

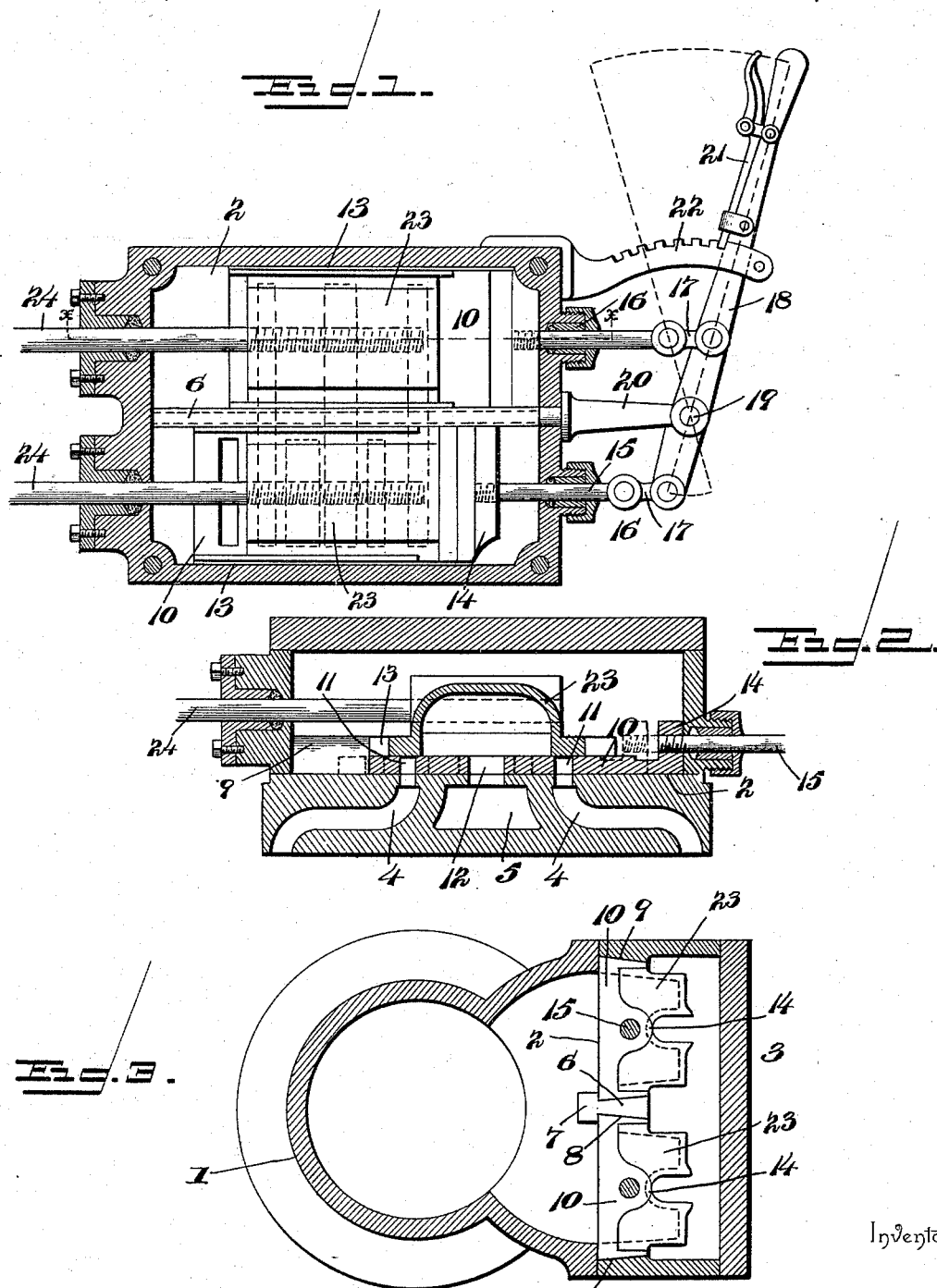
(No Model.)

2 Sheets—Sheet 1.

T. B. HEADEN.  
REVERSING VALVE FOR ENGINES.

No. 526,707.

Patented Oct. 2, 1894.



Witnesses

*E. S. Stewart*  
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By *his* Attorneys.

Thomas B. Headen

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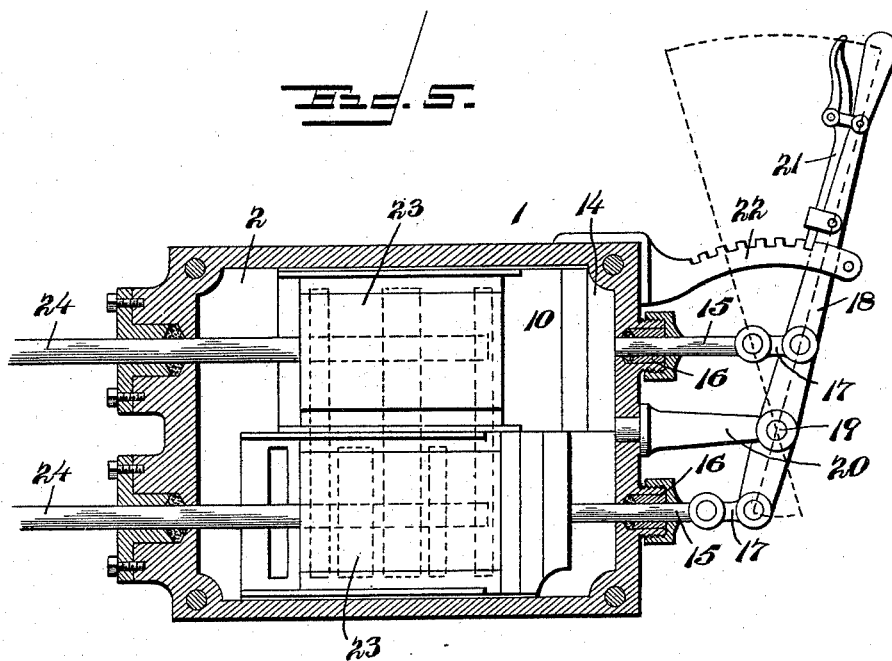
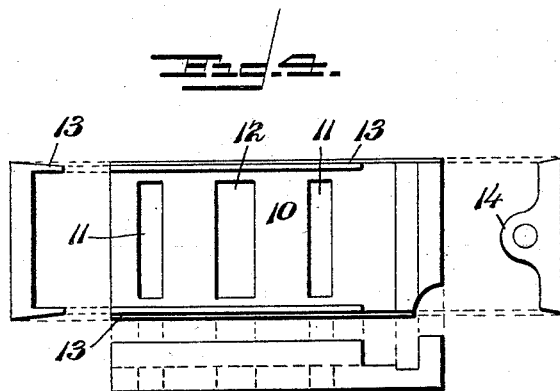
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Inventor

*Thomas B. Headen*

Witnesses

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# UNITED STATES PATENT OFFICE.

THOMAS B. HEADEN, OF LAWRENCE, KANSAS.

## REVERSING-VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 526,707, dated October 2, 1894.

Application filed May 18, 1894. Serial No. 611,717. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS B. HEADEN, a citizen of the United States, residing at Lawrence, in the county of Douglas and State of Kansas, have invented a new and useful Reversing-Valve for Steam-Engines, of which the following is a specification.

This invention relates to reversing valves for steam engines, and it has for its object to provide reversing valves especially adapted for use in connection with traction engines, and which, while dispensing with the link and other complicated reversing gear motions for steam engines, at the same time provides simple and efficient means for quickly and positively changing the direction of the travel of the steam into the cylinder for the purpose of reversing the travel of the piston.

With these and 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.

In the accompanying drawings:—Figure 1 is a sectional view of the steam chest of the steam engine equipped with the herein-described improvements. Fig. 2 is a sectional view on the line  $x-x$  of Fig. 1, showing in full and dotted lines, one of the sliding valve seats shifted to a position to close the cylinder ports and also to open the same. Fig. 3 is a cross sectional view of the cylinder and steam chest of an engine showing in end elevation the arrangement of the sliding valve seats and sliding valves. Fig. 4 is a detail plan view, and a series of projections of one of the sliding valve seats. Fig. 5 is a view similar to Fig. 1, showing a modified arrangement of the sliding valve seat with the central longitudinal bridge-tree plate dispensed with.

Referring to the accompanying drawings, 1 designates the cylinder of a steam engine of the ordinary construction provided at one side with the flat cylinder face 2, forming one of the inclosing walls of the ordinary steam chest 3, fitted over the said cylinder face. In the present invention, the flat cylinder face is made double the width of the ordinary cylinder face of an engine of the same size and is pierced by the ordinary cyl-

inder ports 4, and the single exhaust port 5, which ports are made with double the amount of area that is required in an ordinary engine of the same size and are preferably divided or separated into opposite sets by the central bridge-tree plate 6.

The central bridge-tree plate 6, may be cast as a part of the cylinder face 2, but is illustrated as being fitted in the retaining groove 7, planed in the face of the cylinder 2, longitudinally thereof and at a point centrally between opposite side edges of the said cylinder face, in order to properly position the bridge-tree plate centrally of the ports 4 and 5, to separate the same into opposite sets at both sides of the bridge-tree plate, the latter being secured in the retaining groove 7, by any suitable fastening devices.

The central longitudinal bridge-tree plate 6, projects beyond the cylinder face 2, into the steam chest 3, and is provided on both sides thereof with the bevel-grooves 8, that are reversely disposed with respect to the directly opposite bevel-grooves 9, planed within opposite sides of the steam chest 3, at opposite side edges of the cylinder face 2, in order to complete, with the bevel-grooves of the bridge-tree plate, dovetailed ways to receive therein the sliding valve seats 10. The sliding valve seats 10, are mounted to slide flat upon the cylinder face 2, and are provided with a single set of induction and eduction ports 11 and 12, corresponding to the cylinder and exhaust ports 4 and 5, of the cylinder face, so that the said sliding seats may be adjusted within the steam chest to a position wherein the ports thereof will register with the ports in the cylinder face, it being of course understood, that when one sliding valve seat is brought to a registering position with the ports of the cylinder face at one side of the central bridge-tree plate, the other sliding valve seat will cover the opposite set of ports, and a reversal in the positions of these valve seats will change the course of the steam and therefore reverse the piston.

The oppositely sliding valve seats 10, are provided at opposite sides with the inclined side flanges 13, that are outwardly convergent to form slides to steady and retain the seats properly in position within the steam

chest while being adjusted, and also providing for loosely dovetailing the seats between the bridge-tree plate 6, and the bevel-grooves at opposite sides of the steam chest, such manner of mounting the valve seats providing for steam tight joints between the same and the face of the cylinder and also at the sliding points of contact with the sides of the steam chest and the bridge-tree plate. The said sliding valve seats 10, are further provided at one end with the perforated lugs 14, in which are fitted the inner ends of the adjusting rods 15, that work in the stuffing boxes 16, at one end of the steam chest 3, and are connected at their outer ends by the links 17, pivotally, to the reversing lever 18, that is pivotally mounted at 19, between the connections of the links 17, therewith, on the outer end of the supporting bracket 20. The reversing lever 18, carries an ordinary catch pawl 21 that is adapted to engage the notches in the notched segment 22, secured to and standing off from one end of the steam chest 3, at one side of the lever 18.

By reason of the construction of the sliding seats 10, that are provided with a single set of ports corresponding to the ports of an ordinary engine, it will be understood that any form of a sliding valve whether flat, cylindrical, triangular, square or other shape, may be used in connection therewith, and for the purpose of illustration ordinary square slide valves 23 are shown as adapted to reciprocate flat on the outer faces of the seats 10, and are guided in their reciprocations on such seats by the side flanges 13, that also subserve the additional function of holding and guiding the slide valves 23 to a steady movement on the valve seats, and said slide valves are carried on the inner ends of the valve stems 24, that are operated by any ordinary valve gearing.

While I have described the preferred manner of mounting the valve seats on the cylinder face, it will be understood that the bridge-tree plate 6, and therefore the dovetailed ways for the sliding valve seats may be dispensed with as illustrated in Fig. 5, of the drawings. In this figure the side flanges 13, of the valve seats are shown as disposed at direct right angles to the body of the seats, and the said seats are held steady in their adjustment within the steam chest by reason of the same playing side by side in direct contact with each other, the adjacent flanges of the same meeting in sliding contact. In this modification the slide valves are arranged as previously described, that is mounted to slide on the valve seats between the side flanges thereof.

To reverse the engine it is simply necessary to manipulate the lever 18, as already described, and it will therefore be apparent to those skilled in the art that the reversing of

the engine may be accomplished in a much simpler and more efficient manner than heretofore, and it will be understood that changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a reversing device for steam engines, the combination of the cylinder having a double-width face provided with opposite sets of ports, the steam chest, a pair of separate and independent valve seats mounted to slide side by side on the cylinder face over the ports and each provided at its opposite side edges with side flanges, the outermost of which flanges are adapted to have a sliding contact with the inner sides of the steam chest, means for simultaneously adjusting these separate valve seats in opposite directions, and separate slide valves mounted to slide on the valve seats and registering in the space between the flanges thereof, substantially as set forth.

2. The combination of a cylinder having a double width face pierced by the ordinary ports, a bridge-tree plate extending longitudinally of the cylinder face and projecting beyond the same, sliding valve seats provided with a single set of ports and side flanges and mounted to slide on the cylinder face at both sides of said bridge-tree plate, means for adjusting said valve seats, and slide valves mounted to slide on each of said valve seats, substantially as set forth.

3. The combination of a cylinder having a double width face pierced by the ordinary ports, the steam chest provided at directly opposite sides with bevel-grooves located at opposite side edges of the cylinder face, a bridge tree plate extending longitudinally of the cylinder face, to separate the ports thereof into opposite sets and projecting beyond the cylinder face, said bridge tree plate being provided on both sides with bevel-grooves reversely disposed to the directly opposite grooves of the steam chest to form dovetailed-ways, sliding valve seats having a single set of ports and provided with side flanges, outwardly convergent to register in said dovetailed-ways, means for simultaneously and oppositely adjusting said valve seats, and the slide valves arranged to slide on the valve seats between the flanges thereof, substantially as set forth.

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

THOMAS B. HEADEN.

Witnesses:

A. G. HAGER,

R. B. WAGSTAFF.