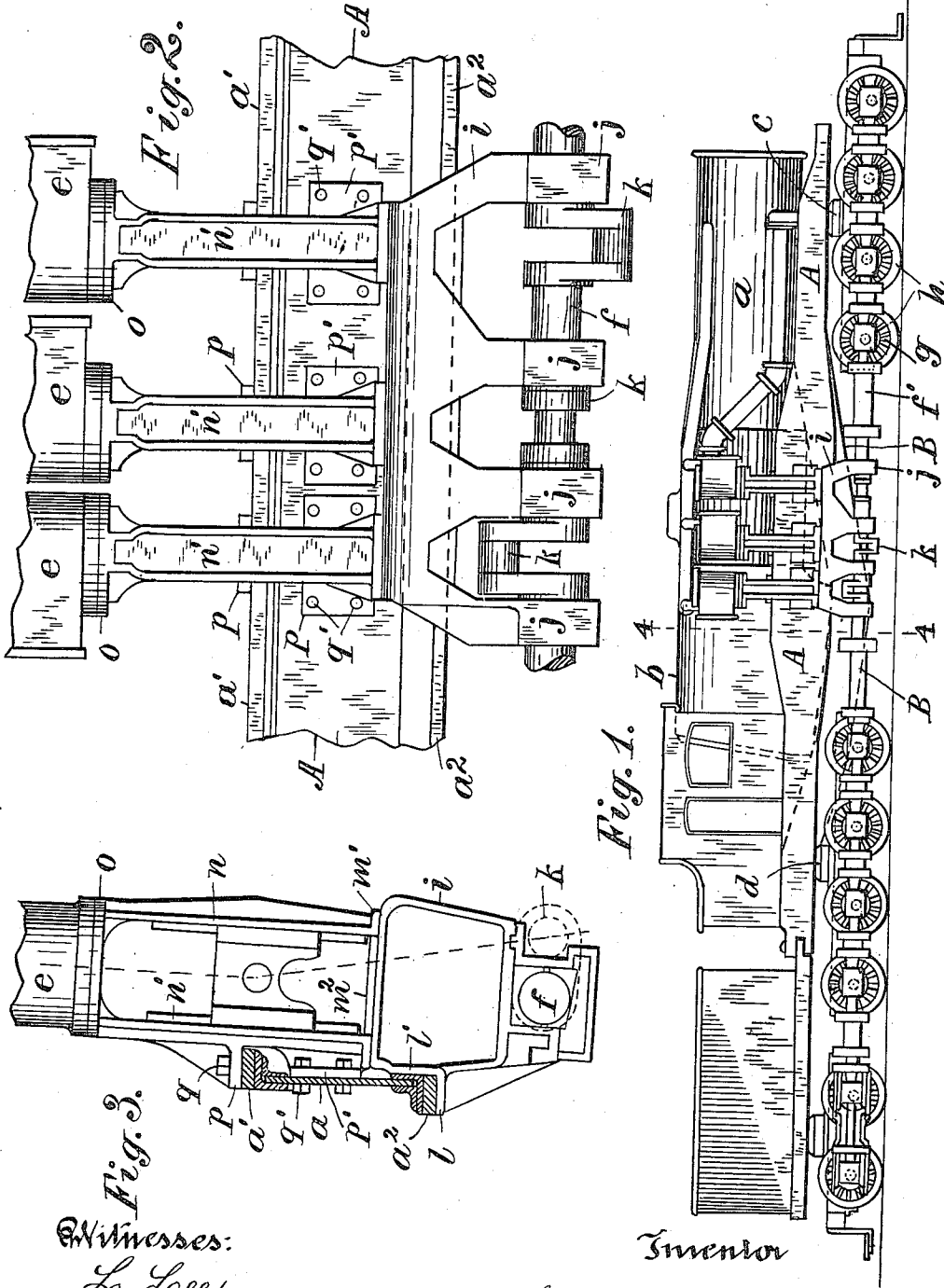


L. E. FEIGHTNER.  
 STEAM ENGINE MOUNTING FOR GEARED LOCOMOTIVES.  
 APPLICATION FILED JULY 25, 1913.

1,075,705.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 1.



Witnesses:  
 L. Lee.  
 Walter Deenbrou

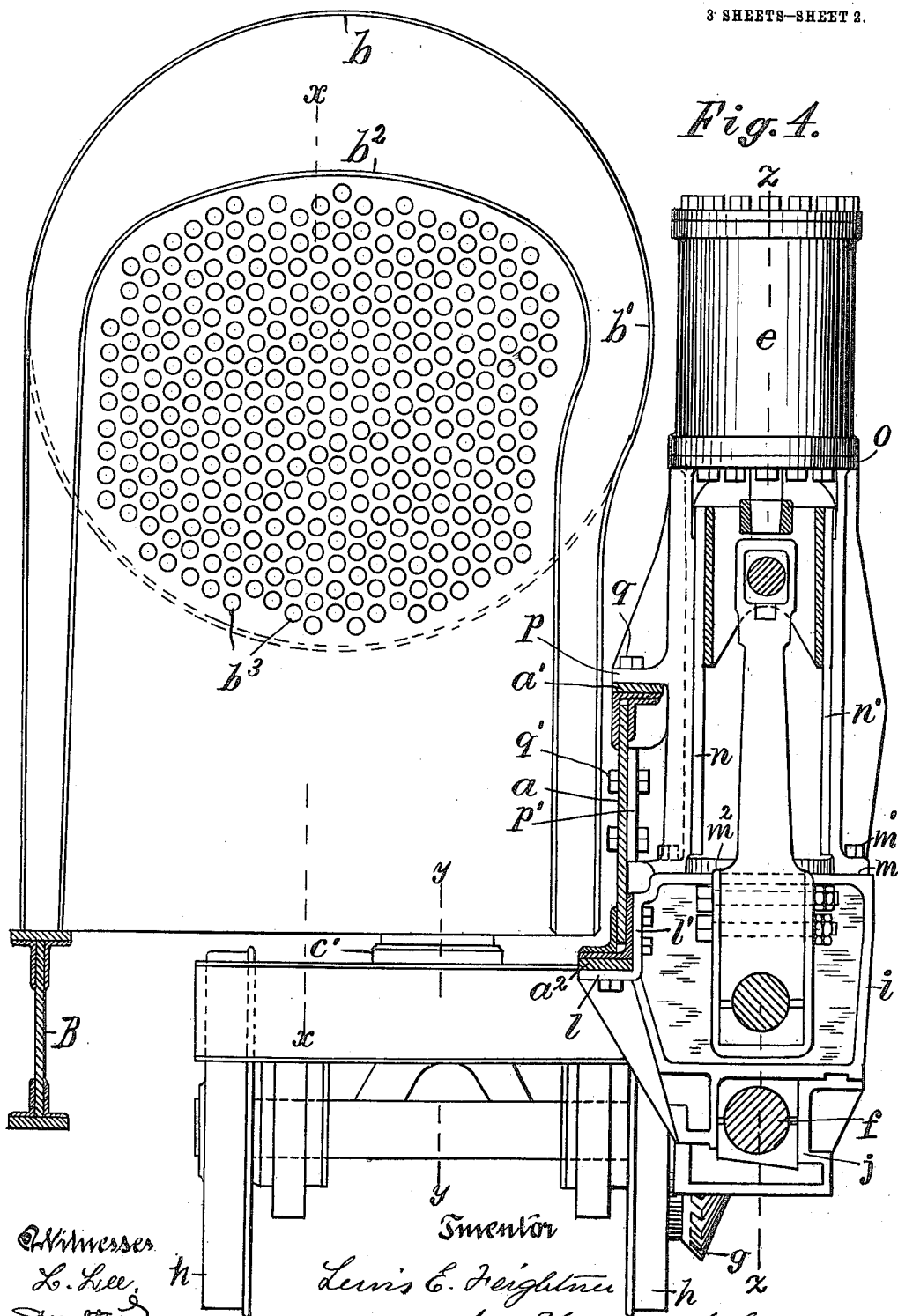
Inventor  
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 per Thomas S. Crane, Atty.

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3 SHEETS—SHEET 2.



Witnesses  
 L. Lee, Jr.  
 Walter Greenbow

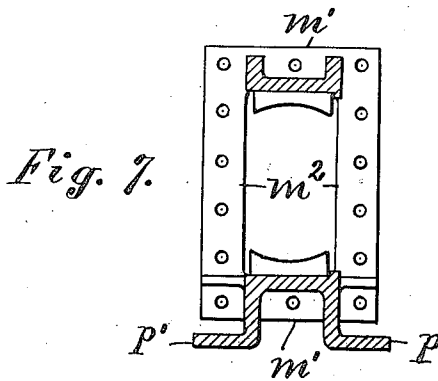
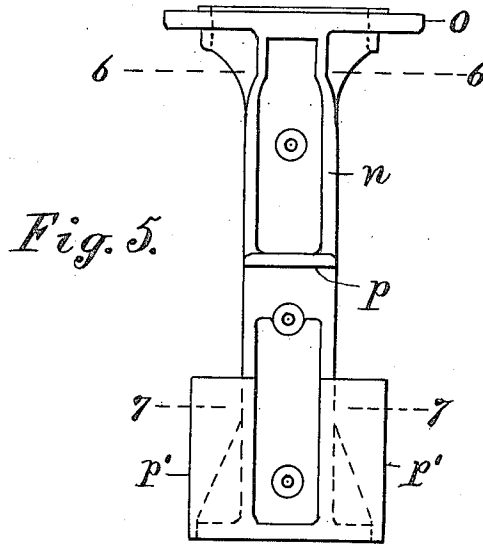
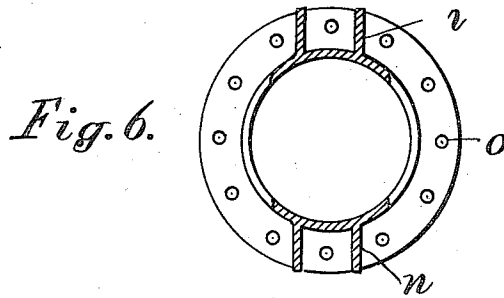
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3 SHEETS—SHEET 3.



Witnesses:  
 L. Lee.  
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Inventor.  
 Lewis E. Feightner, per  
 Thomas S. Crane, Atty.

# UNITED STATES PATENT OFFICE.

LEWIS E. FEIGHTNER, OF LIMA, OHIO, ASSIGNOR TO LIMA LOCOMOTIVE CORPORATION,  
OF LIMA, OHIO, A CORPORATION OF OHIO.

STEAM-ENGINE MOUNTING FOR GEARED LOCOMOTIVES.

1,075,705.

Specification of Letters Patent.

Patented Oct. 14, 1913.

Application filed July 25, 1913. Serial No. 781,066.

To all whom it may concern:

Be it known that I, LEWIS E. FEIGHTNER, a citizen of the United States, residing at 715 South Broadway, Lima, county of Allen, and State of Ohio, have invented certain new and useful Improvements in Steam-Engine Mountings for Geared Locomotives, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to the class of geared locomotives, in which the weight is carried upon truck-wheels having gears attached thereto, and such gears connected by a suitable line-shaft and couplings to a longitudinal crank-shaft. In such locomotives, it has been common to use upright engines and to fasten the steam cylinders by bracket-feet and bolts directly to the fire-box of the boiler thus necessitating the disconnection of the cylinders from the boilers whenever it becomes necessary to lift the boiler from the frame, and it is the object of the present invention to furnish supports for the engines wholly upon the side-frame of the locomotive, so that the boiler can be applied to and removed from the frame without disturbing the engines or unbolting the cylinder connections.

This object is attained by making one of the side-frames of the locomotive of sufficient depth to attach the cylinders and the crank-shaft bearings respectively to the upper and lower edges of the frame, the brackets which support both of these parts being connected by crosshead guides in such manner as to strongly brace those parts together, and hold them rigidly upon the frame. The locomotive frame is preferably made of plate-girders and one of them extended upwardly at the side of the locomotive boiler materially above the bottom line of the same and possessing sufficient breadth to support the parts firmly when the cylinder brackets and the crank-shaft bracket are attached thereto. The plate-form of girder affords a flat surface intermediate its edges to which the feet of the cylinder brackets can be attached as well as to the upper edge of the girder, thus securing a very firm support for the cylinders, in connection with the brace afforded by the crosshead guides, which form a part of such cylinder brackets and

which are attached at their lower ends to a horizontally extended bracket having bearings for the crank-shaft.

The upright engines in geared locomotives are commonly arranged at one side of the frame to operate the gearing at the one end of the track-axles, and the construction illustrated herein thus necessitates the disposition of the boiler center at one side of the truck-centers, and the arrangement of one of the locomotive frames below the bottom line of the boiler and the other frame above the said line. The vertical engines being attached to the higher of the two frames, has ample support independent of the boiler, and all the space above the frames is thus entirely clear so that the boiler can be lifted therefrom without any disconnection of the engines.

In the drawing the invention is illustrated in a locomotive having two eight-wheel trucks, Figure 1 showing a side elevation of the locomotive; Fig. 2 a front elevation of the cylinder, and crank-bearing attachment. Fig. 3 is a side elevation of the same with a section of the locomotive side-frame. Figs. 2 and 3 are upon a larger scale than Fig. 1. Fig. 4 is a section of the locomotive frame on line 4—4 in Fig. 1 with the engines and one of the trucks, and an outline of the fire-box showing its relation to the frames; this figure being upon a still larger scale. Fig. 5 is an elevation of the cylinder bracket. Fig. 6 is a section on line 6—6 in Fig. 5 looking upward; Fig. 7 a section on line 7—7 in Fig. 5 looking downward.

The side frames A and B are supported upon two trucks by bolsters *c* and *d*, the ends of the side-frames being at the same level, to receive the said bolsters. The center line *x—x* of the fire-box is disposed considerably at one side of the center line *y—y* of the truck, to balance the weight of the engines represented by the cylinders *e* and crank-shaft *f*; which are attached to the outer side of the side-frame A. Fig. 4 shows the forward truck with the swivel plate *c'* of the bolster *c*, through which the line *y—y* is drawn. This relation of the boiler and trucks brings the crank-shaft *f* in a line with the line-shaft *f'* which is connected by gears *g* with the truck-wheels *h*. This disposition of the boiler necessitates the bending of the

side-frame B downward as indicated by dotted lines in Fig. 1, to pass under the fire-box of the boiler and thus support the same.

5 The side-frame A is disposed at one side of the fire-box, almost wholly above the bottom of the same, and thus lies about midway between the cylinders *e* and the crank-shaft *f*, so that both can be firmly attached thereto. An engine is shown, with three cylinders  
10 fastened separately to the side-frame A by cylinder brackets, and the side-frames are shown of plate-girder form, with angle-irons at the edges connected to top and bottom plates *a'* and *a''*.

15 The crank-shaft is shown carried in a horizontally extended bracket *i* having four bearings *j* for the crank-shaft, with spaces between the bearings for the cranks *k*. The crank-shaft bracket *i* is shown with a foot *l* attached to the bottom plate of the girder A, and a flange *l'* attached to the angle next  
20 such plate, and it is provided upon the top with seats *m* for the feet of crosshead-guides *n, n'*. Each pair of crosshead-guides is formed at the top in one piece with a circular flange *o* to which the bottom of the cylinder *e* is bolted, and the inner crosshead-guide *n* is formed with a horizontal lug *p* which is secured by bolts *q* to the top-plate  
30 *a'* of the girder *a*. The same guide is formed with a vertical foot *p'* which fits the face of the girder plate between the angle-irons, thereto by bolts *q'*. The crosshead-guide with the lug *p*, foot *p'* flange *o*, and bottom  
35 frame *m'* forms an integral cylinder bracket. The bottom ends of the crosshead-guides have feet *m'* connected by a flat frame *m''*, and the feet bolted upon the seats *m* of the crank-shaft bracket *i*; which thus ties all the crosshead-guides together, while the connection of the crosshead-guides with the cylinders and the crank-shaft bracket braces each  
40 of those parts firmly to one another and to the girder A, as the lug *p* and foot *p'* form a part of the inner guide *n*.

45 Reference to Fig. 4 shows that the engines are disposed wholly outside of the side-frame A and connected solely thereto, while the boiler sets upon the inner side of the said frame, entirely clear of the engines, and thus adapted to be lifted from the frames without  
50 displacing any part whatever of the engines.

55 The connection of the engines with the side-frame A by means of cylinder-brackets and a crank-bracket, which are bolted together as well as to the side-frame, holds all the parts securely in their working position, while avoiding the bolting of the cylinders to the fire-box which has been common  
60 hitherto.

65 The axis *z* of the cylinders and crank-shaft is, at the top, inclined outwardly from the side-frame A and the fire-box, thus making some space above the edge of the side-frame in which the fire-box can be extended by

curving its upper side *b'* toward the cylinders, thus widening the upper part of the fire-box just below the crown-sheet *b''*, and thereby increasing the size of the combustion-chamber therein and the space for the  
70 flues *b'''*. This particular form of fire-box is designed especially for use with engines mounted upon the outer side of the side-frame A, and I have therefore claimed the same in connection with such mounting of  
75 the engines.

Having thus set forth the nature of the invention what is claimed herein is:

1. In a geared locomotive, the combination, with two side-frames and a longitudinal boiler supported removably thereon, of  
80 vertical engines projected upward by the side of the boiler and supported wholly upon one of the side-frames to permit the removal of the boiler from the frames without  
85 disturbing the engines.

2. In a geared locomotive, the combination, with two side-frames and a longitudinal boiler supported removably thereon, of a longitudinal crank-shaft having bearings  
90 at one side of the frames and vertical engine-cylinders attached to one of the side-frames above the crank-shaft and wholly clear from the boiler to permit the ready removal of the boiler from the frames.  
95

3. In a geared locomotive, the combination, with two side-frames, trucks supporting the frames and having the truck-wheels supplied with gearing, and a locomotive boiler supported removably upon the  
100 frames, of a crank-shaft with bearings at one side of the frames, vertical engines projected upwardly at the side of the boiler firebox, and brackets attached to one of the side-frames and supporting the engines and  
105 crank-shaft thereupon.

4. In a geared locomotive, the combination, with two side-frames and a longitudinal boiler supported removably thereon, of a crank shaft, a bracket upon one of the  
110 side-frames with bearings for the crank-shaft, a bracket attached solely to the said side-frame with steam-cylinder supported thereon, and crosshead guides connecting the steam-cylinder and the crank-shaft  
115 bracket.

5. In a geared locomotive, the combination, with a longitudinal boiler, of a main frame including a girder at one side of the boiler, a longitudinal crank-shaft with  
120 bracket having bearings therefor and attached to the lower edge of the said girder, steam-cylinders with brackets supporting the same upon the upper edge of said girder, and crosshead-guides connecting the  
125 said cylinders and crank shaft bracket.

6. In a geared locomotive, the combination, with a longitudinal boiler, of a main frame having a plate-girder at one side of the boiler, a crank-shaft with a plurality of  
130

cranks, a horizontally extended crank-shaft bracket attached to the lower edge of such girder and provided with bearings between the cranks for the said shaft, steam-cylinders corresponding to the said cranks, and brackets attached to and supporting them upon the upper edge of the girder, and said brackets provided with crosshead-guides attached to the cylinders and to the said crank-shaft bracket.

7. In a geared locomotive, the combination with a longitudinal removable boiler, of a main frame having a plate-girder at one side of the boiler, a longitudinal crank-shaft, a horizontally extended bracket attached to the lower edge of such girder with bearings between the cranks of the said shaft, steam-cylinders corresponding to the said cranks with brackets attached to and supporting them upon the upper edge and face of the said girder, and crosshead-guides formed in one piece with the said cylinder-brackets and connected to the crank-shaft bracket.

8. In a geared locomotive, the combination, with a removable locomotive boiler having the fire-box at one end, of two side-frames having their ends at the same level and provided with bolsters, and trucks to support the same, one of the side-frames being bent downwardly to the bottom of the said fire-box and the other side-frame ex-

tending along the outer side of the fire-box, and vertical engines including the crank-shaft and bearings attached exclusively to the said frame which is extended outside of the fire-box.

9. In a geared locomotive, the combination, with a removable locomotive boiler having the fire-box at one end, of two side-frames having their ends at the same level and provided with bolsters, and trucks to support the same, one of the side-frames being bent downwardly to the bottom of the said fire-box and the other side-frame extending along the outer side of the fire-box, and vertical engines including the crank-shaft and bearings attached exclusively to the said frame which is extended outside of the fire-box, and the upper part of the said fire-box being curved outwardly at one side above the side-frame which carries the said engines, whereby the fire-box is widened in its upper part, thereby affording more space for combustion and for the insertion of flues.

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

LEWIS E. FEIGHTNER.

Witnesses:

L. R. WRIGHT,  
F. WELLS.