

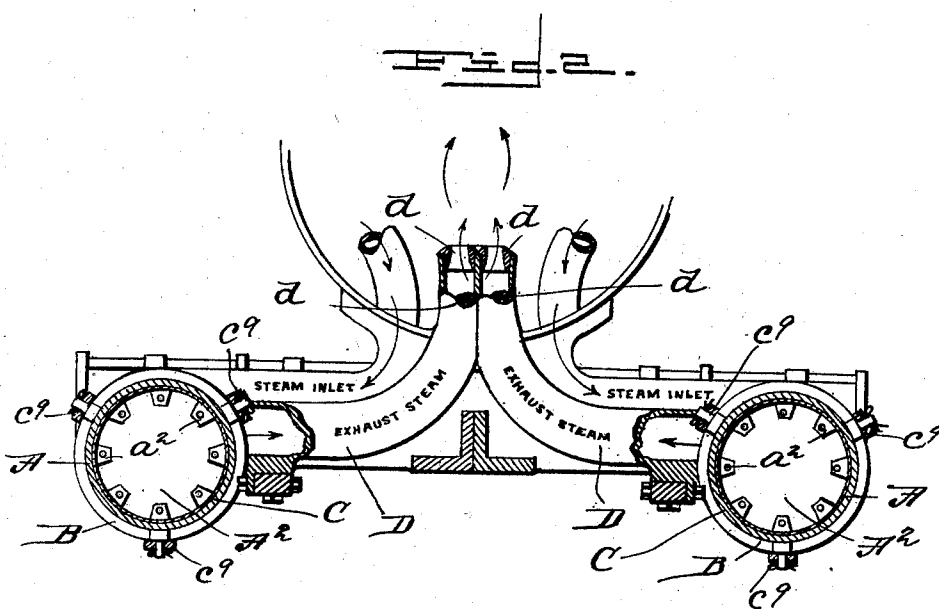
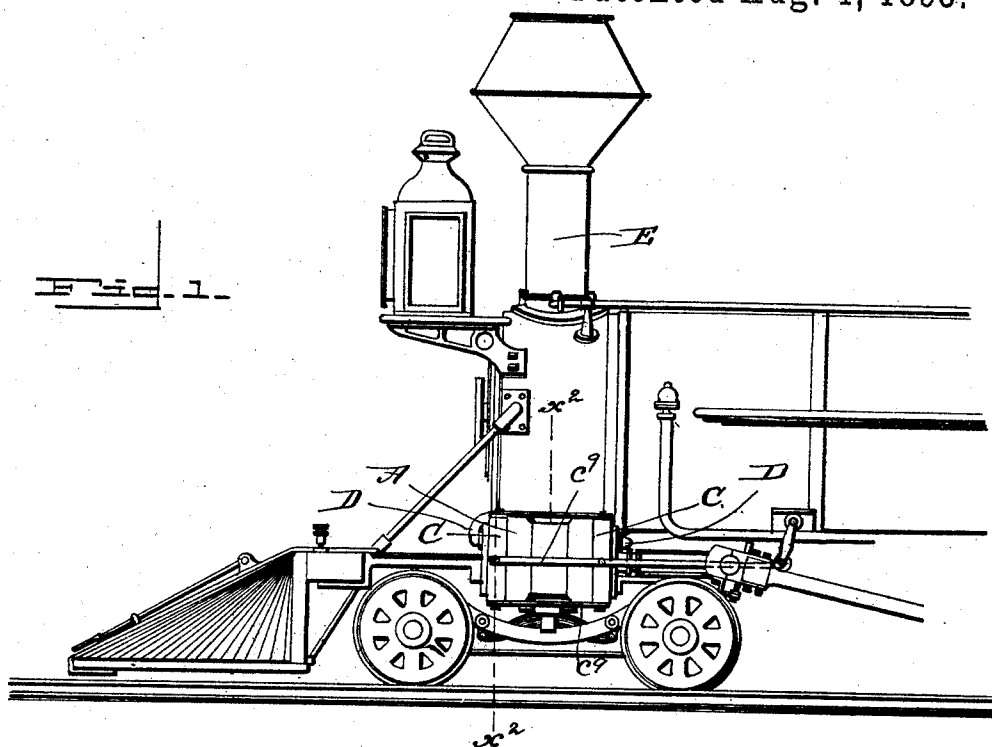
(No Model.)

2 Sheets—Sheet 1.

H. W. LOUNSBERY.
STEAM ENGINE VALVE.

No. 502,497.

Patented Aug. 1, 1893.



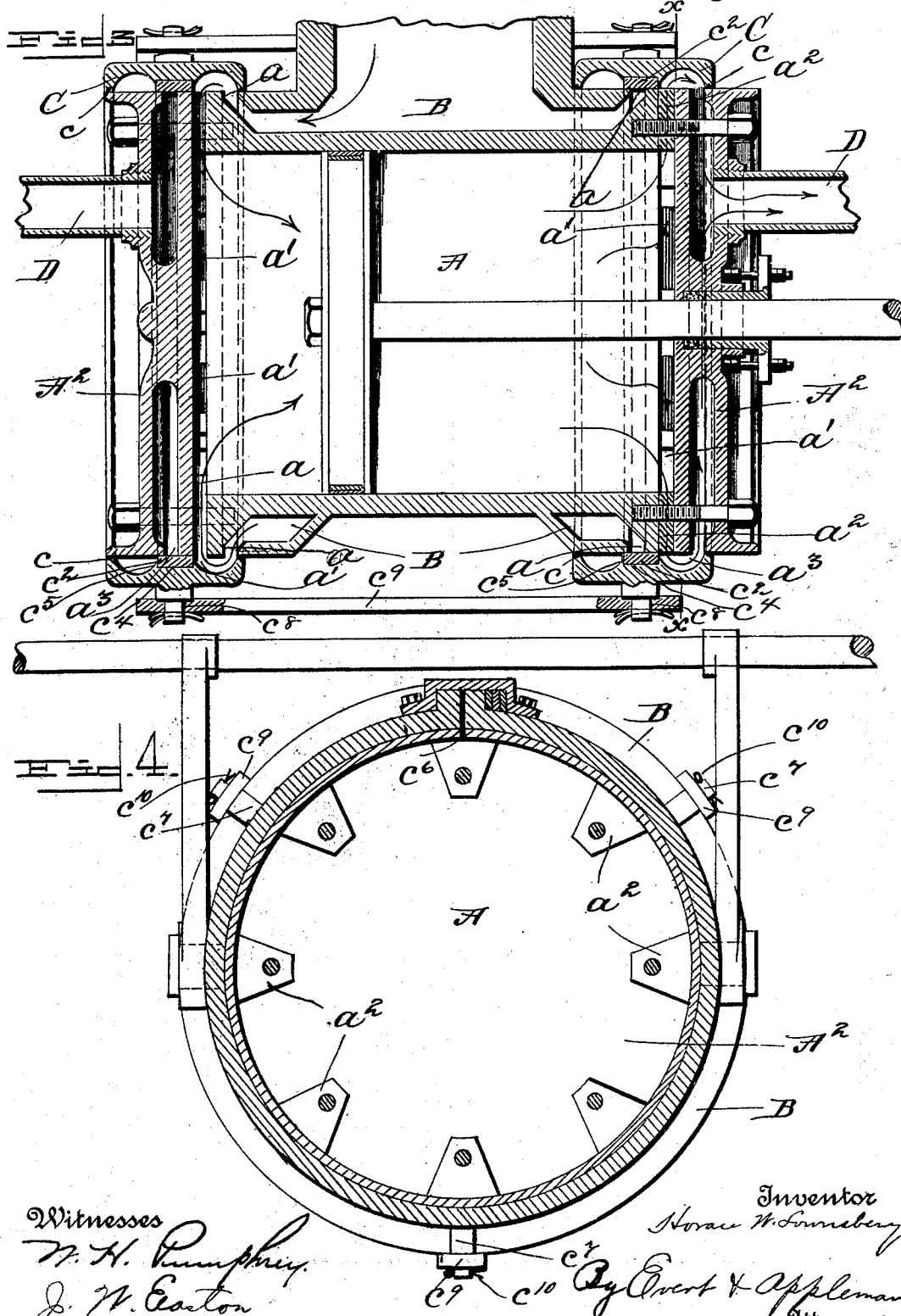
(No Model.)

2 Sheets—Sheet 2.

H. W. LOUNSBERY.
STEAM ENGINE VALVE.

No. 502,497.

Patented Aug. 1, 1893.



Witnesses
W. H. Humphrey
J. M. Easton

Inventor
Hiram W. Lounsbury
By Ewert & Appleman
Attorneys

UNITED STATES PATENT OFFICE.

HORACE W. LOUNSBERY, OF WELLSBOROUGH, PENNSYLVANIA.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 502,497, dated August 1, 1893.

Application filed September 27, 1892, Serial No. 447,010. (No model.)

To all whom it may concern:

Be it known that I, HORACE W. LOUNSBERY, a citizen of the United States of America, residing at Wellsborough, in the county of Tioga and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engine Valves, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain new and useful improvements in engines and slide valves.

The object of the invention will be readily apparent from the following comparison; drawn to disclose more clearly the important advantages of this construction over various forms in use at the present day, wherein a cylinder commonly employed on a locomotive, is represented by X. First, in cylinder X, the length of each inlet port measures fifteen port inches, from the interior of the steam chest to the bore of cylinder, and sixteen inches transversely or at right angles to the cylinder bore, making two hundred and forty square inches in all. In an engine having driving wheels six feet in diameter, two hundred and ninety four revolutions will be made per mile and counting two inlets to each revolution a total of one hundred and forty-one thousand one hundred and twenty port inches of steam will be utilized to fill port space per minute, supposing the speed to be one mile per minute. With the herein described construction, the length of steam chest to bore of cylinder measures three inches and transversely or around the cylinder fifty-two inches amounting to one hundred and fifty-six port inches at each end of the cylinder, thus aggregating three hundred and twelve port inches and following out the calculation, with two inlets per revolution and two hundred and ninety-four revolutions per mile, a total of ninety-one thousand seven hundred and twenty-eight port inches of steam will be utilized against one hundred and forty-one thousand one hundred and twenty as above, which results in a saving of forty-nine thousand three hundred and ninety-two port inches of steam per mile, per minute. As the piston is moving at nearly its maximum velocity when the slide valve is at either extremity of its stroke, the necessity of rapid and unobstructed ex-

haust will be fully appreciated. With cylinder X, it has been impossible to obtain the desired high speed of from seventy-five to one hundred miles per hour owing to the insufficient means for rapid exhaustion of the cylinder, that is to say to the heretofore unavoidable distance between the exhaust ports and the bore of the cylinder, which tends to cause a lagging of the steam in the cylinder and finally results in a back pressure on the piston. Again taking the number of revolutions per mile (two hundred and ninety-four with six feet driving wheels) there would be three hundred and eighty-eight exhausts per minute and supposing this to be increased to number five hundred and ninety-two exhausts or a speed of one and one-half miles per minute, the well known failing would result, namely, lack of exhaust, also running away of the piston from the live steam in the cylinder which is occasioned by the momentum of the engine and the unnecessary length of the admission ports. In this device a series of exhaust ports are provided and arranged in a circle at each end of the cylinder, measuring in the aggregate one hundred and fifty-six port inches and the distance between the exhaust chamber and the cylinder bore being but three inches, allows for rapid action in both admission and exhaust and readily admits of speeding the piston up to drive at a rate of seventy-five to one hundred miles per hour; furthermore, great inconvenience is experienced in discharging the exhaust steam into the stack advantageously and at the same time successfully overcoming all tendency toward back pressure. The old form of one nozzle for this purpose has been found inoperative for varying speeds, and with an improved arrangement comprising two nozzles, wherein each is required to carry double or the exhaust from both ends of the cylinder, although greatly facilitating the ready discharge of the exhaust steam, certain well known failings are noticeably prominent and to provide an unobstructed flow for said exhaust, four pipes, or one for each end of the cylinders, connecting with a corresponding number of nozzles in the stack are arranged.

Furthermore, the object of the invention resides in the provision of circular or sleeve

slide valves mounted on suitably planed surfaces at each end of the cylinder, on the exterior thereof and particularly adapted for lessening the length of admission and exhaust

5 ports, to produce as a result the new, economical and useful results heretofore set forth.

In describing the invention in detail, reference is had to the accompanying drawings forming a part of this specification, wherein
10 like letters of reference indicate corresponding parts in the several views, in which—

Figure 1, is a view in central longitudinal section of one form of device embodying my improvements, shown as applied to a locomotive. Fig. 2, is a transverse sectional view of the same, on the line x, x , of Fig. 1, showing the arrangement of exhaust pipes. Fig. 3, is a detail sectional view of the device on an enlarged scale. Fig. 4, is an enlarged detail
15 transverse sectional view of the same on the line x^2, x^2 , of Fig. 3.

In these drawings, A, indicates the cylinder proper, having formed exteriorly thereof a steam chamber B, communicating with the interior of said cylinder through the inlet
25 or admission ports a . These inlet ports a , (see Fig. 4) are formed between lugs a^2 , of the cylinder heads A^2 , which are cast thereon in a radial series as shown. This construction affords many advantages as will
30 be readily apparent to persons versed in the art to which it appertains; for example the usual length of the port from the steam chest to the bore of the cylinder may be decreased
35 to one-fifth, which in the present instance would be a maximum port length. Again the ports may be increased transversely from one to three times that ordinarily used and as the exhaust ports are of corresponding proportions,
40 it will be at once seen that the saving in steam, rapidity of action, &c., will serve to facilitate a ready and economical operation.

The valves C, (here shown in the form of sleeves or bands) controlling the admission
45 and exhaust ports a, a^3 , are provided with packing rings c, c^2 . The latter being the central ring forming the valve proper, is seated in an annular groove c^4 , formed between the flanges c^5 , and having its ends meeting as at
50 c^6 , (see Fig. 4.) These valves are further provided with radially projecting studs c^7 , which are adapted to enter apertures c^8 , formed in the tie rods c^9 ; said connection being made secure by the locking keys c^{10} . As the valve,
55 piston rod, &c., may be connected up in the usual manner, observing the same relationship between the parts, it is not thought necessary to specifically describe the same. From each exhaust chamber at the ends of the cylinder pipe D leads and connects with its
60 respective nozzle d , in position in the stack E, as is clearly shown in Fig. 4.

It will be particularly noted that I do not limit myself to the general design and arrangement of parts as herein given, to more
65 clearly illustrate the broad idea, furthermore, that various changes may be made in the de-

tail construction tending toward the accomplishment of the several objects as above set forth in a more economical and expeditious
70 manner.

I claim the right to vary this valve in lap or lead; furthermore the valve may have one port or more may be made in a solid ring or open on one side as circumstances may require;
75 it will also be noticed to use relief valves to relieve overpressure caused by drawing water from boiler, condensation or compression, also grooves to convey steam to port in valve to keep packing in position, come within the
80 scope of my invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an engine, a cylinder provided exteriorly with a steam chamber, the cylinder
85 heads hollowed out to form exhaust chambers, the inlet and exhaust ports located between the ends of the cylinder and the heads thereof and the sleeve valves controlling said
90 ports and having packing rings forming the valves proper, as specified.

2. In an engine, a cylinder provided with an annular steam chamber, the cylinder heads
95 hollowed out to form exhaust chambers and ports, the inlet ports between the cylinder ends and heads, the sleeve valves arranged exterior to the said cylinder and steam chamber and provided with annular grooves and
100 central packing rings forming the valves proper, as specified.

3. In an engine, the combination with a steam chamber arranged exterior to the cylinder and forming inlet ports and passages,
105 of the sleeve valves controlling said ports and being provided with annular grooves forming continuations of said passages, the cylinder heads hollowed out to form exhaust chambers and ports and the radially disposed blocks secured between the inner faces of said heads
110 and the ends of the cylinder, as specified.

4. In an engine, the combination with a cylinder of an annular steam chamber arranged exterior to the same, inlet passages a between
115 the said cylinder and chamber, the cylinder heads hollowed out to form exhaust ports and chambers and secured to said cylinder forming admission ports a' , the sleeve valves controlling said exhaust admission and inlet
120 ports, provided with annular grooves and packing rings, the latter being located between said grooves, as specified.

5. In an engine, the cylinder A, the steam chamber B, the heads A^2 and the inlet, admission and exhaust ports a, a', a^3 , as
125 described, and the sleeve valves arranged exterior to said cylinder and controlling said ports, provided with two or more annular grooves and the packing rings forming the valves proper arranged between said grooves, as
130 specified.

6. In a valve gear, the cylinder being provided exteriorly with a steam jacket, the radially disposed admission ports or communi-

cating passages between said cylinder and jacket, the exhaust ports adjacent to said admission ports, and the sleeve valves being provided with annular grooves and packing
5 rings between said grooves, the central ring thereof forming the valve proper, substantially as and for the purpose described.

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

HORACE W. LOUNSBERY.

Witnesses:

JOSEPH C. EASTON,
EDWIN O. LOUCKS.