Jan. 20, 1931. W. J. TOLLERTON ET AL 1,789,326

WRIST PIN MOUNTING AND FASTENING

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Fig. 1

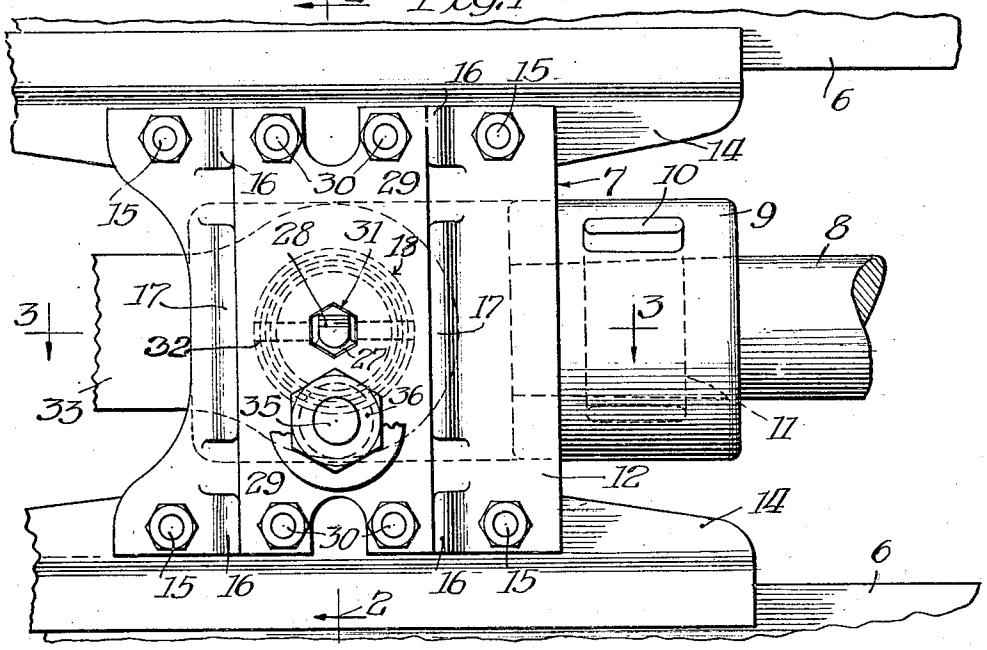


Fig. 2

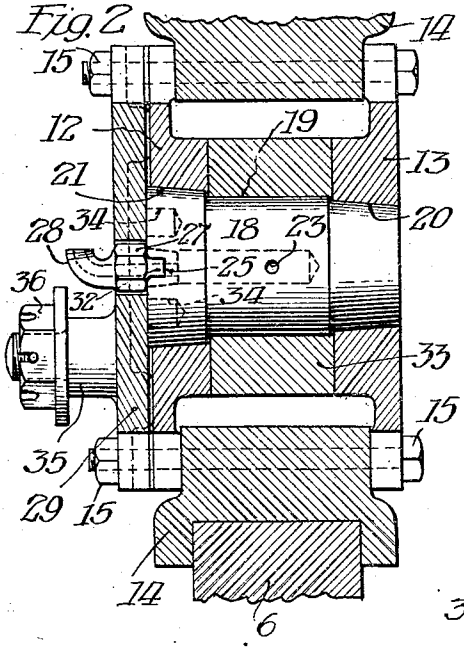


Fig. 3

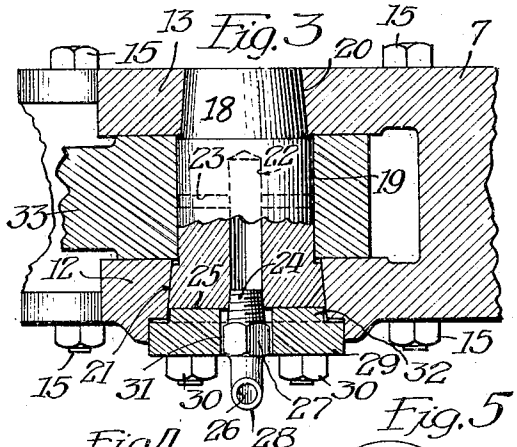


Fig. 4

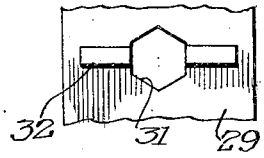
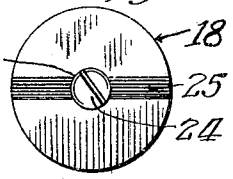


Fig. 5



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WRIST PIN MOUNTING AND FASTENING

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Fig. 7

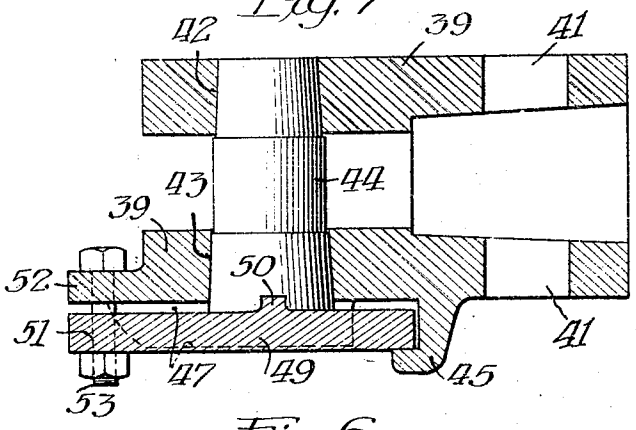


Fig. 6

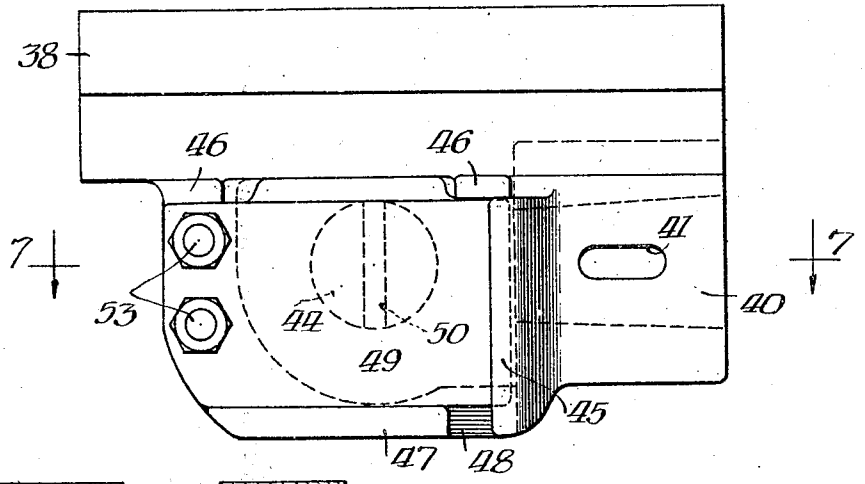
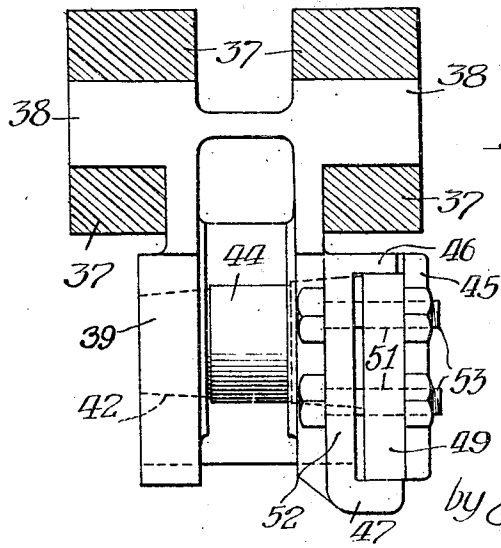


Fig. 8



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WRIST PIN MOUNTING AND FASTENING

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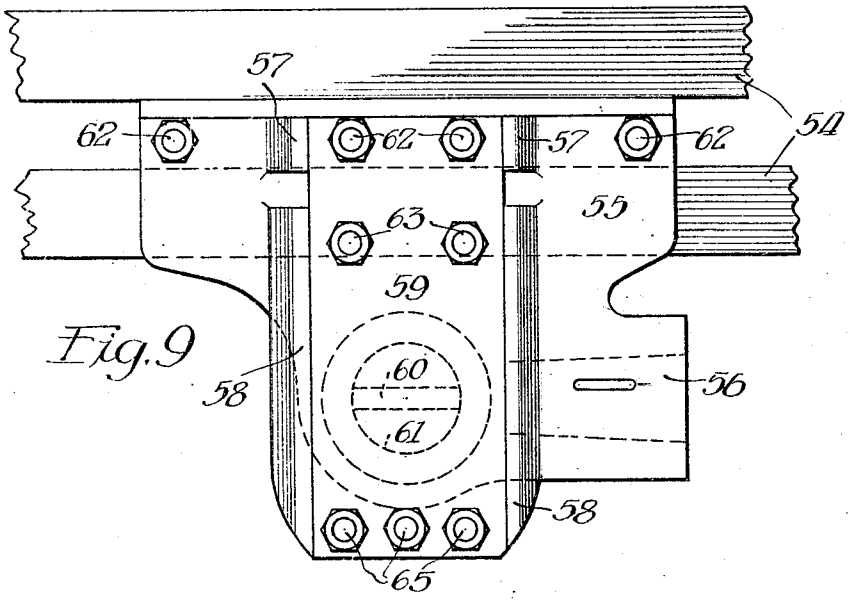


Fig. 9

Fig. 10

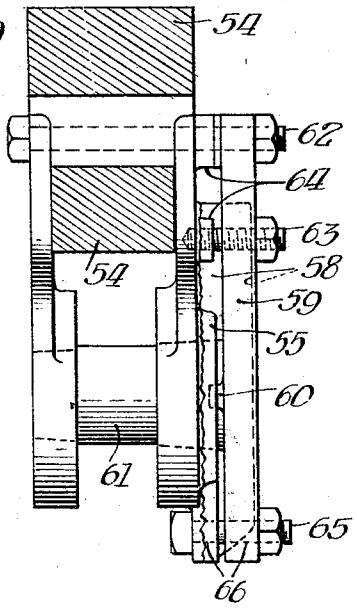
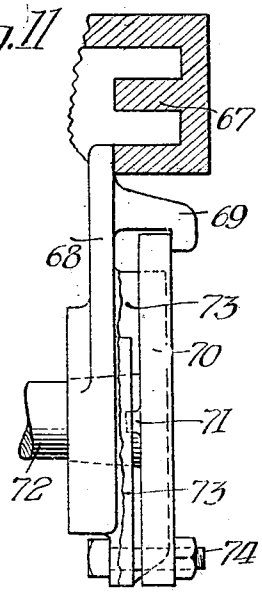


Fig. 11



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UNITED STATES PATENT OFFICE

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WRIST-PIN MOUNTING AND FASTENING

Application filed October 23, 1925. Serial No. 64,475.

This invention relates to wrist pin connections between the crossheads and connecting rods of locomotives, and also to means for operatively connecting the crosshead to the valve gear. Heretofore it has been customary to insert the wrist pins from the inside of the crossheads and hold the pins in place by retaining nuts threaded on their outer ends. This arrangement is quite inconvenient and the present invention seeks to provide an improved arrangement in which the wrist pins are inserted from the outside and are held against outward displacement and turning by a retaining plate bolted or anchored to the outer face of the crosshead. The invention consists in the features of improvement hereinafter set forth, illustrated in the preferred forms in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings, Fig. 1 is a fragmentary elevation showing a crosshead mounted in its guides and connected to the piston and connecting rods and equipped with the novel wrist pin fastening of our invention.

Fig. 2 is a vertical sectional view taken on the plan of the section line of 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view taken on the plan of the section line 3—3 of Fig. 1, part of the wrist pin being in elevation and part in section to disclose the lubricating means.

Fig. 4 is a fragmentary inside elevation of the retaining plate for the wrist pin.

Fig. 5 is an outside end elevation of the wrist pin.

Fig. 6 is a front elevation of a four-bar type of crosshead having the invention applied thereto in a modified form.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is an end elevation of the structure shown in Figs. 6 and 7 looking toward the right.

Fig. 9 is a front elevation of a Laird type of crosshead with the invention applied thereto in another form.

Fig. 10 is an end elevation of the structure shown in Fig. 9 with part of the same broken away, and

Fig. 11 is a fragmentary elevation showing another form of crosshead mounting with the invention applied thereto.

Referring to the drawings in detail in which similar reference characters designate corresponding parts throughout the several views, 6 designates the guides in which the crosshead 7 is adapted to reciprocate when actuated by the usual driving piston through the piston rod 8 in the usual or any preferred way. The crosshead has an extension socket 9 in which the end of the piston rod 8 is inserted for rigid connection with the crosshead through the medium of an inclined or obliquely extending pin or key 10 which is inserted in a similarly extending slot 11 extending diametrically of the extension socket 9 and through a corresponding slot in the end of the piston rod which is engaged in the socket, as will be readily apparent from Fig. 1 of the drawings and to those skilled in this art.

The crosshead includes a body portion with opposite walls 12 and 13 having top and bottom flanges connected by bolts 15 to the bearing portions 14 of the crosshead which engage the guides 6. If present crossheads are employed they are either turned upside down or changed from one to the other side of the locomotive so that openings in the crosshead for receiving the wrist pins taper inwardly, instead of outwardly as is usual, and thus permit the insertion of the wrist pins from the outside of the crossheads. The wall or outside portion of the crosshead is provided at the top and bottom with short spaced, parallel, vertical upper and lower short ribs 16 and with spaced, parallel, aligned vertical elongated intermediate ribs 17 disposed in vertical alignment with the ribs 16 and having their shoulders facing inwardly perpendicular to the plane of the face or wall of the crosshead. These ribs may be welded or otherwise formed on the crosshead as usually constructed.

The bore for receiving the wrist pin 18 in the main rod 33 is of uniform diameter at its central portion 19, but the opening in the inner portion of the crosshead is tapered to a smaller diameter as indicated at 20, and that

in its outer portion is tapered from a larger diameter at the outside as indicated at 21 so as to receive the correspondingly shaped wrist pin, which is machined or finished all over to snugly fit the cylindrical and tapered openings of the rod and crosshead. The wrist pin may be provided with a central axial hole or counterbore 22 from which lead oil passages 23 extending radially to the periphery thereof and designed to distribute lubricant or grease from the axial hole in conjunction with a filling or partial filling of hair or felt or other suitable lubricating means which, however, may be omitted if desired. The counterbore 22 extends to the outer end of the wrist pin and is preferably tapped to take a plug or closure screw 24 at the outer end thereof and at the intersection of a diametrically disposed groove 25 across the head of the pin. However, this tap may be provided to receive an oil or grease cup 26 having external threads engaging the internal threads of the tap and a wrench head or surface 27 for applying or removing it and an upwardly curved or elbow-shaped cup-receiving extension 28 projecting outwardly therefrom but confined within the radius of the plug or wrench head which is of greater diameter than the width of the groove 25.

A retaining plate 29 is tightly fitted between the spaced vertical ribs 16 and 17 spaced from the outer face of the crosshead, and is secured or anchored thereto as by means of bolts 30 extending through its upper and lower ends. This plate 29 may have an opening 31 of hexagonal or other shape to receive the wrench head 27 of the plug so that the latter is held from turning and becoming loosened, although it is to be understood that other or additional means may be provided for this purpose. The plate has a transverse tongue or rib 32 at its inner face intersecting the opening 31 when the latter is employed and corresponding substantially in length to the diameter of the outer end of the wrist pin so as to extend into the groove or slot 25 and prevent turning of the wrist pin. The retaining plate is adjustably bolted or anchored to the outer face of the crosshead, so that by means of the nuts on its retaining bolts it can be employed to force the wrist pin snugly to position and to securely hold it against outward displacement. The lugs or ribs 16 and 17 on the outer face of the crosshead and between which the retaining plate fits, relieve the bolts of horizontal shearing strain, and the interlocking rib and groove 32 and 25 which are disposed at right angles to the ribs 16 and 17 relieve the bolts of vertical shearing strain. The bolts however, hold the plate and pin against outward displacement and also serve to force the pin snugly into the tapered apertures in the inner and outer portions of the crosshead. Preferably, as shown, the outer end of the wrist pin is provided with tapped openings, as indicated at 34, for receiving stud or tap bolts for removing the wrist pin after the retaining plate has been removed. The holes 34 may receive dowels fixed to the retaining plate in lieu of the tongue or rib 32 for preventing the turning of the wrist pin, but such rib is preferred.

The retaining plate 29 is preferably provided with an integral trunnion 35 for connection with and operation of the valve gear, the connecting link being retained in position on the trunnion by a lock nut 36.

In the form of the invention shown in Figs. 6 to 8 inclusive illustrating a four-bar type of cross-head, the bars are designated at 37 and are spaced apart to take the bearings or slides 38 of the crosshead. The latter is of a web construction and includes the crosshead body 39 provided with the usual socket 40 for receiving the piston rod which is keyed thereto through the holes 41. The opposite apertures 42 and 43 receive the wrist pin 44 which engages the main rod between the spaced walls of the crosshead body. The front wall is provided with a flanged rib 45 extending vertically at one end, with short horizontal ribs 46 near the ends thereof and at the top of the crosshead body, while a relatively long horizontal longitudinal rib 47 is provided at the bottom and spaced from the flanged rib 45, as indicated at 48. The retaining plate is designated at 49 and has the usual rib 50 for engagement with the groove in the wrist pin as heretofore described, except that in this instance the rib and groove are extended vertically. The plate 49 fits between the ribs 46 and 47 and beneath the flange of the rib 45, while its opposite end has apertures 51 registering with corresponding apertures in the end of the front crosshead wall, which is of reduced thickness as indicated at 52, and which apertures receive bolts 53 for rigidly securing the retaining plate in position. This structure effectively prevents displacement of the wrist pin and the ribs relieve the bolts of all shearing strain.

In the form of the invention shown in Figs. 9 and 10, there is illustrated a Laird type of crosshead in which the guides are designated at 54. The crosshead proper is designated at 55 and has a socket 56 for connection with the piston rod in the usual or any preferred way. The front plate of the crosshead body is provided with upper and lower series of vertical ribs 57 and 58 opposing each other in spaced parallel relation to take a retaining plate 59 therebetween. This plate has a rib 60 at the inside to engage a diametrical groove in the wrist pin 61. Bolts 62 connect the opposed sides of the crosshead body or walls thereof at the top and the intermediate bolts also provide for the

attachment of the retaining plate 59. Additional bolts or stud screws 63 may be provided for securing the plate 59 in position below the intermediate top bolts 62 and between the top portions of the ribs 58. Suitable bosses may be formed on the front wall of the crosshead body as indicated at 64 for the purpose of taking the bolts 63. Additional bolts 65 are provided to extend through aligned openings 66 at the lower end of the plate 59 and between corresponding portions of the ribs 58 to connect the retaining plate 59 with the front wall of the crosshead body. In this instance the ribs prevent turning of the plate as in the previously described forms and thereby also remove shear from the bolts.

In the form of the invention illustrated in Fig. 11, an alternative arrangement is shown where, due to the construction of the guide or groove arrangement for the sides of the crosshead, as indicated at 67, the retaining plate cannot be bolted at the top. In this form the crosshead body or front wall thereof is designated at 68 and is provided with a flanged rib 69 at the top overhanging the retaining plate 70 which has a rib 71 on its inner face engaging the diametrical groove of the wrist pin 72. Ribs are provided at the sides as indicated at 73 corresponding to the ribs 57 and 58 as shown in Figs. 9 and 10, between which the retaining plate 70 fits. The retaining plate is also additionally bolted at the bottom as indicated at 74, thus retaining the plate in position.

It is noted that the retaining plates and the ribs which snugly fit the side edges of the plates are provided with engaging faces that are parallel to the axis of the pin, so that the ribs will securely hold the plate against transverse movement as the latter is forced inwardly to apply endwise pressure to the pin. It is also noted that the retaining plate is substantially rectangular in form and relatively thin and that the fastening devices and bolts engage the ends only of the plate, so that, by tightening the bolts, a slight camber may be given to the plate which will automatically take up any wear and prevent any looseness or endwise play of the pin.

While we have shown and described our invention in a preferred form, we are aware that various modifications and changes may be made without departing from the principles thereof, the scope of which is to be determined from the appended claims.

We claim as our invention:

1. In combination, a crosshead and a crosshead pin, said crosshead having parallel ribs on its outer face on opposite sides of the pin opening and said pin having a transverse groove in its outer end, a retainer plate snugly fitting between said ribs and extending over the outer end of said pin, the engaging surfaces of said ribs and plate being parallel to the axis of the pin bolts projecting from said crosshead and extending through the ends of said plate and nuts on said bolts for securing said plate in position and for forcing the same inwardly between said ribs to apply endwise pressure to the pin, said plate having a rib on its inner face transverse to the ribs of the crosshead and fitting within the groove of the crosshead pin, substantially as described.

2. In combination, a crosshead, a crosshead pin fitting inwardly tapering seats in the crosshead and projecting slightly beyond the outer face thereof, a retaining plate extending over the outer face of the crosshead and across the outer end of said pin, said crosshead having ribs on its outer face snugly fitting against the side edges of said plate with the engaging surfaces of the ribs and plate parallel to the axis of the pin, and retaining devices engaging the ends of said plate for clamping the plate to the crosshead and including bolts for forcing the plate inwardly to exert endwise pressure on said pin, and said plate having an inwardly projecting tongue engaging a groove in the outer end of the pin for holding the latter against turning, substantially as described.

3. In combination, a crosshead, a crosshead pin fitting inwardly tapering seats in the crosshead and projecting slightly beyond the outer face thereof, a substantially rectangular, relatively thin retaining plate extending over the outer face of the crosshead and the outer end of said pin, said crosshead having ribs on its outer face snugly fitting against the opposite side edges of said rectangular plate, the engaging faces of the ribs and plate being parallel to the axis of the pin, and retaining devices engaging the ends only of said plate for clamping the latter to the crosshead and including bolts for forcing the plate inwardly to thereby camber the plate and exert endwise pressure on said pin, and said plate and pin having an interlocking tongue and groove for holding the pin against turning, substantially as described.

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