

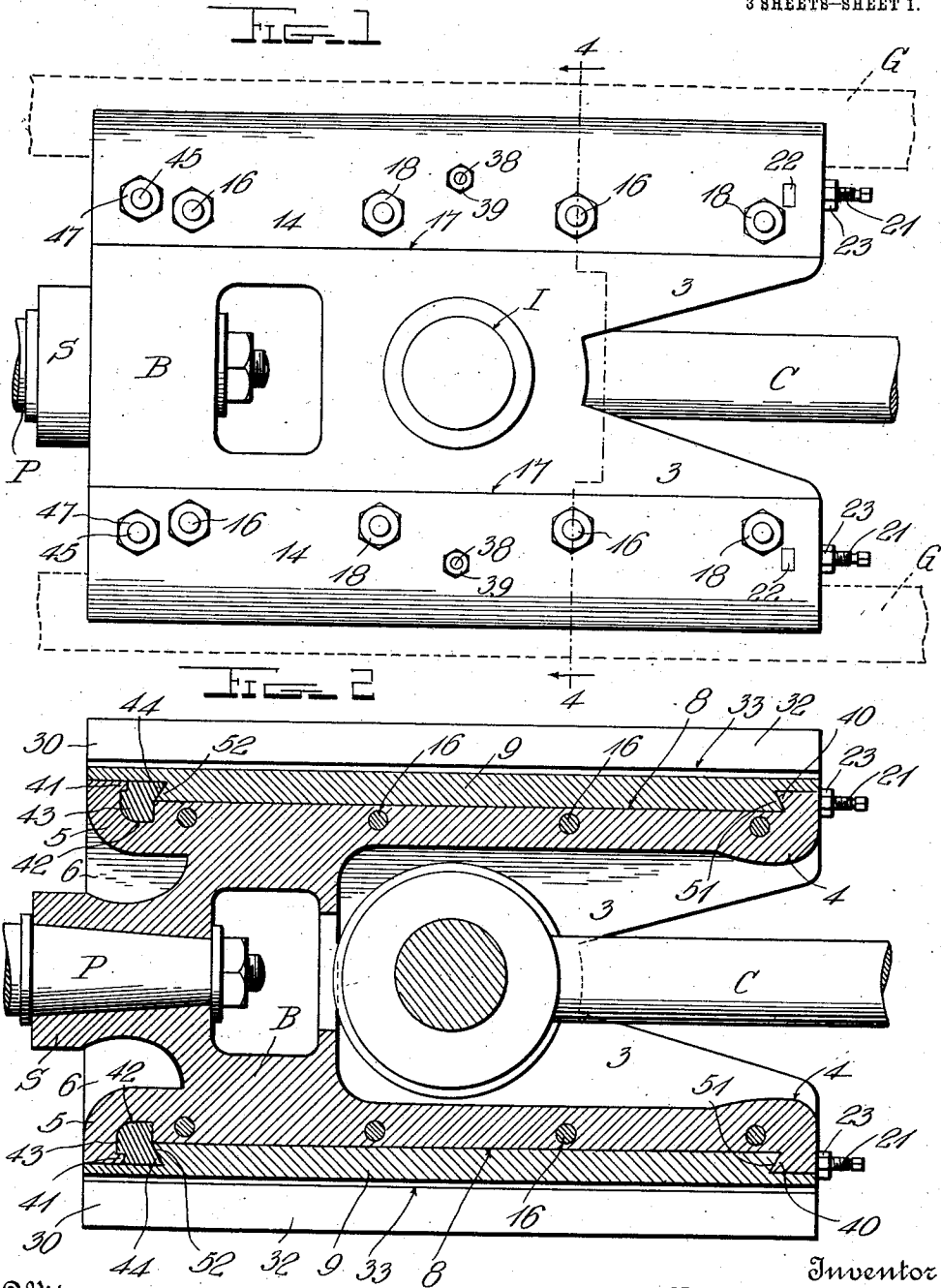
W. A. PRINCE.
CROSS HEAD.

APPLICATION FILED MAY 8, 1911.

1,009,569.

Patented Nov. 21, 1911.

3 SHEETS-SHEET 1.



Witnesses

E. E. Smith

O. B. Hopkins

Inventor

W. A. Prince

by *H. B. Wilson & Co.*

Attorneys

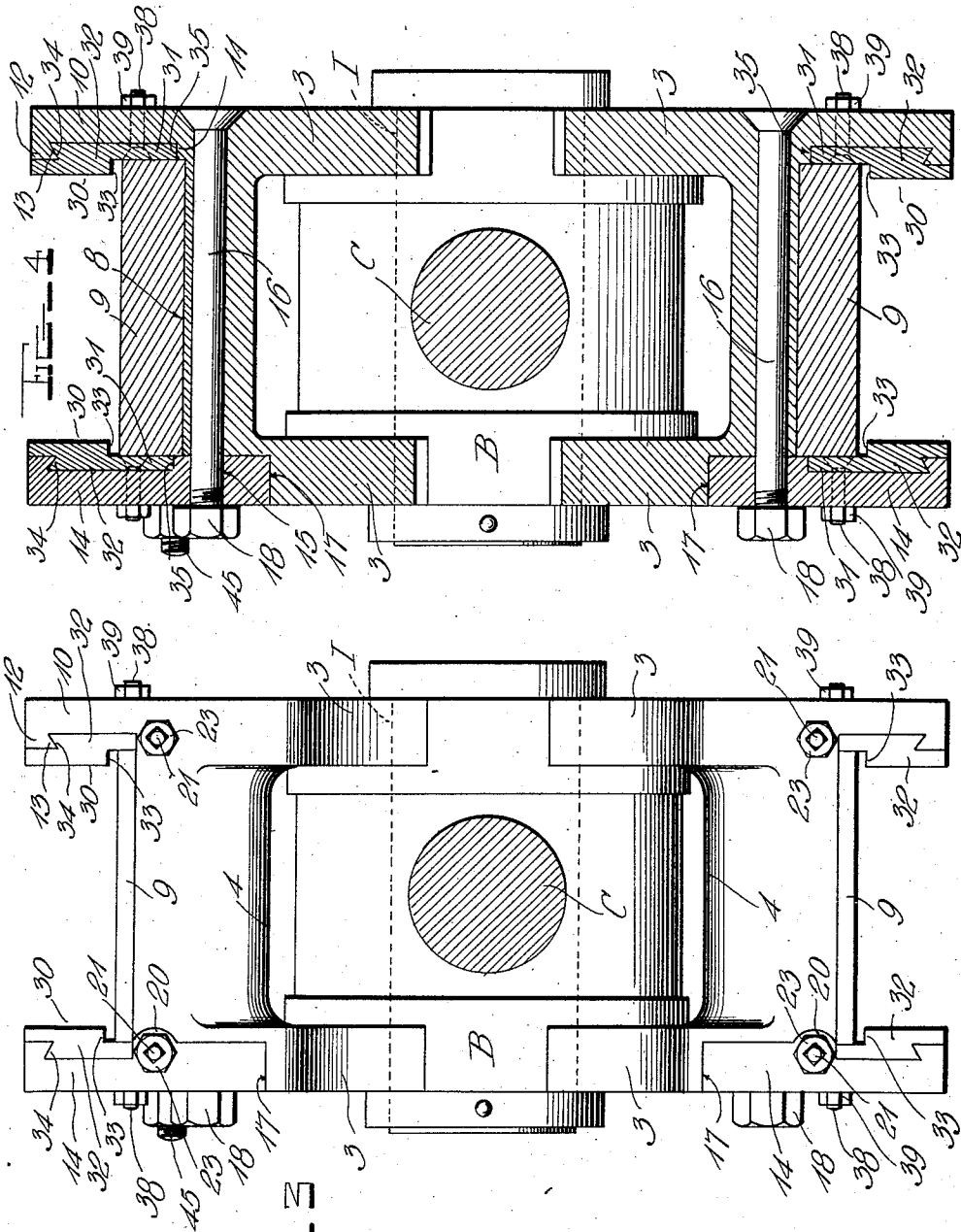
W. A. PRINCE.
CROSS HEAD.

APPLICATION FILED MAY 8, 1911.

1,009,569.

Patented Nov. 21, 1911.

3 SHEETS-SHEET 2.



Witnesses

E. Coleman

O. B. Hopkins

Inventor

W. A. Prince

by *A. B. Wilson & Co*

Attorneys

W. A. PRINCE.

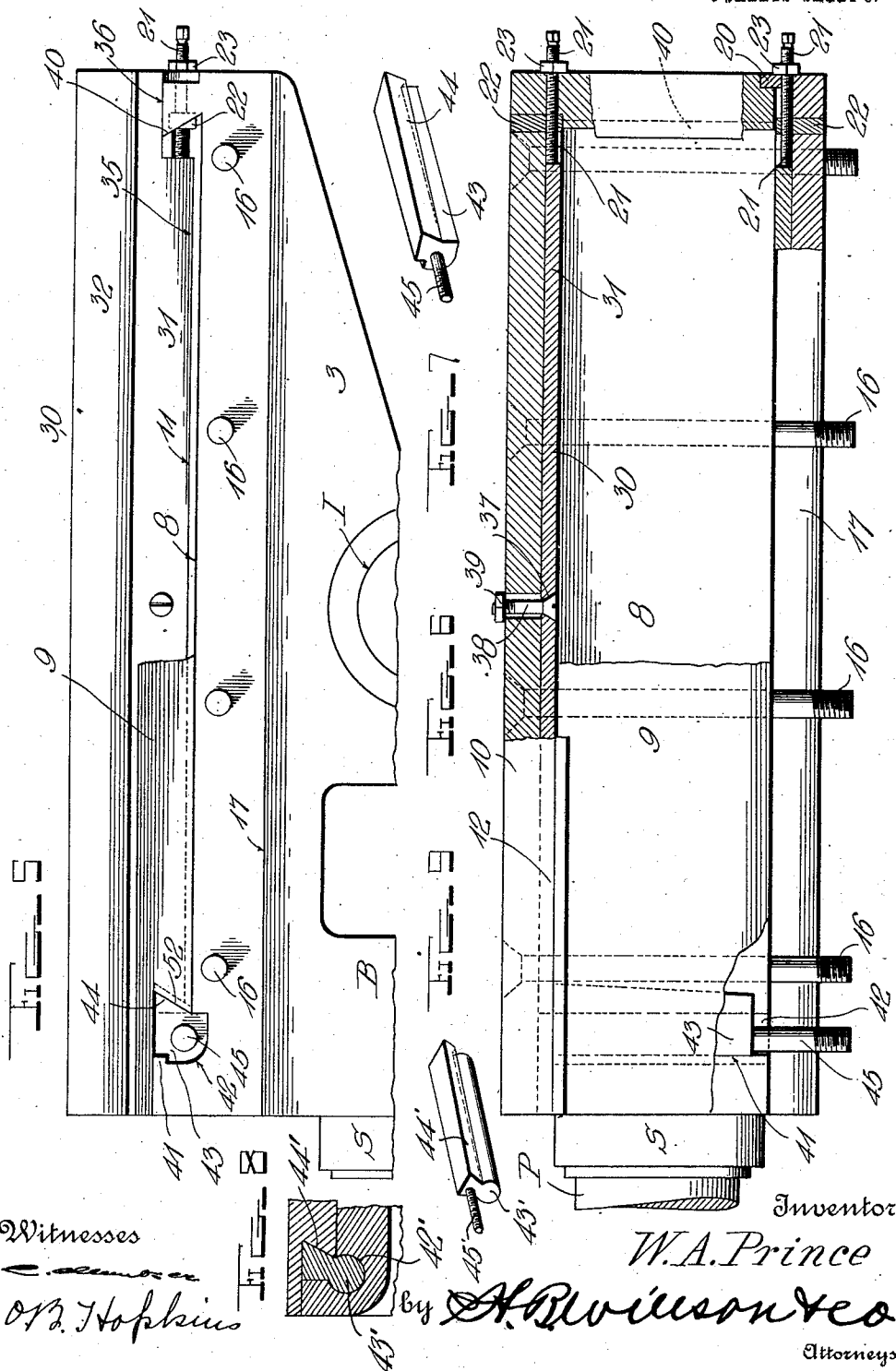
CROSS HEAD.

APPLICATION FILED MAY 8, 1911.

1,009,569.

Patented Nov. 21, 1911.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

WILLIAM A. PRINCE, OF KNOXVILLE, TENNESSEE.

CROSS-HEAD.

1,009,569.

Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed May 8, 1911. Serial No. 625,922.

To all whom it may concern:

Be it known that I, WILLIAM A. PRINCE, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Cross-Heads; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention consists in improvements in cross heads which form the pivotal connection between the outer end of a piston rod and the adjacent end of a pitman or crank rod whose other end leads to a crank, while the cross head itself reciprocates between guides so that the lateral strains thrown onto the crank rod by the crank in its various positions are not communicated to the piston rod and the latter will not bind in the pistonhead. Cross heads of this type are commonly employed on locomotives, and when their lining plates or "brasses" become worn on the guides it is an extremely difficult matter to adjust them or replace them without disconnecting and removing the entire cross head, and in fact also in some cases removing one or both of the guides. Obviously this requires considerable time during which the locomotive or engine is out of commission, and it is the purpose of the present invention to save that time by constructing the cross head in such manner that its brasses may be adjusted or replaced quickly without removing the cross head. This and other objects are accomplished by the construction hereinafter more fully described and claimed, and as shown in the drawings wherein—Figure 1 is a side elevation of this cross head; Fig. 2 is a vertical central longitudinal section thereof; Fig. 3 is an end view on an enlarged scale; Fig. 4 is a vertical cross section, taken on line 4—4 of Fig. 1; Fig. 5 is a side elevation of the upper portion of the cross head, the detachable side plate removed, and parts of the base and wear plates broken away, to disclose the construction of the side wear plates; Fig. 6 is a plan view thereof, parts broken away and in section; Fig. 7 is a detail perspective view of the wedge key. Fig. 8 is a fragmentary cross sectional view disclosing a modified form of the wedge key; Fig. 9 is a detail perspective view thereof.

In the drawing the body member B of this cross head has at one end a socket S for the reception of the piston rod P and at about its center a transverse eye I through which passes a bolt or pin on which is pivoted the adjacent end of the connecting rod C in the usual manner, and no novelty is claimed for these parts which are in ordinary use. The V-shaped opening in the rear end of the cross head body, in which the connecting rod C swings, has side flanges 3, and near the outer end its upper and lower walls are provided with lugs 4 projecting slightly toward each other and rounded off a little as shown in the sectional view, the purpose being to give greater strength to the body where its material is thinnest by reason of the bolts immediately above and below the points where these lugs occur and also as far as possible to retain within the cross head the grease and oil by which the parts are lubricated. In similar manner the other end of the cross head, above and below the socket S, is formed with lugs 5 to strengthen the material adjacent the bolts which pass through the body there, and between said lugs and sockets the body is recessed as at 6 for sake of lightness and yet not to such an extent as to sacrifice strength. Otherwise the body member of this cross head is of the usual or of any preferred construction, size, proportion, and material. As is common this cross head reciprocates between parallel guides G which stand above and below it, and as the construction at the top and bottom of my improved cross head is in duplicate, I will describe that only at the top for the sake of brevity. The top of the body is formed with a flat bed 8 upon which rests the bottom brass 9 which stands between two side plates. The rear-most of these numbered 10 rises integrally from the body B, and its inner face has a shoulder 11 along its lower edge and an inwardly projecting flange 12 along its upper edge which is slightly undercut as at 13 as best seen in Fig. 4. The front side plate 14 is removable, but its inner face is constructed like the rear side plate 10. It is provided through its body with a series of holes 15 through which pass stud bolts 16 projecting forward from the body above a rabbet 17 upon which this side plate 14 rests when in place, and the forward extremities of these bolts receive nuts 18 as shown in Fig. 1. The inner face of the detachable side plate

is provided at its lower corner with a lug 20, and into one end of each side plate (preferably the rear end toward the crank bar) is passed a screw 21 whose threads engage a nut 22 set into a lateral angular hole through the side plate, and a jam nut 23 on said screw holds it in adjusted position.

The side brasses 30 are each formed to fit accurately against the inner face of one side plate, and as they are alike I will describe but one. Each has a long thin body whose lower portion 31 is about of the same thickness as the shoulder 11 and whose upper portion 32 is made thicker so as to overhang the lower portion 31 in a shoulder 33 for a purpose to appear hereinafter; its upper edge is formed with a groove 34 which is of a shape to fit accurately into the undercut edge 13 of the flange 12, while its lower edge 35 is flat so that it may rest upon the shoulder 11; its extremity is notched as at 36 deep enough to admit the lug 20 so that the set screw may be tightened up to hold this brass in place; and through its center is a countersunk hole 37 for a bolt 38 passing through an elongated hole in the side plate and provided on its outer end with a clamping nut 39. By removing this bolt and slipping the lower edge of the brass off the shoulder 11 and its notch 36 off the lug 20, a liner or spacer, as of paper, fabric, or very thin metal, may be placed behind the brass and the latter restored to position and held by the set screw; or the brass may be entirely removed and replaced by a new one which has not become worn. Attention is directed to the fact that the insertion of this liner or spacer is not necessary behind the rearmost side brass with my construction, because the front side plate 14 can be bodily removed from the cross head body B for this purpose when necessity requires.

The ends of the bed 8 rise above its flat surface and one of them is undercut as at 40 while the other may have an inwardly projecting flange 41 adjacent which a groove 42 is formed across the bed 8. In this groove and under this flange moves the key best seen in Fig. 7 its body 43 being shaped to fit the groove and flange and its upper portion being undercut at the inner side as at 44 and inclined or wedge-shaped with respect to its length. Into its body at its front end is fixed a stud bolt 45 which projects through a hole in the front side plate 14 when the latter is in place, and receives a nut 47 which stands on the face of the cross head and may be adjusted to move the key within said groove.

A modified form of the key is shown in Figs. 8 and 9 which is similar in construction to the form shown in Fig. 7 except that the body portion 43' is substantially cylindrical throughout its length to fit within the correspondingly shaped groove 42',

and one side of the upper portion thereof is undercut as shown at 44' and inclined or wedge shaped with respect to its length. A stud 45' similar to the stud 45 shown in Fig. 7 extends from the outer end of the key and is designed for the same purpose. The bottom brass 9 is somewhat thicker than the side brasses 30 because the former receives more wear, and one extremity is rabbeted in its lower face across its end as at 51 to fit beneath the undercut end 40, while the other extremity is rabbeted obliquely in its under face at 52 to fit against the undercut portion 44 of the key. By my invention the setting of the latter holds this brass in place, in addition to which its side edges rest beneath the shoulders 33 in the side brasses 30; but when this bottom brass becomes worn, the front side plate 14 is removed and a thin liner or spacer may be inserted between the bed 8 and the bottom or lower face of this brass, the beveled faces of its undercut rabbets 51 and 52 being ground off so that when it is replaced in position upon its spacer and the key tightened up its upper face will stand a little higher above the bed 8 and the rattle between the guides G will be eliminated. Here again, the removal of the nuts from the front ends of all of the stud bolts and the entire withdrawal of the front side plate 14, permits access to the bottom brass which of course becomes loose upon the bed as soon as the key is forced inward; and yet it is not necessary to remove this cross head from between the guides or to disconnect either the piston rod or the crank rod. When the bottom brass becomes worn to too great an extent, it can be replaced by a new one as will be clearly understood. As above stated, the same construction prevails along the lower edge of this cross head and need not be described in detail. The shoulders 33 of the side brasses 30 may be omitted and other changes made without departing from the spirit of my invention.

What is claimed is:

1. The herein described cross head comprising a body connecting the piston and connecting rods and adapted for reciprocation between parallel guides, the body having beds at top and bottom adjacent the inner faces of said guides, rear side plates projecting integrally from the rear edges of said beds and adapted to stand behind the guides, front side plates adapted to stand forward of said guides, means for securing them detachably to said body so as to permit their removal from the front of the cross head without removing the latter from its position, and brasses carried by all said plates and beds and sliding against said guides.

2. The herein described cross head having beds at top and bottom and rabbets in its front face between said beds, a series of bolts

projecting forward from said rabbets, a removable front side plate adapted to rest in each rabbet and having holes adapted to receive said bolts, nuts on the latter, a rear side plate rising integrally from the rear edge of said bed, a bottom brass resting upon the bed, and side brasses carried by said side plates.

3. The herein described cross head having beds at top and bottom and rabbets in its front face between said beds, a series of bolts projecting forward from said rabbets, a removable front side plate adapted to rest in each rabbet and having holes adapted to receive said bolts, nuts on the latter, a rear side plate rising integrally from the rear edge of said bed, each side plate having a shoulder along the bottom of its inner face and a flange along the top undercut along its lower edge, side brasses shaped to conform with said shoulder and undercut flange, means for holding the side brasses in place, and a bottom brass.

4. The herein described cross head having beds at top and bottom and rabbets in its front face between said beds, a series of bolts projecting forward from said rabbets, a removable front side plate adapted to rest in each rabbet and having holes adapted to receive said bolts, nuts on the latter, a rear side plate rising rigidly from the rear edge of said bed, each side plate having a shoulder along the bottom of its inner face and a flange along the top of its inner face undercut along its lower edge, side brasses shaped to conform with said shoulder and undercut flange and having overhanging shoulders on their inner faces below which they are thinner than above, a bottom brass resting upon said bed with its edges beneath said shoulders and engaging the thinner portions, and means for holding the bottom brass in place.

5. The herein described cross head having beds at top and bottom and rabbets in its front face between said beds, a removable front side plate adapted to rest in each rabbet, means for holding it removably therein, a rear side plate rising rigidly from the rear edge of said bed, each side plate having a shoulder along the bottom of its inner face and a flange along the top of its inner face undercut along its lower edge, side brasses shaped to conform with said shoulder and undercut flange and having overhanging shoulders on their inner faces below which

they are thinner than above, a bottom brass resting upon said bed with its edges beneath said shoulders and engaging the thinner portions, and means for holding the bottom brass in place.

6. In a cross head, the combination with the body having a rear side plate rising rigidly from the back of its bed, a removable front side plate, and means for detachably attaching it to said body; of ends rising rigidly from said bed, one of them being undercut on its inner face and the other having an inwardly projecting flange, the bed being grooved adjacent said flange, a key shaped to slidably fit said groove and flange and having its upper portion wedge-shaped and undercut obliquely to its length, a bottom brass whose extremities are transversely rabbeted to fit said undercut faces, and side brasses carried by said side plates.

7. In a cross head, the combination with the body having front and rear side plates, and side brasses carried thereby; of ends rising rigidly from said bed, one of them being undercut on its inner face and the bed being grooved adjacent the other, a key whose body is shaped to slide in said groove and whose upper portion is wedge-shaped and oblique to its length, a bottom brass whose extremities are transversely rabbeted to fit said undercut faces, a bolt on said key projecting through the front side plate, and means on the projecting end of the bolt for adjusting said key in its groove.

8. The herein described cross head having beds at top and bottom, a removable front side plate, and a rear side plate rising integrally from the rear edge of said bed, each side plate having a shoulder along the bottom of its inner face and a flange along the top of its inner face undercut along its lower edge, side brasses shaped to conform with said shoulder and undercut flange and having overhanging shoulders on their inner faces, a bottom brass resting upon said bed with its edges beneath said overhanging shoulders, and means for holding the bottom brass from longitudinal movement.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM A. PRINCE.

Witnesses:

W. B. CLAPP,

B. A. WILLIAMS.