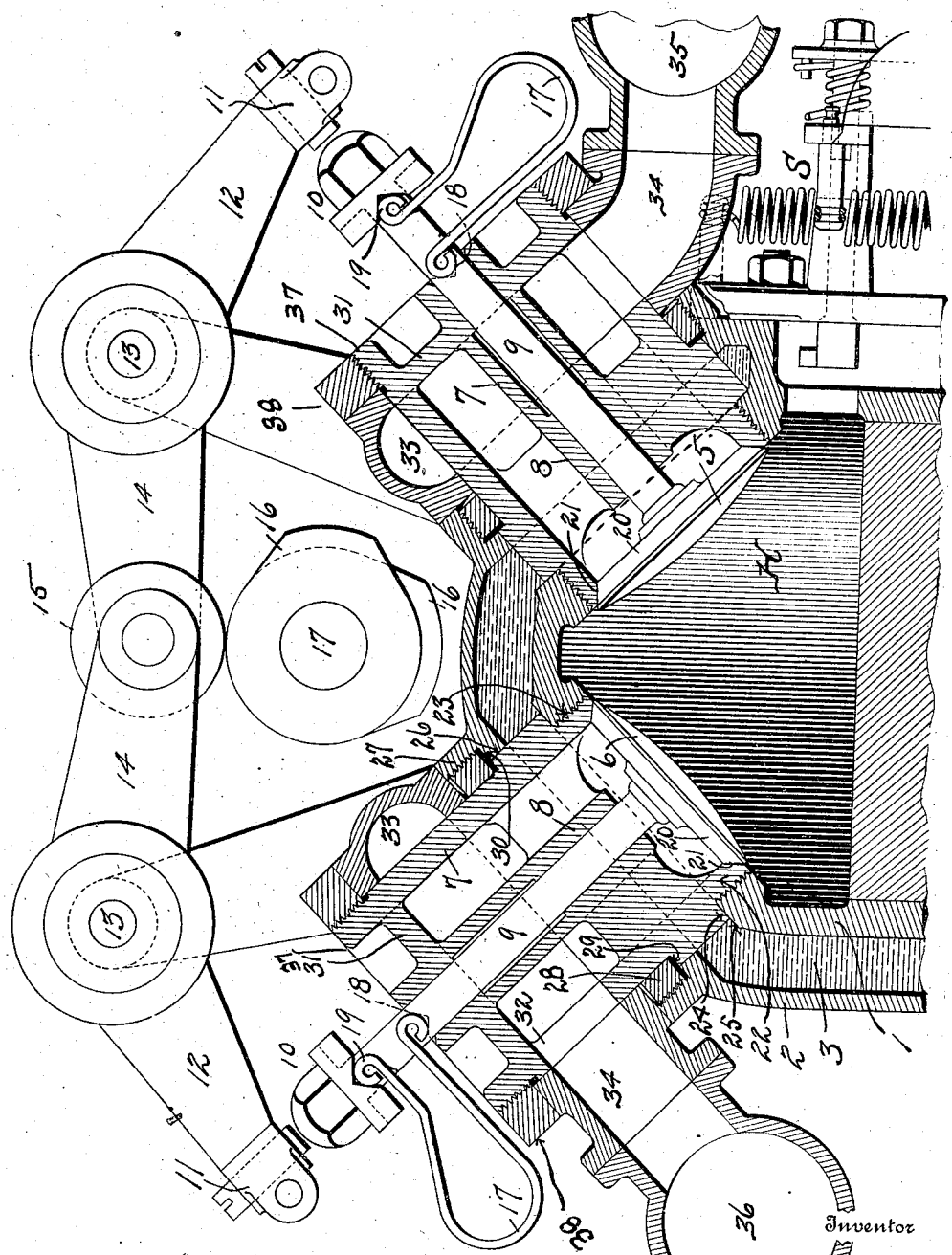
No. 893,323. PATENTED JULY 14, 1908.

C. R. GREUTER.

EXPLOSIVE ENGINE.

APPLICATION FILED APR. 25, 1907.



Witnesses

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EXPLOSIVE-ENGINE.

No. 893,323. Specification of Letters Patent. Patented July 14, 1908.

Application filed April 25, 1907. Serial No. 370,277.

To all whom it may concern:

Be it known that I, CHARLES R. GREUTER, a citizen of the United States of America, residing at Wilkes - Barre, Pennsylvania, have invented new and useful Improvements in Explosive-Engines, of which the following is a specification.

This invention relates to explosive engines and has special reference to certain new and practical improvements in the valve mounting therefor.

To this end the invention primarily has in view a novel mounting of the inlet and exhaust valves for explosive engines whereby such valves and their accessories are maintained thoroughly cooled so that the same will not become sufficiently hot to scale or pit, thereby obviating the necessity of regrinding the valves as is required in the ordinary types of valve mountings for explosive engines.

A further and distinctive object of the invention is to provide a novel arrangement of the cages for the inlet and exhaust valves of an explosive engine, whereby the said cages are exposed directly to the cooling influence of the water in the water jacket of the cylinder, thus providing means which positively insures the proper cooling of the exhaust valve.

A further object of the invention is to so mount the valves in their related parts as to permit of ready assembling and also ready removal for purposes of repair or adjustment and to provide for a water tight connection between the walls of the cylinder and the valve cage.

With these and many other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in carrying out the objects above indicated are necessarily susceptible to structural change without departing from the scope of the invention, but a preferred embodiment thereof is shown in the accompanying drawings, in which the figure of the drawings is a sectional view of the head portion of the cylinder of an explosive engine showing the same equipped with the improved valve mounting contemplated by the present invention.

In carrying out the present invention no radical change is required in the valve construction or in the valve controlling mechanism of the inlet and exhaust valves associated with the cylinder head of the explosive engine, so for illustrative purposes there is shown in the drawings the head portion H of the cylinder of an explosive engine, which head portion includes in its construction the inner and outer cylinder wall 1 and 2 arranged in spaced relation to provide the usual inclosed water jacket 3 enveloping the cylinder body and its head, and designed to have water circulated therethrough for cooling purposes.

It is preferable in adapting the improvements to the cylinder head of an explosive engine, to arrange the inlet and exhaust valves 5 and 6 respectively at opposite sides of the cylinder head, but performing the usual functions of admitting the explosive mixture to the cylinder head, and exhausting spent products therefrom. The equipment and mounting of each of said valves 5 and 6 are the same, the only difference to be noted residing in the fact that the exhaust valve and its equipment are arranged at the side of the cylinder head, (opposite the sparking mechanism S,) where the most water is located, and thereby giving the exhaust valve and its cage the benefit of more effective cooling from the water in the water jacket of the cylinder.

Referring particularly to the mounting of the oppositely arranged valves 5 and 6, it will be observed that the cylinder head is provided upon opposite sides thereof with inclined valve supporting sections within and upon which sections are designed to be mounted the cages 7 for the valves. Each valve cage 7 essentially consists of a cylindrical body provided therein with a centrally arranged guiding tube 8 accommodating the sliding valve stem 9 connected at its inner end with the valve proper, the outer end of each valve stem 9 carrying a contact head 10 adapted to be engaged by the tappet 11 carried by a rocker arm 12 mounted on a rock shaft 13 to which is also connected a second rocker arm 14 carrying at its free end a contact roller 15 for engagement with the cam 16 on the cam shaft 17. These parts are duplicated for the oppositely arranged valves, thereby completing a valve controlling mechanism, which by reason of the arrangement of the cams on the cam shaft, provides

means for the alternate opening and closing of the inlet and exhaust valves in proper time, all of which will be readily understood by those familiar with the art without further description. However, in this connection, it may be further noted that there is associated with each of the sliding valve stems 9 a bowed valve closing spring 17, one end of which has a fulcrum rest, as at 18, on the outer end of the valve cage, while its free end 19 has a bearing against and under the contact head 10 for the purpose of normally and yieldingly holding the valve closed onto its seat at the inner end of the valve cage therefor.

As above indicated, each valve is provided with a beveled contact face 20 adapted to register with the beveled valve seat 21 formed at the inner end of the valve cage 7 for said valve. Also at its inner end each valve cage 9 is provided with an exteriorly threaded fastening neck 22 engaging the threaded receiving opening 23 provided in the inner wall portion 1 of the inclined valve supporting section of the cylinder head. By reason of forming the exteriorly threaded fastening neck 22 there is provided on the inner end portion of each valve cage 7 an external joint shoulder 24 adapted to smoothly and tightly bind on the ground joint face 25 turned on the outer face of the inner wall section 1 of the cylinder head. This provides an effective tight joint between the valve cage and said wall section and prevents leakage at this point, while at the same time exposing a material portion of the body of the valve cage to the water within the water jacket 3.

The cylindrical body of each valve cage 7 projects upwardly from its connection with the inner wall section 1 across the water jacket space 3, and through a holding opening 26 formed in the outer wall section 2. Said holding opening 26 is formed in the base of what may be termed an interiorly threaded socket 27 accommodating therein an exteriorly threaded packing nut 28 which lies wholly within the socket and is adapted to be turned against a copper or equivalent gasket 29 seated on the base of the socket and binding against an exterior bearing shoulder 30 provided on the body of the valve cage 7. By reason of this construction, it will be observed that the tendency of the packing nut 28 is to force the valve cage 7 against the ground joint face or shoulder 25 of the inner wall section thereby maintaining a secure water tight joint connection between the valve cage body and the inner and outer wall sections of the cylinder head, while at the same time exposing a material portion of the valve cage body to the cooling influence of the water in the water jacket.

The outer projecting portion of each valve cage body 7, lying beyond the outer wall of the cylinder head, is provided with an outer closed head 31 and with a side port or ports 32 in communication with a semi-tubular pipe ring 33 encircling the outer projecting portion of the valve cage body. The semi-tubular pipe ring 33 for each of the opposite valve cages, is provided at one side with a coupling neck 34, and to the coupling necks 34 of the opposite pipe rings are respectively coupled the inlet and exhaust pipes of the engine, which pipes are designated respectively by the numbers 35 and 36.

In connection with the above features, it will be noted that each valve cage body 7 is provided with an outer threaded extremity 37 receiving thereon an internally threaded ring nut 38 binding upon and holding in position the pipe ring 33.

I claim:

1. In a valve mounting for explosive engines, a cylinder head having a water jacket, a valve cage having a threaded neck and a contiguous shoulder forming a detachable ground joint connection with the inner wall section, and a locked connection with the outer wall section, said valve cage being exposed to the water in the water jacket.

2. In a valve mounting for explosive engines, the combination of the cylinder head having a water jacket, and whose inner wall section is provided with a ground joint face and a threaded receiving opening, the outer wall section of said head being provided with an interiorly threaded socket and a holding opening piercing the base of the socket, a valve cage carrying a valve equipment and provided at its inner extremity with a threaded fastening neck for engagement with said receiving opening and adjacent to said neck with a joint shoulder for engagement with said ground joint face, said valve cage being further provided with an exterior bearing shoulder, a gasket seated in said socket and bearing on said bearing shoulder of the cage, and an exteriorly threaded nut engaging in said threaded socket and binding on said gasket.

3. In a valve mounting for explosive engines, a cylinder head provided with a water jacket and having in its outer wall a threaded socket, and a valve cage carrying a valve equipment and having an external pipe connection therewith, said valve cage being further provided with an exterior bearing shoulder, a gasket arranged in said socket and binding on said shoulder, and a packing nut mounted in said socket and binding on said gasket.

4. In a valve mounting for explosive engines, a cylinder provided with a water jacket, a valve cage projected through the water jacket, means for securing the said valve cage to the inner wall of the cylinder and means for securing the cage in the outer

wall of the cylinder and forcing it upon a seat on the inner wall of the cylinder, said securing means being located outside of the water jacket, whereby the exterior wall of said cage is in direct contact with the cooling fluid.

5. In a valve mounting for explosive engines, a cylinder provided with a water jacket, a valve cage projected through the water jacket and provided at its inner end with a threaded neck and contiguous shoulder, and means for securing the cage in the outer wall of the cylinder and forcing the shoulder on the cage against a seat on the inner wall of the cylinder.

6. In a valve mounting for explosive engines, a cylinder provided with a water jacket, a valve cage projected through the water jacket, a ground shoulder on the valve cage adapted to seat on a ground seat on the inner wall of the cylinder, an exterior screw thread on the inner end of the cage adapted to engage with an interior screw thread in an opening in the inner wall of the cylinder, a screw threaded recess surrounding the opening in the outer wall of the cylinder through which the valve cage is projected, an interior screw threaded collar adapted to engage with the screw thread in such recess in the outer wall of the cylinder constituting means for securing the valve cage in the outer wall of the cylinder and forcing it against the seat in the inner wall of the cylinder.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 11th day of April 1907.

CHARLES R. GREUTER.

Witnesses:
C. W. MATHESON,
FRANK I. MATHESON.