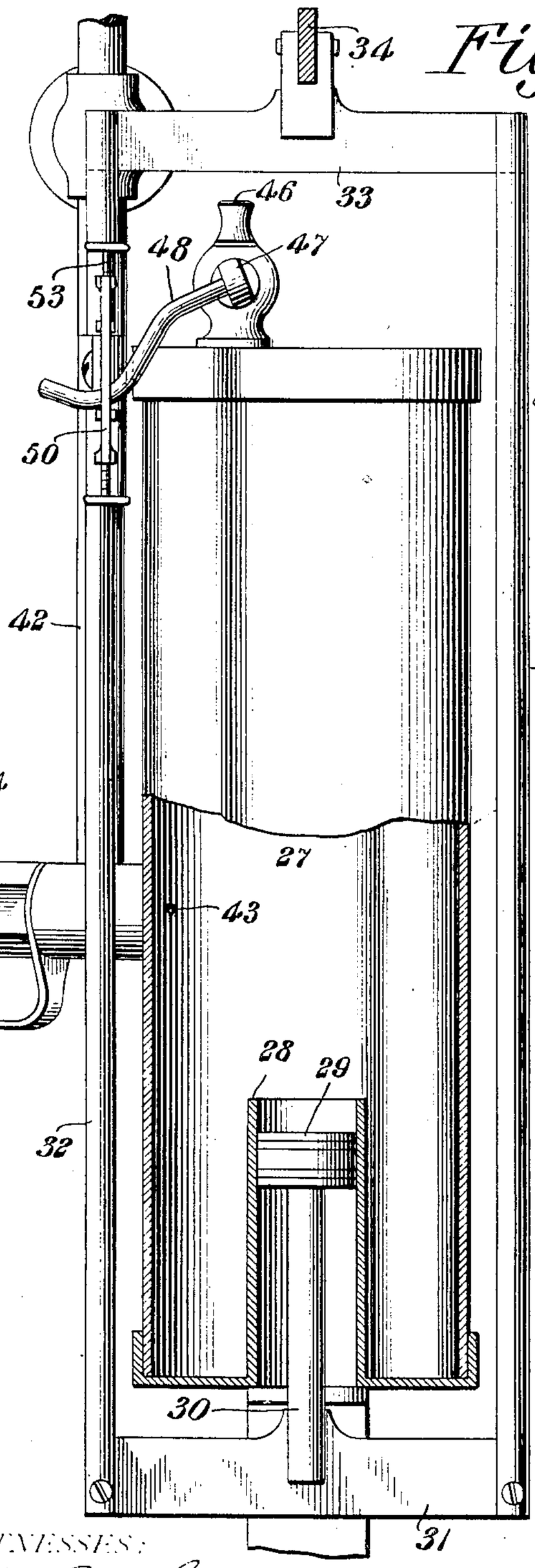

Fig. 4.

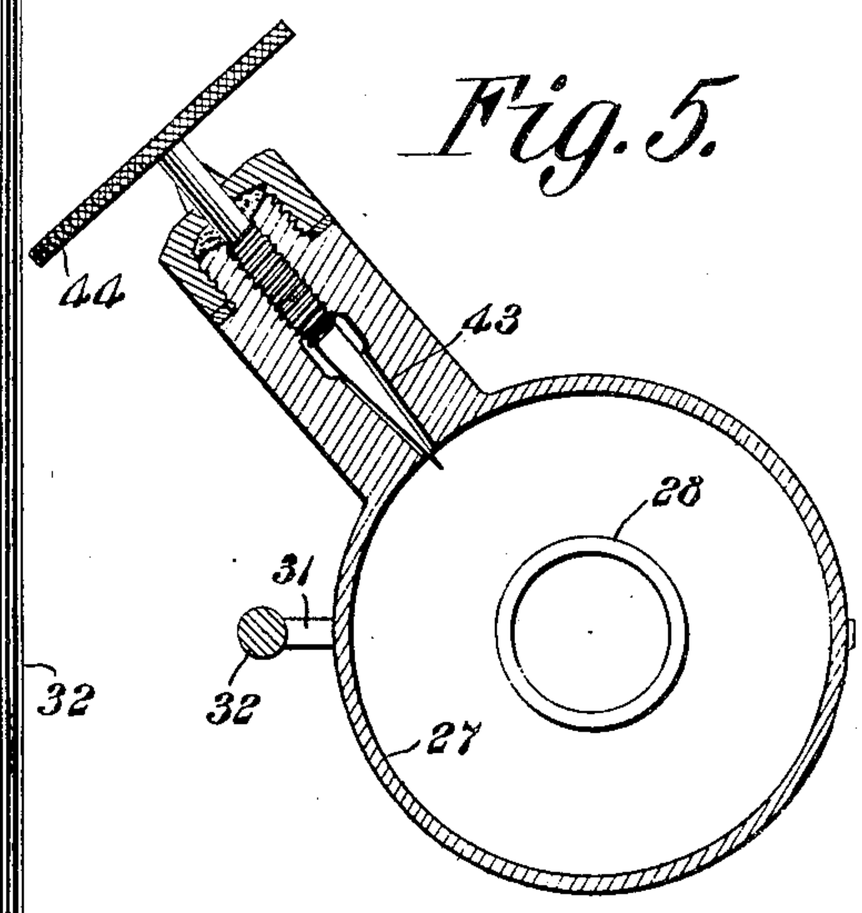

Fig. 5.

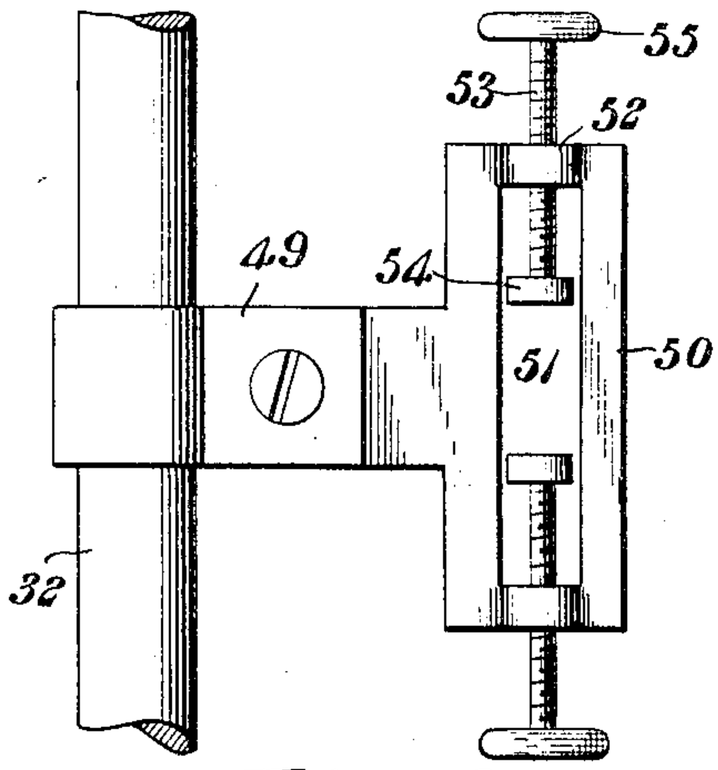

Fig. 6.

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OIL-HOISTING APPARATUS FOR WELLS.

No. 865,429. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed November 19, 1906. Serial No. 344,116.

To all whom it may concern:

Be it known that I, JOHN MICHAEL RETTIG, a citizen of the United States, residing at Chanute, in the county of Neosho and State of Kansas, have invented a new and useful Oil-Hoisting Apparatus for Wells, of which the following is a specification.

This invention relates to pneumatic hoisting apparatus for forcing or "blowing" crude oil or other liquids from wells.

The object of the invention is to provide a novel arrangement of casings and valves whereby oil is permitted to fill a portion of the apparatus without danger of sand entering the same to such an extent as to clog it and interfere with the proper operation thereof.

A still further object is to provide means for directing air under pressure against the fluid within the apparatus so as to force or "blow" it into an outlet pipe extending to any suitable points from the apparatus.

Another object is to provide a valve arrangement for automatically shutting off the air pressure from the well whenever said pressure falls below a predetermined degree so as to be insufficient for the purpose of forcing the liquid from the well.

Still another object of the invention is to provide means automatically operated for directing fluid under pressure into the well at predetermined intervals and for desired periods.

With the above and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is an elevation of the complete apparatus the well being shown in vertical section; Fig. 2 is an enlarged sectional view showing the pressure controlled valve and its actuating mechanism; Fig. 3 is a transverse section through the casing of the valve shown in Fig. 2; Fig. 4 is an enlarged view partly in elevation and partly in section of the actuating mechanism of the time controlled valve; Fig. 5 is a transverse section through the casing shown in Fig. 4 and the valve thereon; Fig. 6 is an enlarged detail view of the adjustable valve actuating stop.

Referring to the figures by characters of reference, 1 is a well casing of the usual form adapted to be driven into the well until its lower open end is in position within the upper portion of the strata of oil sand. The upper portion of this casing is preferably closed as at 2 and supported on the closed end, by means of a collar 3 or in any other preferred manner, is an inner casing 4 closed at its upper and lower ends as shown at 5 and 6, said lower end projecting below the casing 1. The projecting portion 6 of casing 4 has a plurality of openings 7 therein each of which is adapted to be normally closed by a gravity seated valve 8. It is of course to be understood, however, that other forms of valve may be employed, it merely being necessary to provide valves which will permit liquid to pass into the casing 4 and which will automatically close when pressure is admitted to the interior of casing 4. An outlet pipe 9 extends from the upper portion of casing 4 and is provided with a check valve 10 to prevent return flow of liquids forced into the pipe from the casing.

The pipe 9 is adapted to convey air under pressure to the bottom of the well from any suitable source and a portion of this pipe is preferably supported in a horizontal position above the ground by a suitable number of standards 11. A pressure chamber 12 intersects the horizontally disposed portion of the pipe and communicates therewith. This chamber has a reduced depending extension 13 in which a piston 14 is mounted to reciprocate. This piston has a rod 15 extending downward therefrom which is connected by a cross strip 16 the ends of which are pivotally secured to links 17. These links are pivoted to and suspended from the forked end 18 of a beam 19 which is fulcrumed upon a hanger 20 secured to the pipe 9, although it is to be understood that if preferred said beam may be fulcrumed upon a standard or other suitable support. A weight holder 21 is suspended from the long arm of the beam 19 and is adapted to carry a desired number of weights 22. A valve casing 23 is arranged upon the pipe 9 above the beam 19 and mounted within this casing is a slide valve 24 which normally closes communication through the pipe 9. This valve, however, has an opening 25 therein adapted when the valve is raised to register with the interior of the pipe 9 and permit fluid to flow therethrough without hindrance. A stem 26 projects from the valve 24 and through casing 23 and engages the beam 19.

It is of course understood that when the parts are in their normal positions the piston 14 is held raised within the extension 13 by the weights 22, said weights also serving to hold the valve 24 in closed position so as to shut off communication through the pipe 9. When air is admitted under pressure to the pipe 9 it will of course enter compartment 12 and when this pressure reaches a predetermined degree the piston 14 will be forced downward and a corresponding upward movement of the valve 24 will be produced by the beam 19. The fluid will therefore be free to pass through the pipe and whenever the pressure falls below the degree necessary for actuating the weighted beam 19 said beam will drop into its normal position and close the valve 24 until the pressure shall have reached the predetermined point.

In conjunction with the pressure regulated valve I also employ means whereby the air under pressure will be directed into the well at predetermined periods and as long as desired, said mechanism being automatic and requiring no attention after it has once been adjusted. As is well known to persons familiar with oil wells it is desirable to "blow" certain wells only after certain periods of time have elapsed. For instance, some wells should be "blown" once an hour for a period of from one to three minutes, while others should be "blown" once in two hours and the intervals between the "blowing" of the wells of course varies to suit different conditions. Heretofore, it has been necessary to utilize the services of an operator for directing the compressed fluid into the well at the desired times and such an arrangement has been found to be unreliable. I have therefore devised automatic means for directing the air after desired intervals into the well and, as shown in the drawings, this attachment consists of a casing 27 located at points between the well and the pressure regulated valve. This casing is closed at its ends and has an inwardly extending tube 28 in the bottom thereof within which works a piston 29. A rod 30 extends from this piston and is connected to a cross head 31 which in turn is connected by means of parallel rods 32 with a cross head 33 located above the casing 27. This cross head 33 is pivoted to one end of a beam 34 fulcrumed upon a hanger 35 connected to the pipe 9 and having a weight holder 36 at one end on which is located a suitable number of weights 37. A valve casing 38 is arranged on the pipe 9 above beam 34 and mounted therein is a slide valve 39 which is connected to the beam 34 by means of a stem 40. This slide valve is exactly similar to the valve 24 hereinbefore referred to and has an opening 41 adapted when the valve is pushed upward to register with the interior of the pipe 9 and permit fluid to flow through the pipes without being obstructed thereby. It is of course understood that the valve is held in its normal or closed position by the beam 34 and that said beam also serves to hold the piston in raised position, as shown in Fig. 4. A branch pipe 42 extends from the pipe 9 at a point between the valve casings 23 and 38 and opens into the casing 27, there being a needle valve 43 mounted within the pipe 42 so as to control the passage of compressed air from the pipe 42 into the casing 27. A disk 44 is preferably secured to the outer end of the needle valve and has suitably designated graduations on one face adapted to be read in conjunction with a stationary index 45. These graduations represent periods of time. For instance, by turning the disk so as to bring the numeral 2 in register with the index the valve 43 will be opened enough to permit air to escape into the casing 27 only with sufficient rapidity to prevent the pressure within said casing from overbalancing the weighted beam 34 except after a period of two hours. In other words it will require two hours for the pressure of air admitted to the casing 27 to press downward on the piston 29 with sufficient force to overbalance the weighted end of beam 34.

A vent 46 is suitably located upon the casing 27 and is normally closed by a valve 47 the stem 48 of which extends beyond the casing. A clip 49 is fastened upon one of the rods 32 and formed with this clip is a plate 50 having an elongated slot 51 therein. The ends of this plate are enlarged as at 52 and extending through these ends are screws 53 having blocks 54 swiveled upon their inner ends and adapted to travel within the slot 51 while heads 55 are located upon the outer ends of the screws so as to facilitate their adjustment. The stem 48 is adapted to project through the slot 51 and between the blocks 54. It is of course understood that when the piston 29 and the rods 32 are in their raised or normal position the valve 47 is closed and the stem 48 resting upon the lower block 54. When the piston 29 descends as will be hereinafter disclosed the stem 48 will remain stationary for a predetermined period, after which the upper block 54 will bear downward thereon and cause the valve 47 to open. The valve will be closed in the same manner when the piston 29 returns to its normal position.

The operation of the time controlled valve is as follows: Presuming that the air is under sufficient pressure to hold the valve 24 open said air will be free to pass downward through the pipe 42 and into the casing 27 provided the valve 43 is open. The rapidity with which the air enters the casing 27 is of course controlled by this valve 43. After the air has passed into the casing for a predetermined period the pressure thereof upon the piston 29 will be sufficient to overbalance the weighted beam 34 and the piston 29 will therefore descend and cause beam 34 to press upward on valve 39 and open it. The compressed air within pipe 9 will then be free to run into the well. When the piston 29 and rods 32 descend under pressure the upper block 54 will, as before stated, strike the stem 48 after a predetermined downward movement of the piston 29 and cause the exhaust valve 47 to open. The air will slowly escape through this valve and as soon as the pressure is removed from the piston 29 said piston will be returned to its normal position by the beam 34 and the valve will be lowered into closed position. Just prior to the completion of the upward movement of the piston 29 the lower block 54 will strike the stem 48 and close the valve 47. The apparatus is then reset and its operation will be repeated after a sufficient interval has elapsed to enable the air to again accumulate within casing 27 with sufficient pressure to actuate the piston 29. The interval elapsing between the inward movement of the piston 29 and the actuation of the valve 47 by the blocks 54 can be increased or diminished by adjusting the blocks 54 toward or from each other.

As heretofore stated the pipe 9 extends downward into the lower portion of the inner casing 4. It will of course be understood that when air is not being directed into the well oil will flow by gravity from the pocket in the well through the openings 7 and into the inner casing 4 and will rise within this casing until it reaches its level. When the air is admitted to the well in the manner heretofore stated it will force the trapped oil upward through the casing 4 and discharge it through the pipe 9.

It will be understood that by utilizing apparatus such as herein described the air used for "blowing" the well can only be employed when its pressure is above a predetermined degree and therefore the effective "blowing" of the well is insured each time the time controlled valve is opened. Moreover, by providing

the time controlled apparatus the services of an attendant are dispensed with and the air will be admitted to the well automatically after predetermined intervals, said intervals being easily regulated to suit various conditions. As shown in Fig. 1 a valve 56 may be located within pipe 42 between the pipe 9 and valve 43, and another valve 57 may be placed within the pipe 9 between the well and valve casing 38. By means of the valve 56 the supply of air to the pipe 42 may be controlled and by means of valve 57 the pipe 9 can be positively closed adjacent the well.

The preferred form of the invention has been set forth in the foregoing description but I do not limit myself thereto as I am aware that modifications may be made therein without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of the claims.

What is claimed is:

1. The combination with a well casing and a pipe for directing fluid under pressure thereinto; of a valve within the pipe, a pivotally mounted beam normally holding the valve closed, a casing, a piston therein, a connection between the piston and beam, means for admitting fluid under pressure to the casing from the pipe, and adjustable means actuated by the piston for exhausting the compressed fluid from the casing.

2. The combination with a well casing and a pipe for directing fluid under pressure thereinto; of a valve within the pipe, a pivotally mounted beam normally holding the valve closed, a casing, a piston therein, a connection between the piston and beam, means for admitting fluid under pressure to the casing from the pipe, a valve in the casing and adjustable means movable with the piston for opening and closing said casing valve during opposite strokes of the piston.

3. The combination with a well casing and a pipe for directing fluid under pressure thereinto; of a valve within the pipe, a pivotally mounted beam normally holding the valve closed, a casing, a piston therein, a connection between the piston and beam, means for admitting fluid under pressure to the casing from the pipe, means for controlling the admission of fluid to the casing, and a time indicating device carried by said means.

4. In apparatus of the character described the combination with a well casing and a pipe for conveying fluid under pressure thereto; of a valve within the pipe, a weighted lever connected to and disposed to actuate the valve in one direction, a casing, a tubular projection therein, a piston disposed to reciprocate within said projection, means operated by the piston for actuating the valve, means for permitting the leakage of fluid from the pipe into the casing, and manually operated means for controlling said leakage.

5. The combination with a well casing and a pipe for conveying fluid under pressure thereto; of a valve within the pipe, a weighted lever for holding the valve normally closed, a casing, a piston mounted to reciprocate therein, means operated by the piston for shifting the valve out of normal position, means for permitting leakage of fluid from the pipe into the casing to actuate the piston at predetermined intervals, manually operated means for controlling said leakage, and means for indicating the intervals between the operations of the piston.

6. The combination with a well casing and a pipe for conveying fluid under pressure thereto; of a valve within the pipe, a weighted lever for holding the valve normally closed, a casing, a piston mounted to reciprocate therein, means operated by the piston for shifting the valve out of normal position, means for permitting leakage of fluid from the pipe into the casing to actuate the piston at predetermined intervals, manually operated means for controlling said leakage, and adjustable means operated by the piston for exhausting the fluid in the casing.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN MICHAEL RETTIG.

Witnesses:
A. I. GARDNER,
E. HUME TALBERT.