

(No Model.)

2 Sheets—Sheet 1.

W. GOODSPEED.
SLIDE VALVE.

No. 587,367.

Patented Aug. 3, 1897.

Fig. 1.

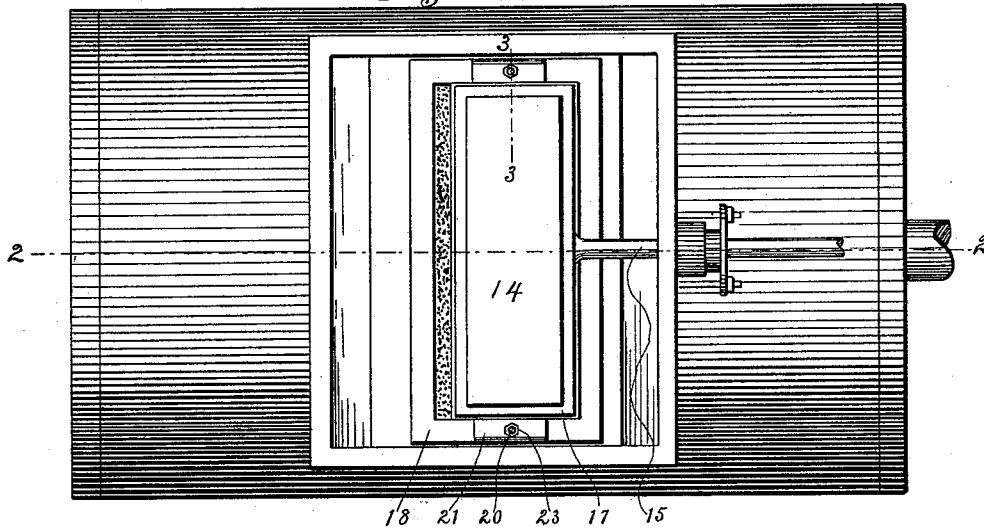
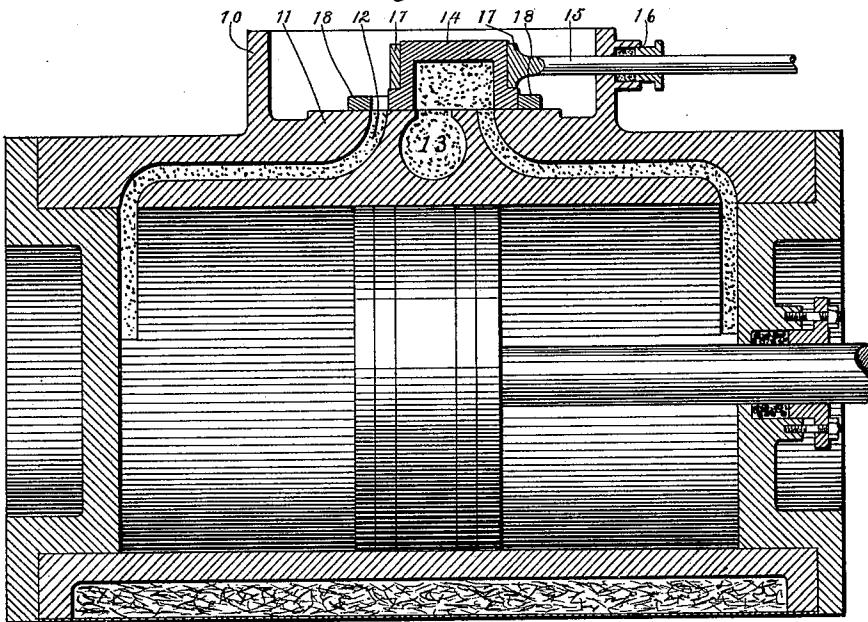


Fig. 2.



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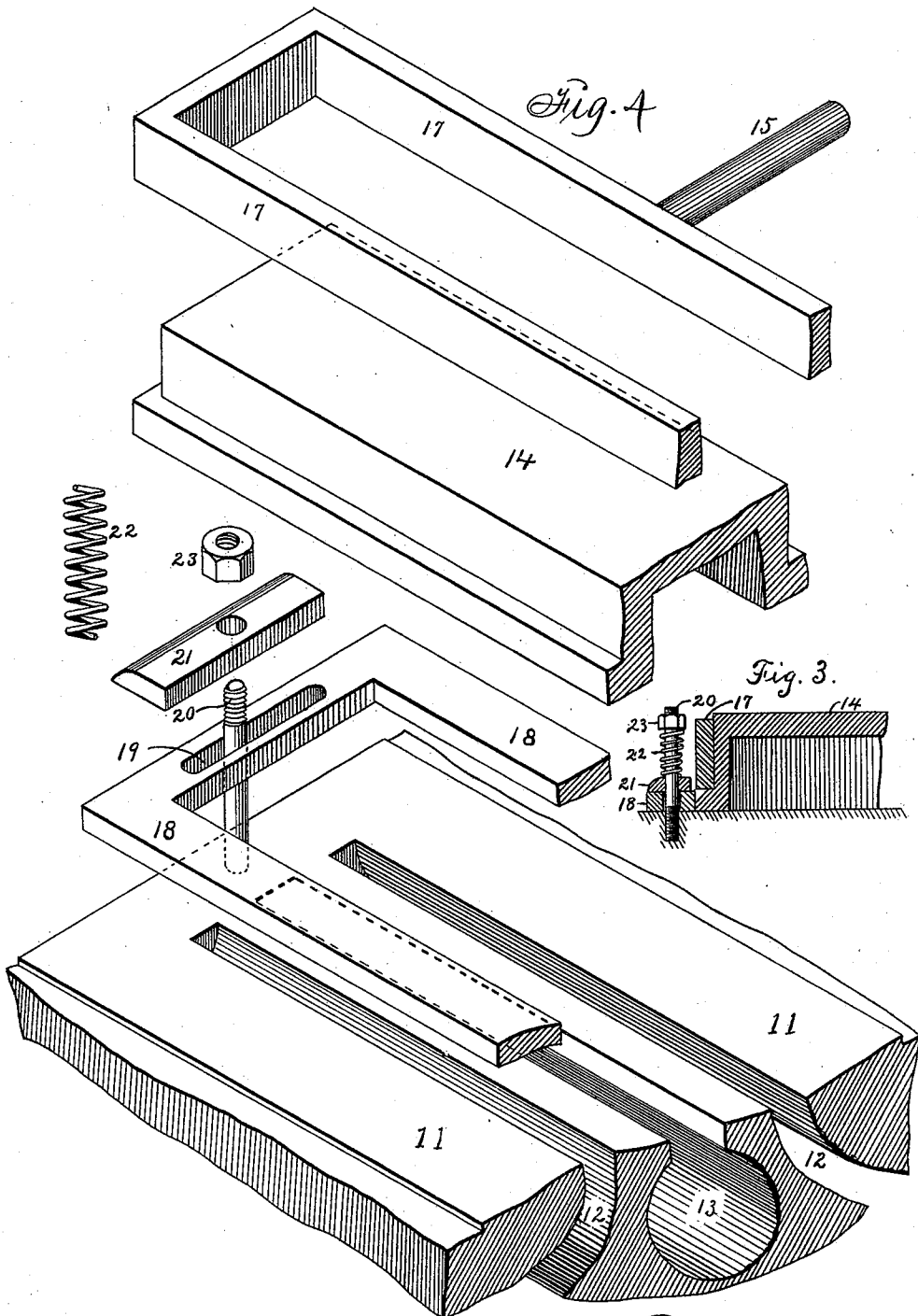
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J. A. Bramhall. }
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UNITED STATES PATENT OFFICE.

WILLIAM GOODSPEED, OF BLOOMFIELD, IOWA.

SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 587,367, dated August 3, 1897.

Application filed March 30, 1897. Serial No. 630,018. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GOODSPEED, a citizen of the United States, residing at Bloomfield, in the county of Davis and State of Iowa, have invented a new and useful Slide-Valve and Auxiliary Cut-Off for Steam-Engines, of which the following is a specification.

This invention is in the nature of an attachment that may be applied to the slide-valve of any ordinary engine with only slight modifications to the valve, and it is especially designed for use in connection with a link-motion for controlling the speed and direction of rotation of the engine.

My object in this invention is to provide a valve of this class of simple, strong, durable, and inexpensive construction that may be adjusted or set to automatically cut off at any desirable point without employing any valve-stem or the like in addition to the ones ordinarily used.

A further object is to provide a valve in which a comparatively large and free induction-port is provided when the valve is set to cut off at a relatively small portion of the piston's stroke to thereby tend to produce a high initial pressure and the consequent increase of steam and the increased efficiency of the engine.

A further object is to provide a valve which may be operated so as to admit steam to the cylinder during the entire stroke of the piston, so that the entire boiler-pressure may be used throughout the entire stroke of the piston when it is desired to generate an unusual great amount of power, and, further, to provide an engine of this class in which the wear upon the valve-seat will be extended over a large area, and hence the durability of the valve will be increased.

My invention consists, essentially, in the construction of the valve and in the construction, arrangement, and combination relative thereto of the auxiliary cut-off, as hereinafter set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which—

Figure 1 shows a top or plan view of the valve mounted on its seat within the steam-chest. Fig. 2 is a central longitudinal vertical section on line 2 2 of Fig. 1. Fig. 3 shows a transverse sectional view through the line

3 3 of Fig. 1, and Fig. 4 shows a detail perspective view of parts of the engine and valve to illustrate certain details of construction.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the steam-chest, having the valve-seat 11 therein provided with the induction-ports 12, leading from the valve-seat to the opposite ends of the cylinder, and also the exhaust-port 13, leading from the valve-seat at a point between the other ports to a point of discharge.

The reference-numeral 14 indicates a slide-valve which differs from the valve of ordinary construction in that it has a diminished inside or outside lap, and 15 indicates a stem passed through the packing-box 16 and having a yoke 17 on its end fixed to the valve 14.

All of the above elements are of the ordinary construction with the single exception noted.

The essential novelty in the valve consists of a rectangular auxiliary cut-off 18, having a flat lower surface and having a rectangular opening in its central portion. The dimensions of this central opening are in one direction the exterior length of the valve plus the width of one of the ports 12 and in the opposite direction exactly the width of a valve. In the side pieces of the auxiliary cut-off are the longitudinal slots 19, and the reference-numeral 20 is used to indicate standards screwed into the face of the valve-seat to project upwardly through the said slots 19.

21 indicates elongated washers having openings, through which the standards 20 are passed, so that the under surfaces of the washers may engage the top surface of the auxiliary cut-off. 22 indicate expansion-springs mounted upon the standards 20, and nuts 23 are placed on the upper ends of the standards to compress the springs to thereby hold the washers 21 in frictional contact with the auxiliary cut-off 18. This arrangement is only for use when there is no steam-pressure in the chest.

In practical operation it is obvious that the valve proper will be moved a slight distance upon its seat before engaging the auxiliary cut-off, and when it does engage the cut-off will be moved slightly—that is, when the stroke of the valve is of greater length than the width of the ports leading to the cylinder.

This valve is designed for use only in connection with a link-motion or other means for regulating the length of its stroke. Assuming that the link-motion is set so that the valve
 5 will cut off at one quarter-stroke and assuming the valve to be in its position for starting—that is, with a small lead-opening—it is obvious that the first movement of the valve will be to open the induction-port wide. Then
 10 the auxiliary cut-off is moved by the valve, so that the side of the cut-off adjacent to the induction-port will be moved to partially cover the said induction-port. Then as the valve starts on its return movement it will meet the
 15 auxiliary cut-off or that portion thereof that is partially covering the induction-port at a point midway between the sides of the induction-port, and hence the steam will be cut off, while the valve has only partially covered the
 20 induction-port—that is, before the full stroke of the valve has been made. It is obvious that the further movement of the valve—that is, to its outer limit and part of the way back—will not open the induction-port. Hence we
 25 have a one-quarter cut-off with a full opening of the induction-port and also a full opening of the exhaust-port. It is to be understood in this connection that the earlier the cut-off the greater is the length of valve movement
 30 required.

Assuming that it is desired to work the engine to its fullest capacity, we will assume that the valve is in the same position as in the former instance—that is, with a small lead
 35 open—and we will assume, further, that the

link-motion is set or adjusted so that the stroke imparted to the valve will be only the same as the width of the induction-port. It is obvious that in this instance the induction-port will be opened gradually until at the end
 40 of the valve's stroke it will be wide open. In this instance it will be noted that the auxiliary cut-off is not moved, and hence the friction of the valve upon its seat will be lessened, inasmuch as the area of the valve upon which the
 45 steam may press is less than with the ordinary-sized valve having considerable outside lap.

Having thus described my invention, what I claim as new therein, and desire to secure by
 50 Letters Patent of the United States therefor, is—

The combination with an engine having a steam-chest and induction and exhaust ports, of a slide-valve 14 having no inside or outside
 55 lap, a stem 15, a yoke 17 thereon fixed to the valve, an auxiliary cut-off 18, having slots 19 at its sides, standards 20 fixed to the valve-seat to project upwardly through the slots, washers on the said standards to engage the
 60 sides of the auxiliary cut-off, expansion-springs on the standards, and nuts on the top of the standards to engage the springs, all arranged and combined substantially in the manner set forth and for the purposes stated. 65

WILLIAM GOODSPEED.

Witnesses:

DILLON H. PAYNE,
 GEO. T. SOWERS.