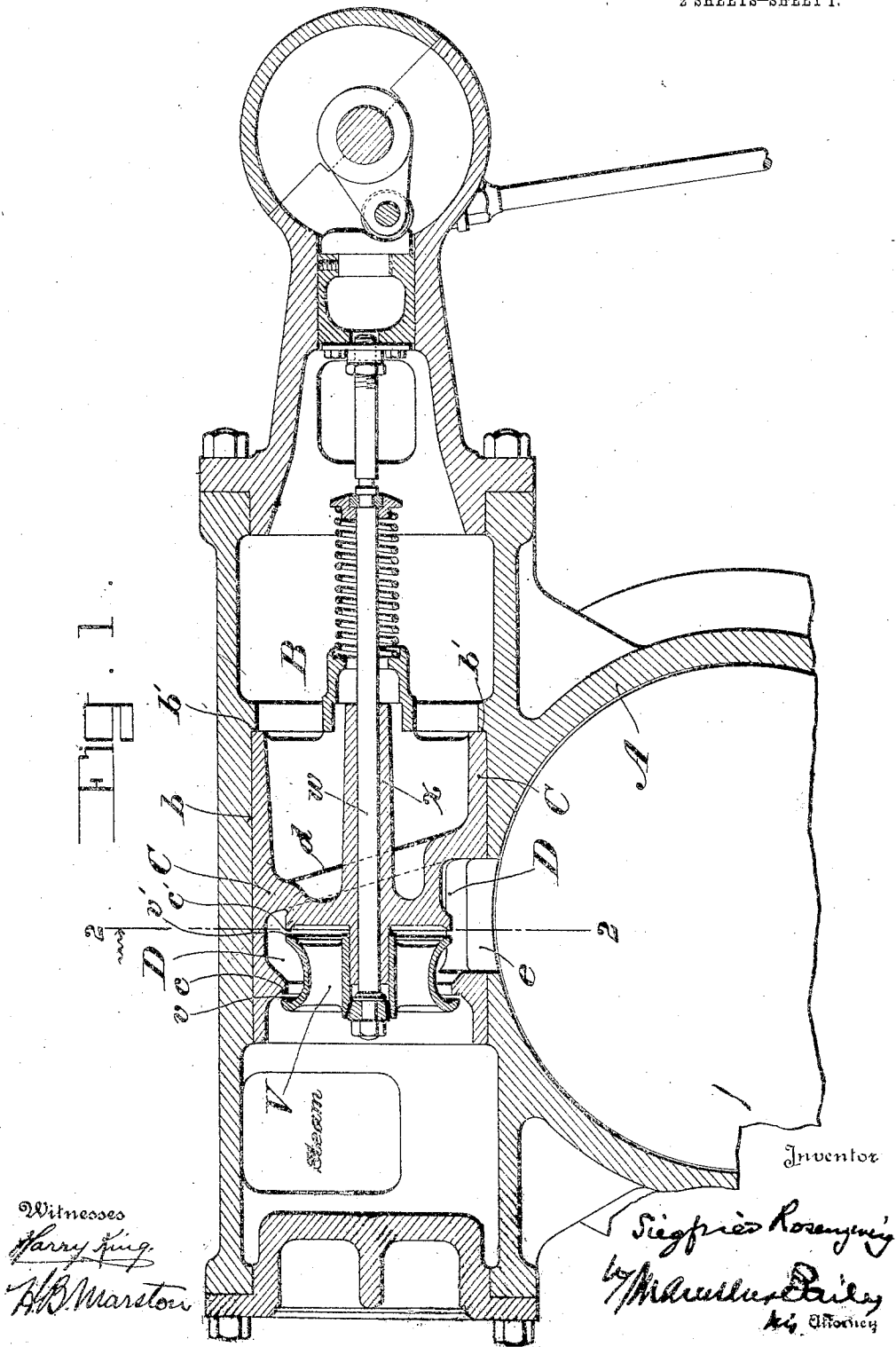


S. ROSENZWEIG.
ENGINE VALVE.
APPLICATION FILED AUG. 1, 1914.

1,125,724.

Patented Jan. 19, 1915.
2 SHEETS—SHEET 1.



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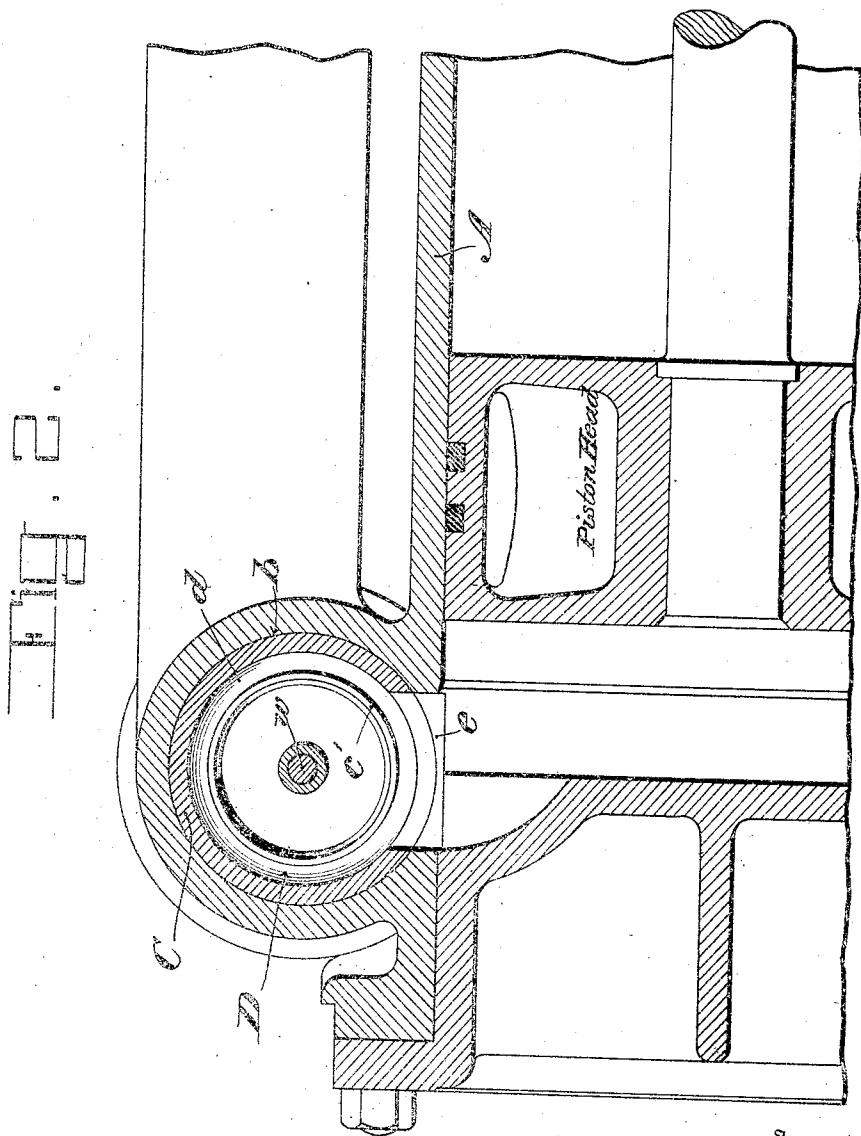
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Witnesses

Harry King

H. B. Marston

Inventor

Siegfried Rosenzweig

By *Marshall Dailor*

his Attorney

UNITED STATES PATENT OFFICE.

SIEGFRIED ROSENZWEIG, OF YORK, PENNSYLVANIA.

ENGINE-VALVE.

Specification of Letters Patent.

Patented Jan. 19, 1915.

1,125,724.

Application filed August 1, 1914. Serial No. 854,554.

To all whom it may concern:

Be it known that I, SIEGFRIED ROSENZWEIG, a citizen of the German Empire, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Engine-Valves, of which the following is a specification.

My invention has to do with valves of the piston or puppet kind—and more particularly the latter—controlling the entrance of steam or gas to the engine cylinder; and it has to do with the construction and formation of the steam or valve chests, or containers, for such valves.

15 Puppet valves prevent the flow of steam or gas from the steam or valve chest into the cylinder port, by resting with their seats upon corresponding seats in the steam chest and thus closing the inlet to such port. The steam chest is usually of cylindrical form and is cast integral with the steam cylinder, as in the well known Corliss engine. In the simplest design of such engines, the seats in the steam chest with which the puppet valves cooperate, have been cast integral with said chest. The limiting walls of the clearance chamber in the steam chest—by clearance chamber I mean the open space intervening between the closed valve and the inlet in the steam cylinder—in this design were formed in the steam chest itself. Such design, however, is open to serious disadvantages, owing to difficulties arising in and growing out of the casting operation, and to the impossibility of renewing and replacing the valve seats in case of accident. To remedy these difficulties, the valve seats, which before were integral with the steam chest, have been formed in and integral with a cage removably fitted and held in the steam chest, the front and rear valve seats being connected and held together by longitudinal ribs extending like rods through the clearance chamber, the limiting walls of which chamber were formed, as before, in the steam chest. The ribs give the cage a skeleton formation, the openings between the ribs communicating with that portion of the clearance chamber formed in the circumference of the steam chest. This design provides a means for readily machining, renewing, and replacing the valve seats; but it is open to objections which seriously impair its usefulness. These objections grow out of the presence of the seat-connecting ribs, which not only give rise to

unequal expansion in the casting operation, but increase largely the surface area of the clearance chamber with which the entering steam must contact, with corresponding increased liability to initial condensation. They also have a disturbing effect upon the smooth and even flow of the steam. The intervals or spaces between the ribs through which the steam circulates enhance this disturbing effect, and add to the volume of the clearance chamber which also is objectionable. It is well known that, in steam engines particularly, the reduction of the surface area and volume of the clearance chamber is of much consequence for the obtaining of high economies.

It is the object of my invention to realize these advantages as well as to obviate the disadvantages above referred to as inherent in other designs. To this end I combine with the steam chest a valve cage removably fitted and held therein, which cage is of smooth, symmetrical, unbroken exterior to permit it to be easily machined and finished, and contains within itself not only the valve seats integral with it, but also the clearance chamber, the side walls of which are formed by the unbroken shell of the cage. In this way the clearance chamber in the valve chest is confined wholly to the interior of the removable cage, there is no portion of said chamber in the outer circumscribing walls of the steam chest, and no skeleton formation of the cage at the point where the clearance chamber is located; the said chamber is unobstructed to the smooth and even flow of the entering steam, and the construction is such as to permit reduction of surface area and volume of the clearance chamber to the possible minimum. I provide for the necessary increase in volume of clearance as the inlet opening to the steam cylinder is approached by inclining rearwardly the rear wall of the clearance chamber, to increase the cross-sectional area of the latter as it nears the steam cylinder. In this way the needed increase is provided for without disturbing or affecting the symmetry of the exterior of the cage.

To enable those skilled in the art to better understand and use my invention, I will now proceed to describe the manner in which the same is, or may be, carried into effect by reference to the accompanying drawing in which—

Figure 1 is a sectional elevation of a por-

tion of steam engine embodying my invention, the section being vertical in the plane of the longitudinal axis of the steam chest of one of the steam inlet valves; Fig. 2 is a section on line 2—2 Fig. 1, showing a fragmentary portion of the steam cylinder and its piston.

A is the steam cylinder and B is the steam chest or cylinder cast in one with the steam cylinder, and designed to contain the steam inlet valve. There will be one of these valves at each end of the steam cylinder, as usual in engines of this character.

C is the cage of cylindrical exterior, removably fitted and held in the steam chest B, and having cast integral with it the front and rear annular valve seats c, c' .

D is the clearance chamber formed and contained within the cage; and e is the inlet port through which the steam enters the steam cylinder A. The rear wall of the clearance chamber is indicated at d Fig. 1, and, as there shown, it inclines rearwardly as it approaches the inlet port e , thus effecting the necessary increase in the volume, or, in other words, the cross-sectional area, of the clearance chamber as it nears the entrance to the steam cylinder. This, it will be noted, is effected without disturbing the symmetrical cylindrical contour of the valve cage C. It will be noted also that the clearance chamber D has a smooth unbroken and unobstructed interior throughout, and that it is confined wholly within the walls of the cage C.

Within the steam chest B is machined out a seat b into which the cage C is fitted closely, and pressed back to bring up against a shoulder b' . When thus once fitted into its seat, it is there held securely; while at the same time it may, whenever occasion demands, be removed and replaced by a fresh cage. The joint between it and the steam chest should, of course, be steam tight, to which end any suitable packing means may be employed, as will be understood without further explanation by those skilled in the art to which this invention pertains.

Within the cage C is an axial tubular bearing or guide, w , for the valve spindle w , which carries the puppet valve V of usual construction with faces v, v' , to cooperate with the seats c, c' , in the cage C. Any suitable form of valve gear to operate the

valve may be employed—preferably that form of valve gear which is the subject of my Patent No. 1,059,567 of April 22, 1913, and which is indicated in the drawing.

The invention hereinbefore described is applicable to the exhaust valve as well as to the steam inlet valve, and I desire to be understood as including any such obvious modification in my claims.

Having described my invention and the best way now known to me of carrying the same into practical effect, I state in conclusion that I do not limit myself strictly to the structural details hereinbefore shown and set forth in illustration of my invention, for manifestly the same can be varied to some extent without departure from the spirit of the invention; but

What I here claim and desire to secure by Letters Patent is as follows:

1. The combination with the steam chest, steam cylinder and steam valve, of a valve cage having a symmetrical unbroken exterior and fitted and removably held in a seat of corresponding shape formed for its reception in the steam chest, said cage being provided with valve seats in its interior to cooperate with said steam valve, and with a clearance chamber between the valve seats and the entrance to the steam cylinder, having a smooth unobstructed interior, and confined wholly within the walls of the cage.

2. The combination with the steam chest, steam cylinder and steam valve, of a valve cage having a symmetrical unbroken exterior and fitted and removably held in a seat of corresponding shape formed for its reception in the steam chest, said cage being provided with valve seats in its interior to cooperate with said steam valve, and with a clearance chamber between the valve seats and the entrance to the steam cylinder, having a smooth unobstructed interior, and confined wholly within the walls of the cage, the rear wall of the clearance chamber being inclined rearwardly so as to increase the cross-sectional area of the chamber as it approaches the entrance to the steam cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

SIEGFRIED ROSENZWEIG.

Witnesses:

H. B. MARSTON,
CHAS. S. HYER.