Oct. 20, 1925. 1,558,056

G. F. SOCKMAN

WELL CAPPER AND FLOW DISTRIBUTOR

Filed March 5, 1925

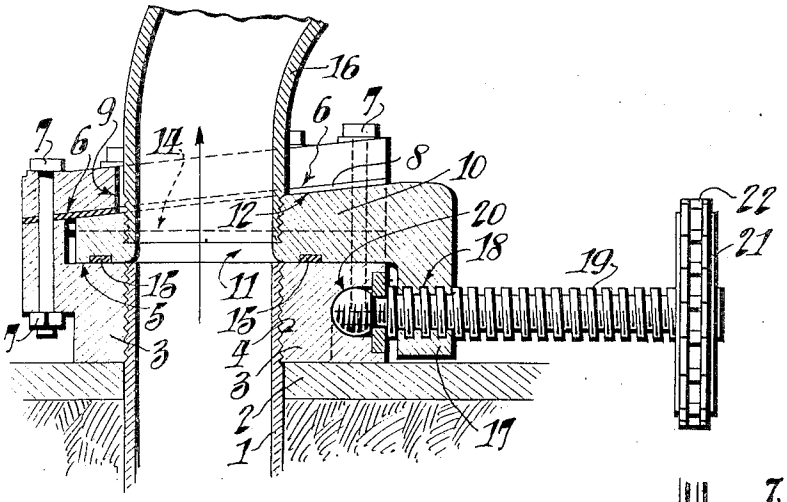


Fig. 1.

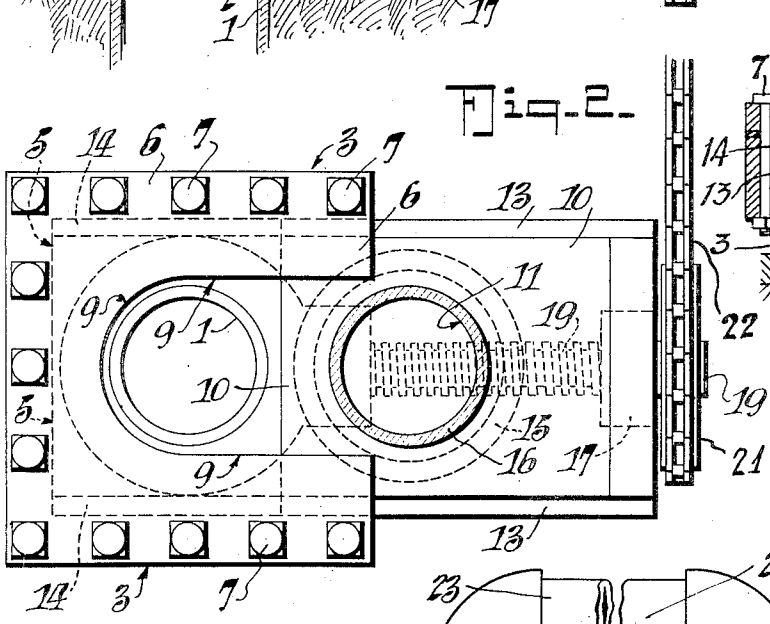


Fig. 2.

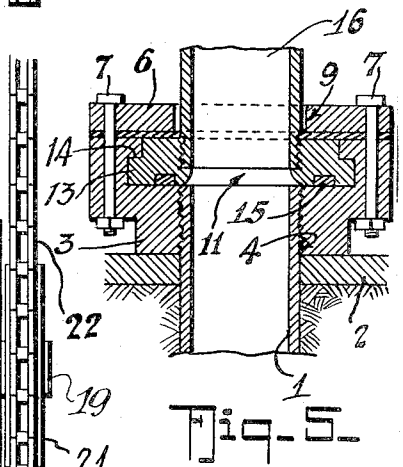


Fig. 5.

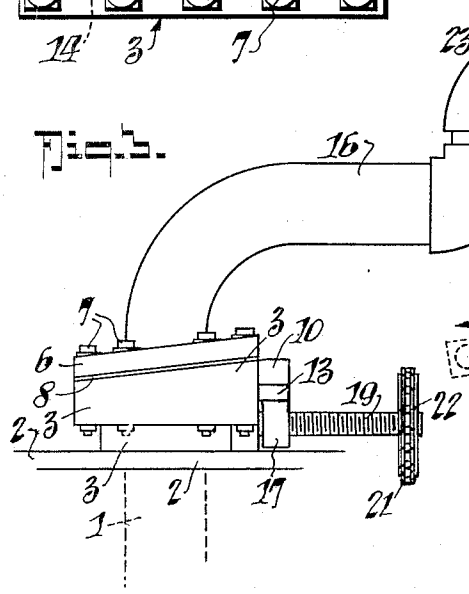


Fig. 3.

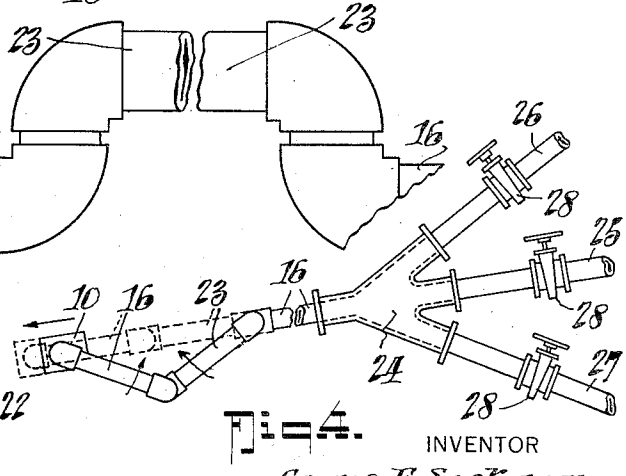


Fig. 4.

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Patented Oct. 20, 1925. 1,558,056

UNITED STATES PATENT OFFICE.

GEORGE F. SOCKMAN, OF WOODLAWN, PENNSYLVANIA.

WELL CAPPER AND FLOW DISTRIBUTOR.

Application filed March 5, 1925. Serial No. 13,286.

To all whom it may concern:

Be it known that I, GEORGE F. SOCKMAN, a citizen of the United States, residing at Woodlawn, in the county of Beaver and State of Pennsylvania, have invented a new and Improved Well Capper and Flow Distributor, of which the following is a specification.

The invention generally relates to oil and gas well flow controlling apparatus and has for its primary object to provide a simple and effective means for quickly capping the well at the opportune moment and distributing the fluid emitted therefrom in a manner reducing waste thereof to the minimum and for effectually preventing fire hazard.

As is well known, it sometimes happens that when a well is "drilled in," oil is discharged from the well under high pressure, as in the case of what is known as a gusher, or gas at similarly high pressure, is discharged. In either such case, much difficulty is encountered in connecting the well with a suitable storage tank or reservoir, and this frequently results in a large wastage or loss being sustained before the well is finally brought under control. As the well is "drilled in" and blows, the line of drilling tools are commonly blown out and the rigging demolished, with the attendant loss referred to above and also with great danger to the workmen and subjection to the ready possibility of fire.

I am aware that inventive effort has been previously directed toward the provision of quick capping devices, but none thereof, to my knowledge, have been produced which have the qualities of overcoming the above enumerated ills in the simple and efficient manner in which my apparatus herein disclosed performs its desired function, which said apparatus provides means for quickly and effectively capping the well at the opportune moment so as to eliminate the great waste of oil and gas now common, the said apparatus being so constructed and cooperatively mounted upon the discharge end of the wall casing as not to interfere with the drilling function when in its inoperative position, which is movable to its operative position by remotely controlled agencies, and which, when so moved to its operative position, serves to effectively distribute the oil or gas to its proper place, or to snuff out a fire if such should start.

With the above and other objects in view the invention further resides in those novel details of construction, combinations and arrangements of parts, all of which will be first fully described, then particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which:—

Figure 1 is a vertically longitudinal section of the capping device.

Figure 2 is a plan view of the capping device.

Figure 3 is a diagrammatic side elevation of the capping device and the distributor pipe carried thereby.

Figure 4 is a diagrammatic plan view of the distributor pipe connections.

Figure 5 is a central vertical cross section of the capping device.

In the drawing in which like numerals of reference indicate like parts in all of the figures 1 designates the upper or discharge end of a well casing and 2 a portion of the rigging platform.

A capper head 3 is secured upon the discharge end of the casing 1 in any approved manner as for example by a thread connection indicated by the numeral 4. The head 3 is provided with a cut out portion 5 adapted to provide a gate slideway. For purpose of construction the guideway 5 is open at the top and a cover plate 6 is securely bolted upon the head 3, as at 7, to cooperate with the cut out portion 5 in providing the slideway mentioned, and it will be observed that the top 6 and cut out portion 5 are so corelatively arranged as to provide a tapered top portion, and the said tapered face is suitably gasketed as at 8 to prevent fluid leakage when the closure gate is forced to its well casing capping condition. The top 6 is provided with a cut out portion 9, the purpose for which will appear later.

A slide gate 10 is provided and is slidably mounted in the slideway provided by the cut out portion 5 and the top 6 for a purpose that will soon be apparent. The gate 10 is provided with a vertical bore 11 of the same size as the discharge end of the well casing 1 and which is adapted to be brought into register with the said casing end when the gate 10 is forced to its operative or capping

condition, and the said gate is also provided with an upper tapered face 12, the taper of which corresponds with that of the bottom face of the top 6. The gate 10 also includes a pair of laterally extended horizontal guide flanges 13 which are adapted to be guided in the guideways 14 provided in the lateral walls of the cut out guide way 5. Thus as the gate 10 is slid forwardly or backwardly it will be guided in a horizontal plane by the flanges and grooves 13 and 14 which will serve to retain the close relation of the said gate with the discharge end of the well casing, the tapered face 12 of the gate and the gasketed lower tapered face of the top 6 serving to provide a wedging function when the gate is forced to its well casing capping position with its bore 11 in register with the discharge end of that casing, see Figure 1. An annular gasket 15 may be provided in the bottom face of the gate 10 surrrounding the bore 11 thereof to serve to cooperate with the gasket 8 in effectively preventing oil leakage when the gate 10 is shifted to its operative condition illustrated in the said figure.

A distributor pipe 16 is secured to the gate 10 in any suitable manner with its entrance end in communication with the bore 11 of the said gate and the said distributor pipe is adapted to be carried by the said gate when it is moved into operative condition with the bore 11 thereof in register with the discharge end of the well casing 1. Thus when the gate is moved to its operative position indicated in Figures 1 and 3 of the drawing the fluid being discharged from the well casing will be directed into the distributor pipe 16. The cut out portion 9 with which the top 6 is provided serves to permit the movement of the distributor pipe 16 just mentioned.

To suitably provide for movement of the gate 10 in the guideways above described the said gate is provided with a suitable lug 17 internally threaded, as at 18, to receive the moving screw 19 which is stationarily rotatable in the bearing 20 provided therefor in the adjacent side of the head 3. The extended stem of the moving screw 19 is provided with a driven sprocket 21 to which rotary motion may be imparted from a remote safe point through the power transmitting chain 22. Accordingly as the sprocket 21 is rotated the gate 10 will be projected across the guideways provided therefor from the position indicated in Figure 2 of the drawing to that indicated in Figure 1 or, reversely, from the position indicated in Figure 1 to that indicated in Figure 2.

It will be observed by reference to Figure 3 of the drawing that the fluid receiving end of the distributor pipe 16 is well curved so as to relieve as much as possible the shock of the fluid directed thereagainst at high pressure and the said pipe may be provided with a pivot joint 23 to permit the gate 10 to be moved into registration with the head 3.

The discharge end of the distributor pipe 16 is connected in communication with a three-way connector 24, to the triple discharge ends of which are connected an oil pipe 25 which is adapted to communicate with a suitable oil receiver, a gas pipe 26 adapted to communicate with a suitable gas receiver, and a pipe 27 which is in the nature of a waste or test pipe. All of the pipes 25, 26 and 27 are provided with suitable control valves 28 and are positioned at a safely remote point.

It will be readily apparent by reference to Figure 2 of the drawing that the parts of my invention are so constructed that they may be mounted upon the upper discharge end of the well casing as there indicated without in any way interfering with the drilling operation or the passing of the drilling tools up and down in the said casing. It is well known that it is a common experience in this art, when a well is "drilled in", for the tools to be blown out of the well casing by the force of the outwardly rushing fluid, gas or oil. This, of course, occasions great waste of fluid before it is possible to suitably cap the well to either stop or direct the flow of the said well. It also causes great danger of loss of life incident to the wreckage of the drilling equipment. It is to prevent the great waste of such oil and gas and, by reason of providing an efficiently constructed capping device controllable from a safely remote point, to obviate all necessity for risk of life that my invention is designed.

In operation, as the well is about to be "drilled in" the valves 28 of the oil and gas conductor pipes 25 and 26 are closed and that 28 of the test conduit 27 allowed to remain open. As the well is "drilled in" and blows, carrying out the drilling tools and causing a gushing from the well casing of the oil or gas, the remote control is actuated and the mover screw 19 set into motion to immediately cap the well, thus quickly closing off the wasteful discharge of the fluid and directing the same in the desired manner now to be described. As the gate 10 is quickly moved into the wedge lock and distributor tube 16 and casing 1 registering position indicated in Figure 1, the fluid being emitted from the well under high pressure will be distributed through the said pipe 16 into the test pipe 27. A small portion of the fluid will be permitted to discharge to waste from the test pipe 27 so that it can be seen what type of fluid is being discharged from the well, oil or gas, or whether there is danger of the same

breaking into flame. In case oil is being emitted the valve 28 of the pipe 27 will be closed to prevent other than the small degree of waste incident to the test made and that of the oil conduit pipe 25 opened effectively distribute the oil to a suitable receiving reservoir or tank. If gas was found to be discharged at the test the valve 28 of the gas conduit pipe 26 will be opened and the other valves 28 closed so as to effectively distribute the gas to a suitable receiving tank. Should the test reveal flame emission the valve 28 of the test pipe 27 would be instantly closed to choke off the fire and prevent the burning of the well and surrounding property.

The provision of the gaskets 15 and 8 of the wedging surfaces 12 and that provided by the top 6 effectively serve to seal the capper head against fluid leakage and in a manner providing for perfect distribution of the said fluid. The guide flanges 13 serve to effectively guide the gate 10 and prevent slapping thereof before it is forced to the completely seated position indicated in Figure 1.

From the foregoing description, taken in connection with the accompanying drawing, it is thought the novel details of construction, the manner of operation and the advantages of my invention will be readily apparent to those skilled in the art.

What I claim is:

1. Apparatus of the class described comprising a gate movable over the discharge end of a well casing and having a passage therethrough adapted to be brought into registration with said casing, a distributor pipe adapted to communicate with the well casing through the gate aperture and which is carried by and movable with said gate.

2. Apparatus of the class described comprising a gate movable over the discharge end of a well casing and having a passage therethrough adapted to be brought into registration with said casing, a distributor pipe adapted to communicate with the well casing through the gate aperture and which is carried by and movable with said gate; an oil conduit pipe, a gas conduit pipe, and a test conduit pipe, all in communication with said distributor pipe and each having a control valve therein for the purposes specified.

3. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a gate slideway having an upper tapered face and traversing said well casing discharge end; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end and shaped to fit said slideway to provide a seal when so brought into register; and a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate for the purposes specified.

4. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a gate slideway having an upper tapered face and traversing said well casing discharge end; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end and shaped to fit said slideway to provide a seal when so brought into registration; and a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate, an oil conduit pipe, a gas conduit pipe, and a test conduit pipe all in communication with said distributor pipe and each having a control valve therein for the purposes specified.

5. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a gate slideway having an upper tapered face and traversing said well casing discharge end; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end and shaped to fit said slideway to provide a seal when so brought into registration; and a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate, and means operable from a remote point for moving the said gate from a position clear of interference with free passage through the casing discharge end to the said casing sealing and distributor pipe registering position for the purposes specified.

6. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a gate slideway having an upper tapered face and traversing said well casing discharge end; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end and shaped to fit said slideway to provide a seal when so brought into registration; said head being also provided with laterally extended horizontally disposed guide grooves and said gate being also provided with laterally extended horizontally disposed guide flanges substantially as shown and for the purposes specified.

7. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a tapered top face, a gate slideway traversing the well casing discharge end

and laterally extended horizontally disposed guide grooves; a top plate secured upon the tapered top face of the head to complete the slideway and having a cut out portion; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end, having laterally extended horizontally positioned guide flanges for fitting the guide grooves and having an effective portion shaped for snugly sealing the slideway when its passage is brought into registration with the well casing; and a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate, and in the cutout portion of the top plate for the purposes specified.

8. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a tapered top face, a gate slideway traversing the well casing discharge end and laterally extended horizontally disposed guide grooves; a top plate secured upon the tapered top face of the head to complete the slideway and having a cut out portion; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end, having laterally extended horizontally positioned guide flanges for fitting the guide grooves and having an effective portion shaped for snugly sealing the slideway when its passage is brought into registration with the well casing; a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate and in the cut out portion of the top plate, and screw connections operable from a remote point for moving the said gate from a position clear of interference with free passage through the casing discharge end to the said casing sealing and distributor pipe registering position for the purposes specified.

9. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a tapered top face, a gate slideway traversing the well casing discharge end and laterally extended horizontally disposed guide grooves; a top plate secured upon the tapered top face of the head to complete the slideway and having a cut out portion; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end, having laterally extended horizontally positioned guide flanges for fitting the guide grooves and having an effective portion shaped for snugly sealing the slideway when its passage is brought into registration with the well casing; a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate and in the cut out portion of the top plate; screw connections operable from a remote point for moving the said gate from a position clear of interference with free passage through the casing discharge end to the said casing sealing and distributor pipe registering position; an oil conduit pipe; a gas conduit pipe, and a test conduit pipe all in communication with said distributor and each having a control valve therein for the purposes specified.

10. Apparatus of the class described comprising a capper head secured upon the discharge end of a well casing and provided with a tapered top face, a gate slideway traversing the well casing discharge end and laterally extended horizontally disposed guide grooves; a top plate secured upon the tapered top face of the head to complete the slideway and having a cut out portion; a gate slidable in the slideway, having a passage therethrough adapted to be brought into registration with the said casing discharge end, having laterally extended horizontally positioned guide flanges for fitting the guide grooves and having an effective portion shaped for snugly sealing the slideway when its passage is brought into registration with the well casing; and a distributor pipe adapted to communicate with the well casing through the gate passage and which is carried by and movable with said gate and in the cut out portion of the top plate, the said distributor pipe having a pivoted section therein to permit movement of that portion thereof which is carried by the slidable gate.

GEORGE F. SOCKMAN.