

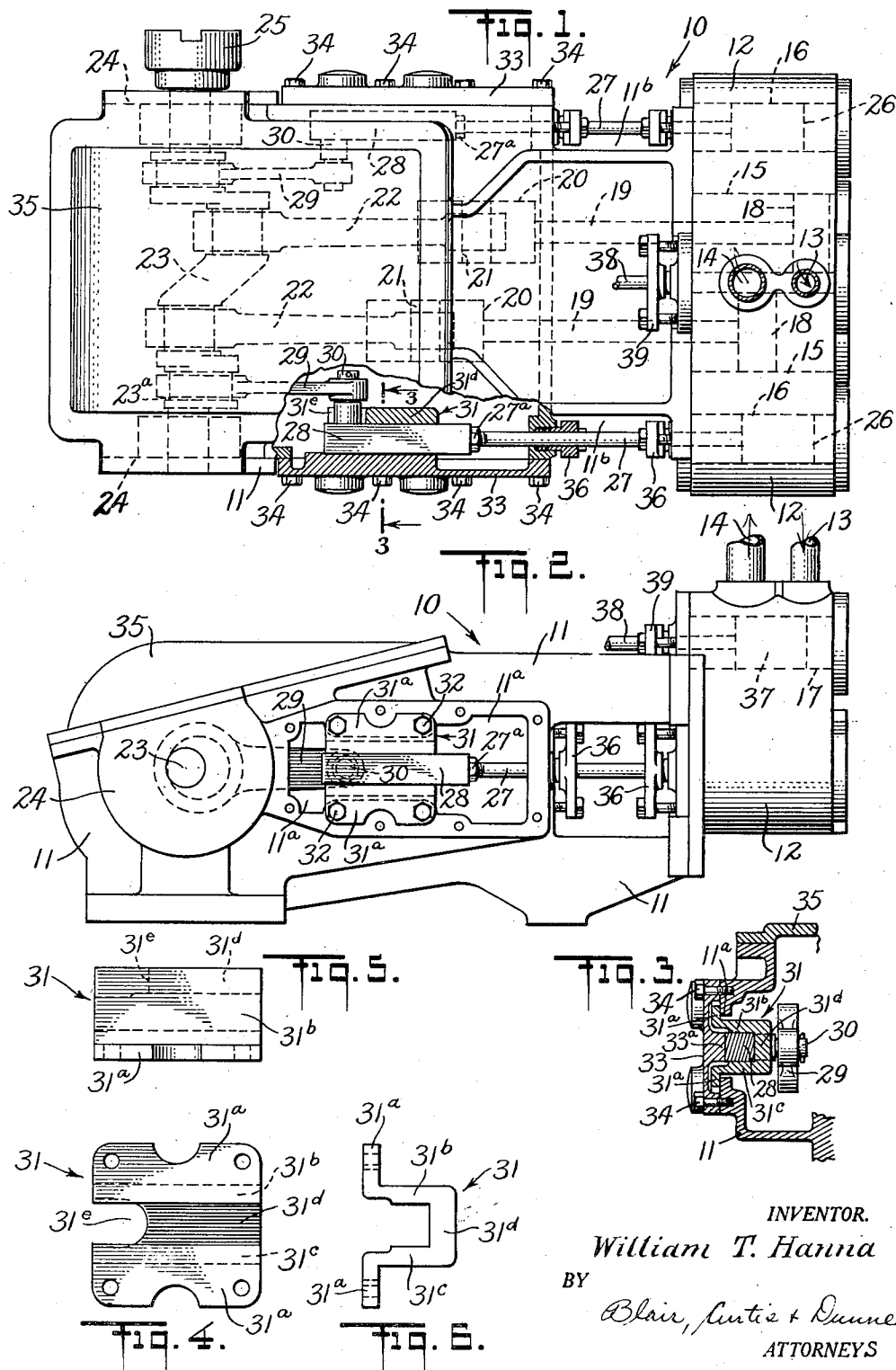
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W. T. HANNA

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ENGINE FRAME

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INVENTOR.

William T. Hanna

BY

Blair, Antis + Dunne

ATTORNEYS

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ENGINE FRAME

William Thompson Hanna, Cincinnati, Ohio

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This invention relates to a reciprocating steam engine construction and more particularly to a steam engine for use in connection with a coal stoker.

One of the objects of this invention is to provide a steam engine construction which is simple and sturdy in construction and thoroughly reliable and efficient in operation. Another object is to provide a construction of the above nature in which various of the operating parts are readily accessible for replacement or reconditioning and in which various of the parts may be readily assembled and may be adjusted and inspected without extensive disassembly of the entire assembly. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing in which is shown one of various embodiments of this invention,

Figure 1 is a plan view, partly in section, of an engine embodying my invention;

Figure 2 is a side elevation of the engine with the side cover plate removed to expose certain of the operating parts;

Figure 3 is a sectional elevation taken along the line 3—3 of Figure 1;

Figure 4 is an enlarged side elevation of the valve slide guide;

Figure 5 is a top view of the valve slide guide; and

Figure 6 is an end view of the valve slide guide.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring first to Figure 2, the engine generally indicated at 10 comprises a frame section 11 which rigidly supports a cylinder and valve block 12, the cylinder and valve block being secured to the frame in any suitable manner as by bolts or the like. Cylinder block 12 is provided with working cylinders 15 (shown in dotted line) and with slide valve chambers 16 (also shown in dotted line). Cylinder block 12 has formed therein suitable steam passages of any desirable form and arrangement which connect an intake 13 and an exhaust 14 with the working cylinders 15 and slide valve chambers 16. I preferably provide also a controlling valve chamber 17 (shown in dotted line in Figure 2) which controls the flow of

steam to the slide valve chambers 16 and forms the working cylinders 15 as will be more fully described hereinafter.

As is more clearly shown in Figure 1, disposed within working cylinders 15 are operating pistons 18 (shown in dotted line) to which are connected piston rods 19 connected to suitable crossheads 20 by means of wrist pins 21. Crossheads 20 are suitably supported and guided within the crank case chamber of engine section 11 and have connected thereto by way of wrist pins 21, connecting rods 22 which connect the cross heads with the crank shaft 23. Crank shaft 23 is preferably journaled in a pair of bearing plates 24 secured to the sides of section 11, these bearing plates being secured to the section in any suitable manner as by bolts or the like. Preferably on one end of crank shaft 23 there is provided a suitable coupling connection 25 through which the power developed by the engine may be transmitted to the operating mechanism of the stoker (not shown).

Suitable pistons 26 (shown in dotted lines) are slidably disposed within slide valve chambers 16, and these pistons preferably take the form of slide valves which control the flow of steam to and from operating cylinders 15. To each of valve pistons 26 is secured a valve stem 27 which extends through the wall of cylinder block 12 and into frame section 11 wherein it is connected to a slide member 28. Preferably the connection between slide member 28 and valve stem 27 is adjustable by threading the stem into or out of the member 28 and locking it in position by nut 27a. A stud 30 extends substantially at right angles from slide member 28 and pivotally on its free end is a link 29 the other end of which is eccentrically mounted on a suitable bearing portion 23a of crank shaft 23. Thus rotation of crank shaft 23 reciprocates link 29 which in turn causes the reciprocation of slide member 28 to operate valve piston 26 and thus control the admission of steam to the working cylinders.

I have found, in order to avoid undue wear and inefficient operation of the valve pistons, that it is desirable to confine the valve pistons as closely as possible within their line of travel and also in proper alignment with the cylinder block. Thus I have provided a valve slide guide generally indicated at 31 (Figure 1) for each of the slide members 28. As is more clearly shown in Figures 2 and 3, guide 31 is bolted to frame section 11 as by bolts 32 which extend through flange portions 31a (Figure 3) resting against the side wall of the frame section. Slide 31 also includes top and bottom walls 31b and 31c (Figures 4 and 6)

and an inner wall 31d all of which are located within the crank case portion of frame section 11 and which form a channel or support in which slide member 28 can reciprocate (see Figure 3).

5 As is more clearly shown in Figures 1 and 5, a recessed portion 31e is formed in wall 31d of guide 31 and this recess receives stud 30 (Figure 1) when slide member 28 and valve piston 26 are in one external position. As is better shown in 10 Figure 2, frame section 11 is provided with an opening 11a through which guide 31 extends and which is closed by a side plate 33 (Figures 1 and 3) bolted to the side wall of frame section 11 as by bolts 34.

15 Referring again to Figure 3, side plate 33 includes a portion 33a which, when the side plate is bolted in position, engages the exposed side of slide member 28 and accordingly completes the formation of the channel or support in which the 20 guide member slides. Thus guide member 28 is always maintained in proper alignment and is retained in reciprocating relation with respect to guide 31 and side plate 33 without any possibility of substantial deviation therefrom. Accordingly 25 valve piston 26 (Figure 1) is always maintained in correct alignment in the cylinder block.

Preferably frame portion 11 is provided with a removable lid or cover plate 35 (Figure 2) which is secured to the frame section by suitable bolts 30 or the like (not shown) and which may be readily removed to permit easy access to the interior of the crank case for purposes of assembling or disassembling the connecting rods to the crank shaft or for inspecting and servicing them.

35 Preferably frame section 11 is so formed as to provide recessed portions 11b through which valve stems 27 extend. Preferably the valve stems are provided with any suitable glands or stuffing boxes 36 and as the valve stems extend through por- 40 tions of the same structure, namely, frame section 11, stuffing boxes 36 are accordingly mounted therein. This feature of construction is particularly advantageous in that it not only renders assembly of the various parts quite easy but also 45 it precludes the possibility of binding the valve stems because of misalignment thereof with the stuffing boxes.

As pointed out above, I have provided controlling cylinder 17 in cylinder block 12 and in cylinder 17 there is reciprocally disposed a valve piston 37 having secured thereto a stem or controlling rod 38 which extends through a wall of the cylinder block and a suitable packing gland 39. Valve stem 38 may be operatively connected to 50 any desired form of operating device to control the flow of steam to the valve cylinders 16 and operating cylinders 15.

With the parts assembled as shown in Figure 2 the engine may be operated and the parts ad- 60 justed while under observation since the engine is operable in this condition without the cover plate 35 covering the opening 11a. This feature is high-

ly advantageous. It enables the mechanism to be assembled quickly and conveniently and also for it to be adjusted initially and later on as the parts may wear while the engine is in operation.

Accordingly I have provided a steam engine for use in operating a mechanical coal stoker which is thoroughly practical and efficient in operation and which achieves the objects hereinabove set forth in addition to many others in a highly practical manner.

As many possible embodiments may be made of the above invention, it is to be understood that all matter hereinbefore set forth is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A guide for supporting the cross head of a valve mounted for reciprocation in a steam engine comprising, in combination, a flanged member having its flanges secured to the engine frame and having its other portions extending therein through an opening formed in a wall thereof, said portions slidably supporting the valve cross head, and a part secured to said frame wall closing said opening and having a bearing surface engaging a portion of the valve cross head.

2. A guide for supporting the cross head of a valve mounted for reciprocation in a steam engine comprising, in combination, a flanged U-shaped member extending into the engine frame, said U-shaped member being positioned to slidably receive between its legs the valve cross head, means securing the flanges of said member to the engine frame, and means secured to said engine frame covering the open side of said member and having a bearing portion slidably engaging the valve cross head.

3. A guide for supporting the cross head of a valve mounted for reciprocation in a steam engine comprising, in combination, a member having flanges and bearing portions, said flanges being secured to the engine frame and said bearing portions extending through an opening formed in the wall of the engine frame to lie therewithin, said bearing portions embracing and slidably supporting the valve cross head, and a plate secured to said frame wall over said member and closing the opening in said frame wall.

4. A guide for supporting the cross head of a valve mounted for reciprocation in a steam engine comprising, in combination, a bearing member having portions secured to the frame member of the engine and bearing portions extending through an opening formed in the wall of said frame member to lie therewithin, at least one of said bearing portions facing outwardly of said opening, said bearing portions slidably supporting the valve cross head, and a plate secured to said frame member wall over said bearing member, said bearing members being secured to said frame member independently of each other.

WILLIAM THOMPSON HANNA.