

Nov. 4, 1924.

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W. E. WOODARD

MOTOR FOR GEARED LOCOMOTIVES

Filed Oct. 6, 1920

4 Sheets-Sheet 1

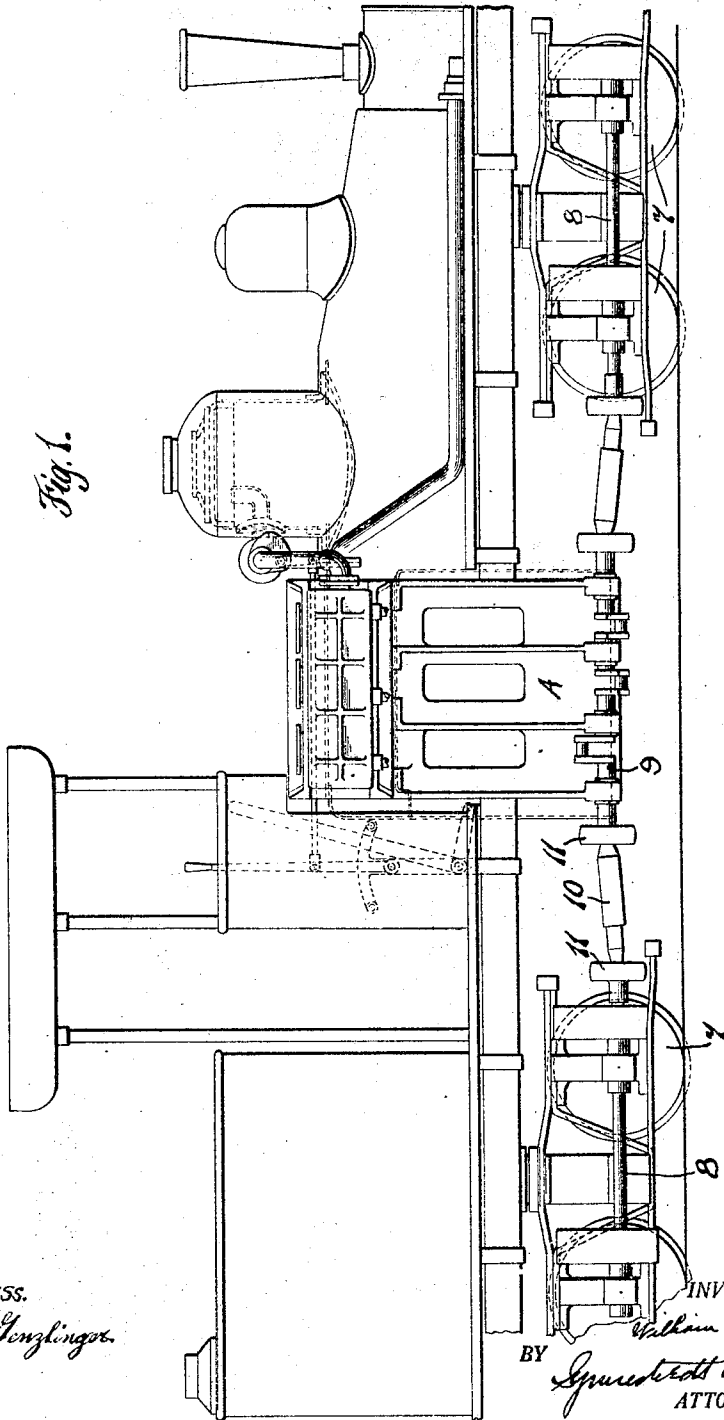


Fig. 1.

WITNESS.
Gustav Henningsen

INVENTOR.
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4 Sheets-Sheet 2

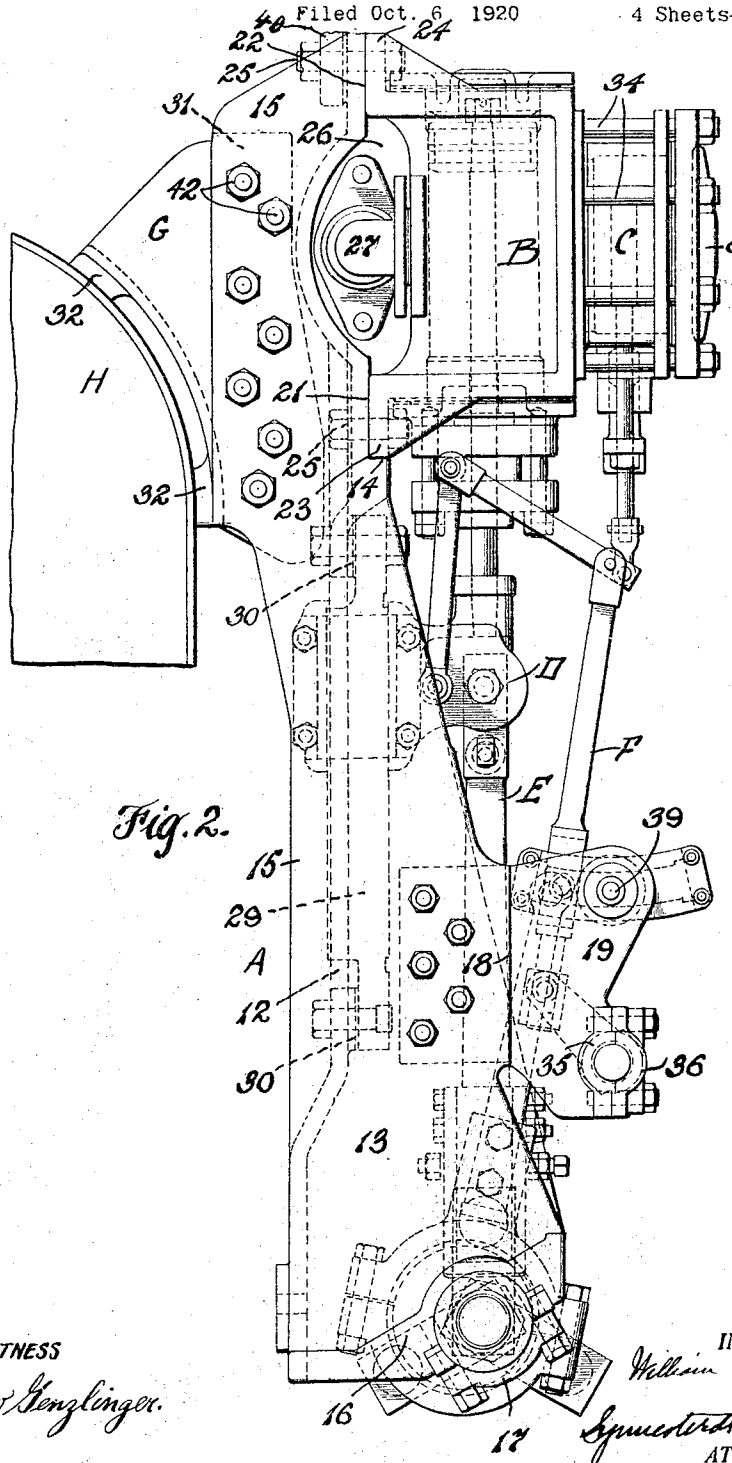


Fig. 2.

WITNESS
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4 Sheets-Sheet 3

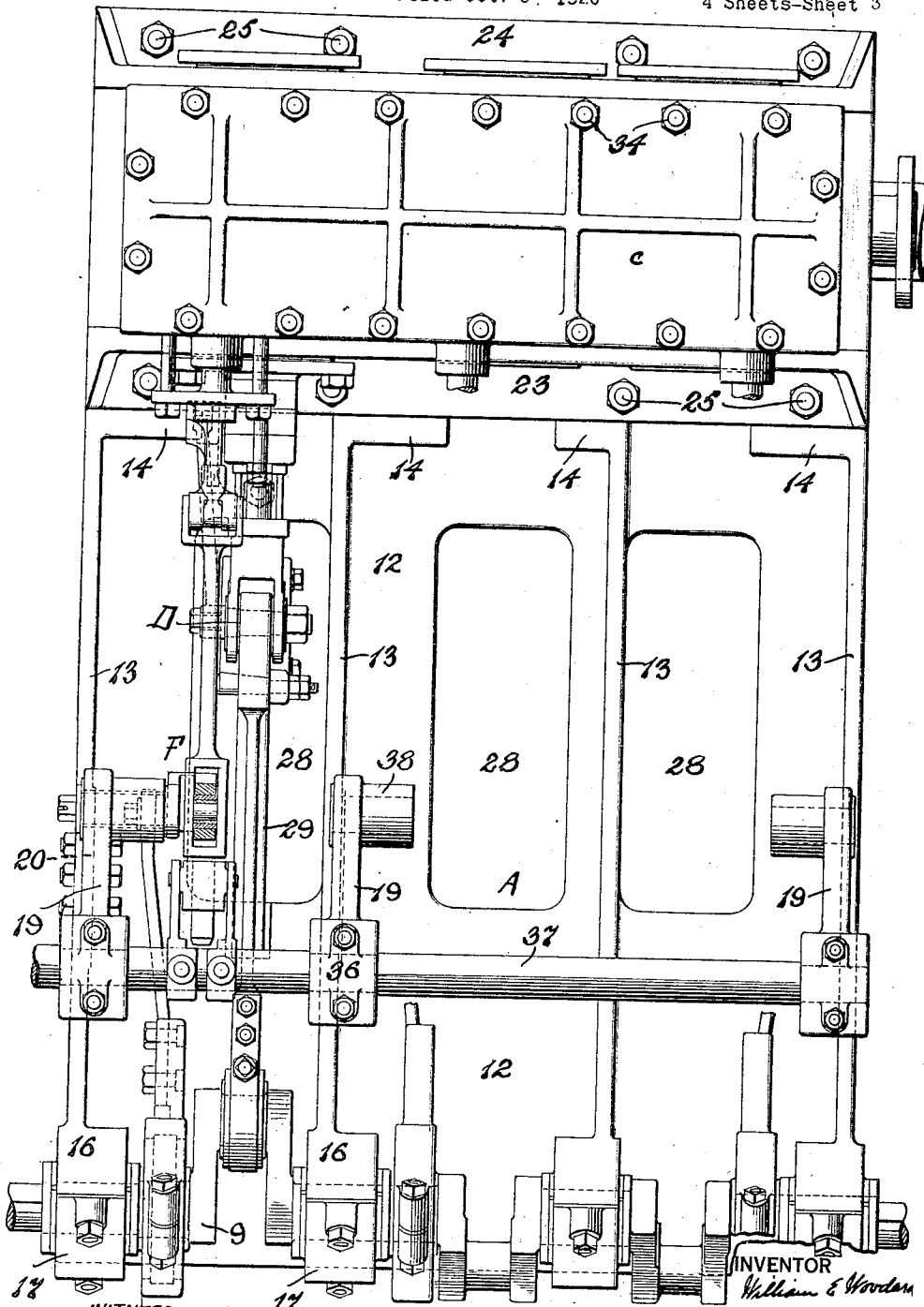


Fig. 3.

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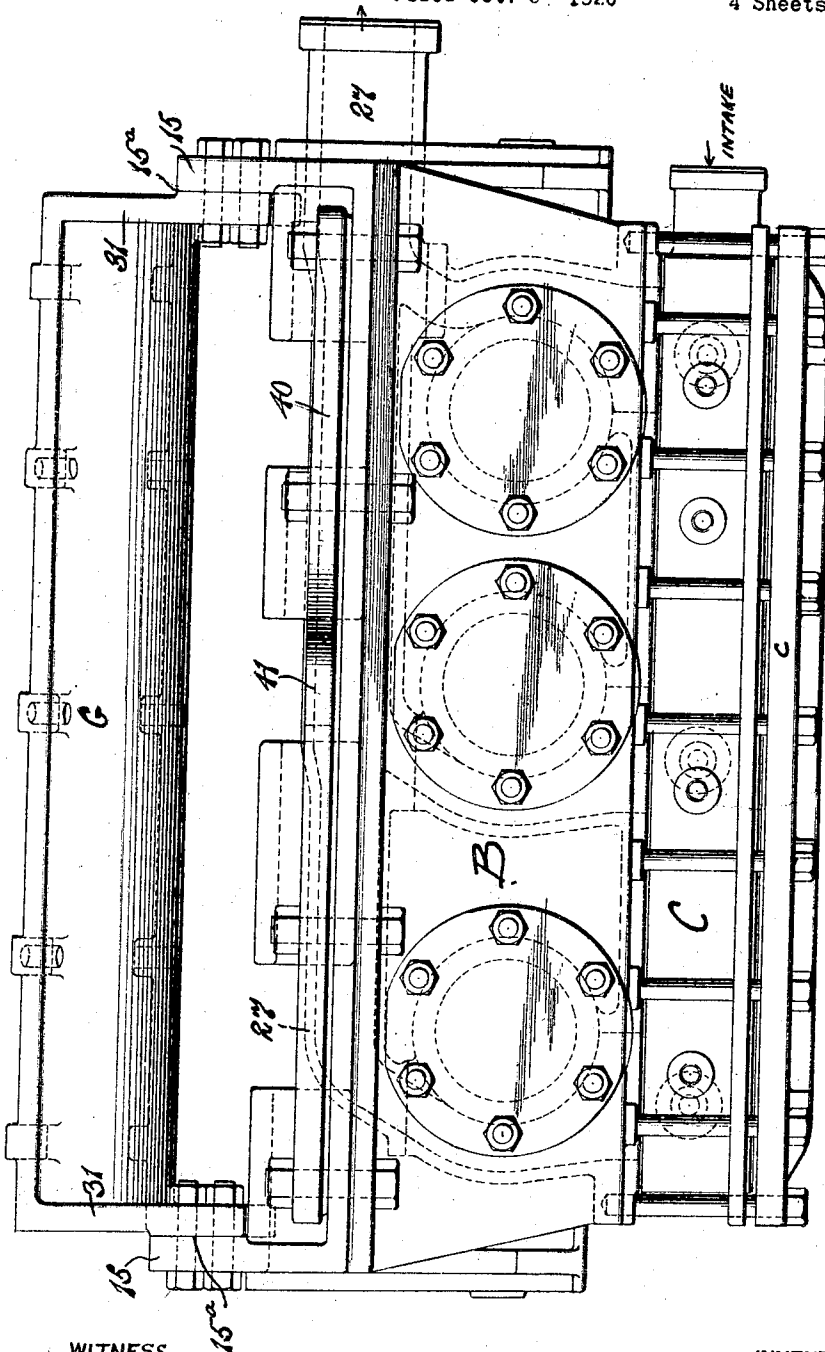


Fig. 4.

WITNESS.
Gustav Junglinger.

INVENTOR
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BY
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UNITED STATES PATENT OFFICE.

WILLIAM E. WOODARD, OF FOREST HILLS, NEW YORK.

MOTOR FOR GEARED LOCOMOTIVES.

Application filed October 6, 1920. Serial No. 415,110.

To all whom it may concern:

Be it known that I, WILLIAM E. WOODARD, a citizen of the United States, residing at Forest Hills, in the county of Queens and State of New York, have invented certain new and useful Improvements in Motors for Geared Locomotives, of which the following is a specification.

This invention relates to motors for geared locomotives and the like and the nature, objects and advantages thereof will be best understood from a brief description of standard practice in equipment of this character.

In Shay and other geared locomotives what is known as a steam bracket containing both the exhaust and the steam passages is bolted to the boiler of the locomotive and has its outer face, against which the cylinders are bolted, machined and scraped to an accurate surface. The cylinders, which are generally three in number, are bolted separately to this steam bracket, the joint between the cylinders and the steam bracket being very carefully made in order to be steam tight. The bottom housing for the crank shaft and the guide castings are then placed in position and the rest of the engine parts assembled. Among the difficulties encountered in this practice are the following: Very accurate workmanship is required in order to secure a steam tight joint between the cylinders and the steam brackets; the various engine parts must be assembled at the time the locomotive is put together in the erecting shop; the engine cannot be tested as a unit before the entire locomotive is ready to run; the time to erect the engine parts upon the locomotive necessarily demands that the engine be held that much longer in the erecting shop; and any change in gauge of track necessitates a new steam bracket pattern having an angle of face to suit the changed location of the crank shaft.

One of the primary objects of my invention is to provide an improved steam motor for geared locomotives which can be more cheaply and conveniently manufactured and applied. Another object of my invention is to provide a steam motor unit which can be made, assembled, completed and tested before applying the same to the locomotive, and which, when placed upon the locomotive will be ready for operation when steam is turned into it.

Still another object of my invention resides in the provision of an improved steam motor for this class of work which will adapt itself to a wide range of application without change or substitution of parts.

My invention also contemplates the provision of an improved engine of the character described in which the exhaust and live steam passages are contained in parts other than the means utilized for securing the engine to the boiler, and also in the provision of an improved construction and arrangement of parts whereby the engine can be erected, handled and applied as a unit.

The foregoing, together with such other objects as may hereinafter appear, I obtain by means of a construction, the preferred embodiments of which I have illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevation of a Shay locomotive equipped with my improvement, with certain of the parts omitted for the sake of clarity; Fig. 2 is an enlarged end elevation of my improved motor, illustrating the method of its application; Fig. 3 is a front elevation of Fig. 2, duplicate parts not being shown; and Fig. 4 is a plan view of Fig. 3.

Referring now to Fig. 1, it will be seen that I have therein diagrammatically indicated a geared locomotive having geared drivers 7, of any preferred design and arrangement, said drivers being driven in the usual manner by the pinion shafts 8. The crank shaft is indicated at 9 and between the crank shaft and the pinion shafts, slip joints 10 and universal joints 11 are provided.

The engine comprises, in general, a bed plate A, preferably a steel casting; the cylinders B, preferably cast en bloc and secured to the bed plate; the valve chests C, also preferably cast en bloc and secured to the bed plate; the cross heads D and pitmans or connecting rods E; the valve motions F, which may be of any preferred design, but which are shown as being of the Walschaert type; and the bracket G, which is secured to the boiler shell H, and from which the bed plate is hung.

The bed plate will now be described. It comprises the substantially vertical web or plate proper 12 provided on its outer face with a plurality of ribs 13 which extend from the bottom upwardly to a point short

of the upper end of the bed plate where they terminate in shoulders 14, the purpose of which will hereinafter appear. Extending rearwardly from the plate 12, at the vertical edges thereof, are ribs 15. At the bottom the ribs 13 are formed into pillows 16 which are angularly disposed and are adapted to receive the block 17 to provide a bearing for the crank shaft 9. These parts are, therefore, more or less accessible from the front. Some distance above the pillows 16, the ribs 13 are provided with substantially vertical surfaces 18, substantially parallel to the longitudinal axis of the motor cylinders and machined to provide seats for the shouldered brackets 19 which carry certain of the parts of the valve gear. The brackets 19 are bolted to the sides of the ribs 13 in the manner indicated, the ribs being provided with pads 20 for this purpose. Above the shoulders 14, seats 21 and 22 are provided to receive the flanges or feet 23 and 24 of the cylinder casting. The shoulders 14 serve to position and support the cylinder castings, thereby relieving, to some extent, the bolts 25 which secure the cylinders to the bed plate.

Intermediate the seats 21 and 22, the bed plate is carried rearwardly to provide a space 26 between the bed plate and the cylinder casting for the introduction of the exhaust manifold 27. Intermediate the ribs 13, the plate 12 is apertured as indicated at 28 to provide a space for the cross heads D which reciprocate on the guides 29, which are bolted or otherwise secured to the bed 12 as indicated in Fig. 2, the bed being provided with pads 30, machined to provide proper seats for the guides. The ribs 15 are provided with pads 15^a machined to provide seats for the end flanges 31 of the bracket G, such bracket, at a plurality of points being provided with pads 32 adapted to take a seat on the boiler shell H, to which the bracket G is secured in any preferred manner.

The steam chest casting, together with its cover *c* are secured to the front face of the cylinder casting by means of the studs 34 as indicated in Fig. 2.

The brackets 19 are provided with pillows 35 and pillow blocks 36 for bearings for the reverse or control shaft 37 and, at the top, each of said brackets is provided with a hub portion 38 to receive the link trunnion 39 of the respective valve motion.

It will be understood that in Fig. 3 the parts are shown in full for one cylinder and valve, such parts being duplicated for the remaining cylinders and valves with proper adjustment thereof.

It will be understood from the foregoing that the motor comprises a unit which can be readily assembled and tested independently of the locomotive and afterwards installed

thereon, the device thus overcoming the difficulties hereinbefore mentioned.

In applying the motor unit to the locomotive, a temporary plate 40 having an eye 41 to receive the hook of a suitable hoist is secured to the top of the bed plate, several of the bolts 25 being utilized for this purpose. After the motor unit has been hoisted and shifted so that the crank shaft 9 is approximately in the same line, both vertically and horizontally as the pinion shafts carried on the trucks, the flanges 31 of the bracket G are suitably marked for the holes for the bolts 42 which serve to secure the bed plate to the bracket G. The unit is then shifted out of the way, the holes drilled, and the unit once again brought into position and bolted or the holes may be drilled with the unit in place which is then bolted.

It will be seen that one of the important advantages of the foregoing is that the unit can be applied to the locomotive in a very simple manner, without change or substitution of parts, irrespective of the variation in track gauge and, therefore, variation in distance between pinion shafts transversely of the locomotive. The parts are, therefore, standard within practical limits. The other advantages hereinbefore noted will be readily understood by those skilled in the art.

I claim:

1. In a locomotive having wheels and gear driving means therefor, the combination of a complete, operable unit steam driving motor including the cylinder and engine parts and a frame or bed adapted to carry said parts, and means whereby said bed may be supported from the locomotive, and flexible connecting means between the motor unit and said driving means.

2. In a geared locomotive, the combination of a boiler, geared driver means for the locomotive, a motor operatively connected with said driver means, and a bracket for securing said motor to the locomotive, said bracket having a substantially vertically disposed flange.

3. In a geared locomotive, the combination of a boiler, geared driver means for the locomotive, a motor operatively connected with said driver means, and a bracket for securing said motor to the boiler, said motor bracket having substantially vertically disposed attaching flanges.

4. In a geared locomotive, the combination of a boiler, geared driver means for the locomotive, a motor operatively connected with said driver means, and a bracket for securing said motor to the locomotive, said bracket and motor having cooperating attaching portions arranged to permit adaptation to variations in gauge.

5. In a geared locomotive, the combination of a boiler, geared driver means there-

for, a motor operatively connected with said driver means, and a connection between the motor and boiler constructed to permit the motor to be shifted to variations in
5 gauge.

6. In a geared locomotive having a boiler, the combination of a steam driving motor, and an attaching bracket secured to the boiler, said motor including a bed and cylinder and valve chest, the steam and exhaust passages of which are independent of the bracket.
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7. In a geared locomotive having a boiler, the combination of a steam motor, including a bed; cylinders cast en bloc, valve chests en bloc and engine parts carried on said bed; and means for attaching the bed to the boiler.
15

8. In a geared locomotive having a steam driving motor provided with cylinders, crank shaft, cross head guides and valve motion parts, the combination of an integral steam motor bed plate having ribs or flanges on its outer face provided with seats for the
20 valve motion parts, pillows for the crank

shaft, a seat for the cylinders and seats for the cross head guides.

9. In a geared locomotive having a steam driving motor provided with cylinders, crank shaft, valve motion parts and cross head guides, the combination of an integral steam motor bed plate having ribs or flanges on its outer face provided with seats for the valve motion parts, pillows for the crank shaft, a shoulder seat for the cylinders and
30 seats for the cross head guides.
35

10. In a geared locomotive having a steam driving motor provided with cylinders, crank shaft, valve motion parts and cross head guides, the combination of an integral steam motor bed plate having ribs or flanges on its outer face provided with seats for the valve motion parts, pillows for the crank shaft, a seat for the cylinders and seats for the cross head guides, said bed also having
40 flanges on its inner face for attachment to the locomotive.
45

In testimony whereof, I have hereunto signed my name.

WILLIAM E. WOODARD.