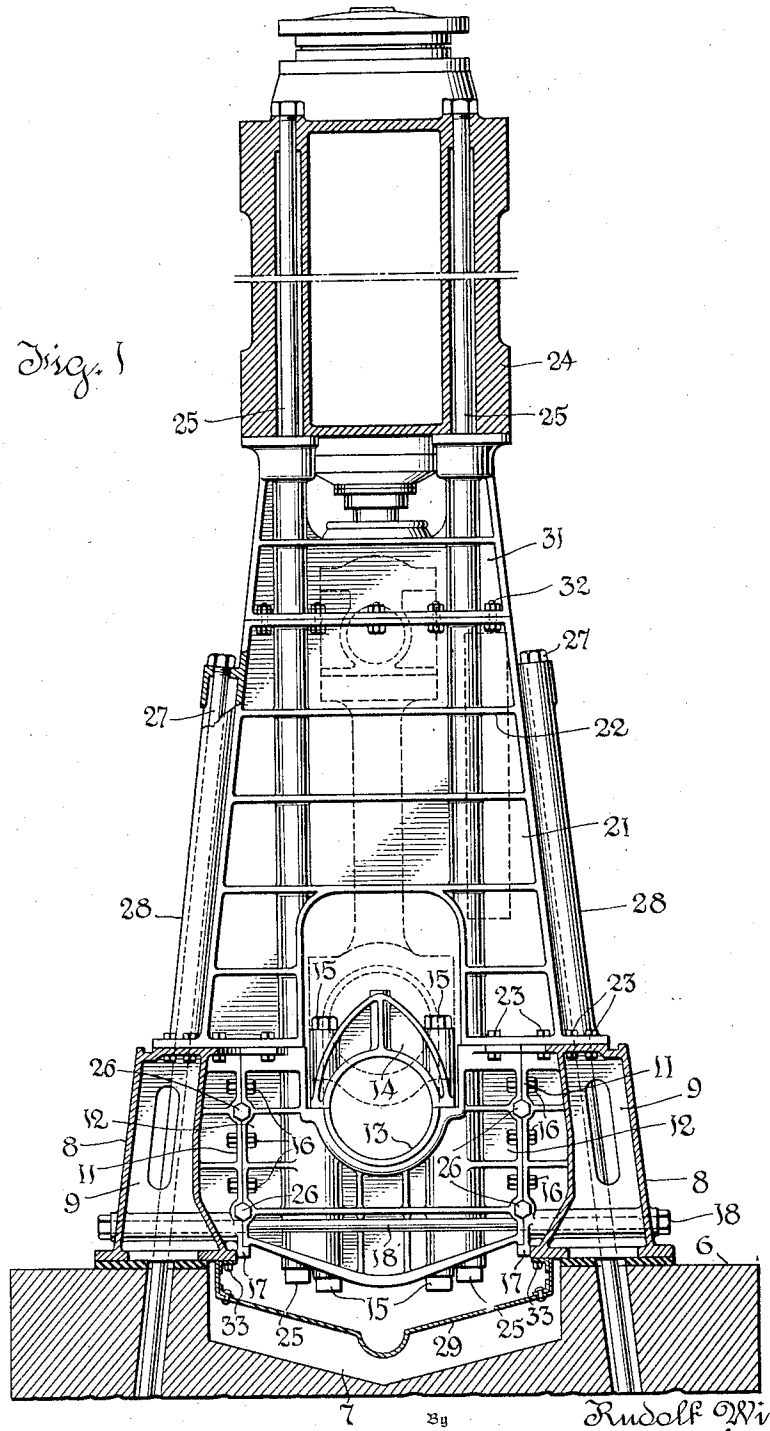
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BEDPLATE CONSTRUCTION

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Fig. 1



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Fig. 2

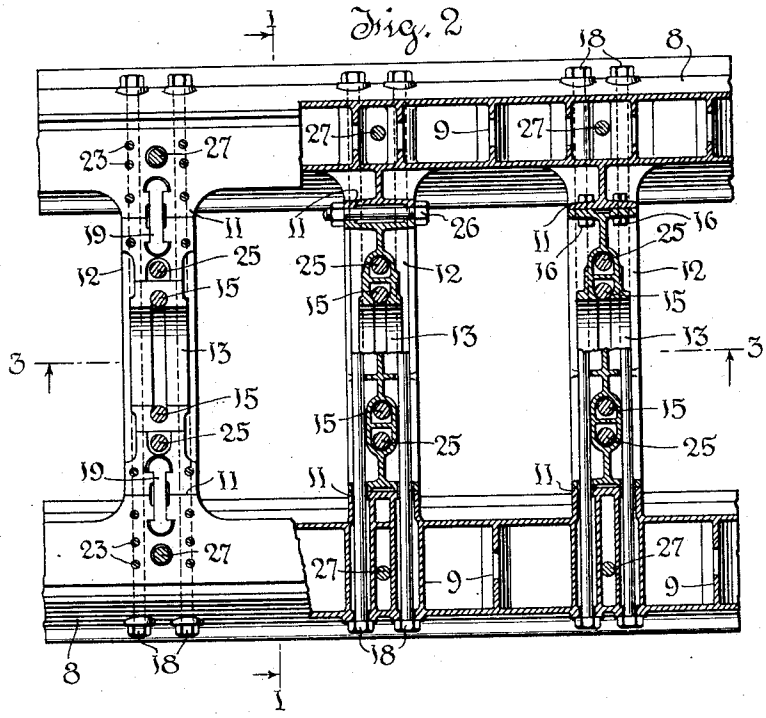
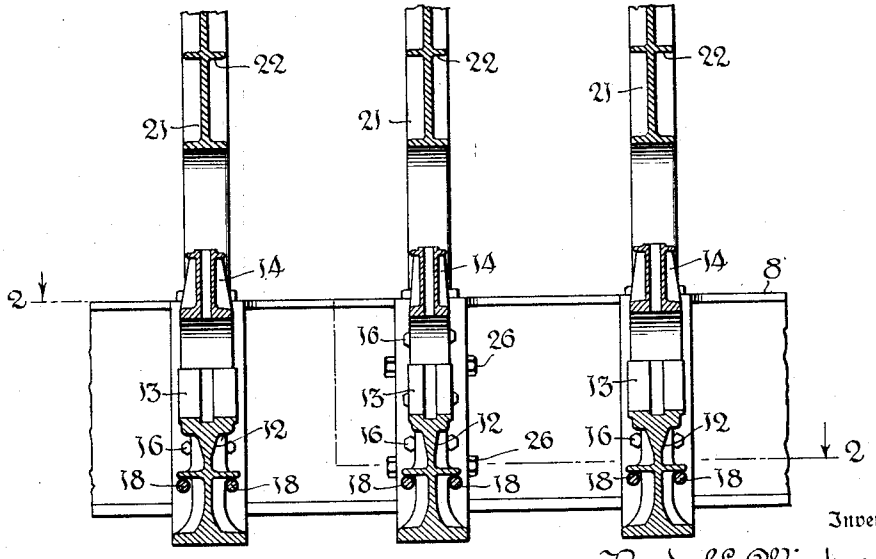


Fig. 3



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UNITED STATES PATENT OFFICE

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BEDPLATE CONSTRUCTION

Application filed March 2, 1931. Serial No. 519,621.

This invention relates to frames for reciprocating engines and particularly to frames for engines of the multi-cylinder vertical type. The object of the invention is to produce a frame of sectional construction which will meet the severe requirements of service.

A unitary bed plate is desirable where practicable, but in the large Diesel engines now coming into extensive use the bed plates are necessarily so large that they cannot be shipped by rail except on specially constructed cars, and cannot be machined with facilities ordinarily available.

The present invention provides a sectional bed plate, so constructed, that in conjunction with the upright frames which support the cylinders, the necessary rigidity of the entire engine frame structure is secured.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a vertical transverse section, this plane of section being indicated by the line 1—1 in Fig. 2;

Fig. 2 is a view of the bed plate partly in plan and partly in section on the line 2—2 of Fig. 3; and

Fig. 3 is a vertical section on the line 3—3 of Fig. 2, showing portions of the upright frames.

A suitable foundation is indicated generally at 6 and is recessed at 7 to afford space for the oil pan.

Resting on the foundation are two longitudinal sill members 8 of box section. These are in the form of cored steel castings, suitably webbed as indicated at 9 and provided on their approximate faces with webbed bolting pads 11.

The pads on the two sills are spaced to correspond with the spacing of the main crank shaft bearings, and to them are bolted cross tie members 12 preferably cast individually and suitably webbed. The members 12 carry the main crank shaft bearings 13 which have removable caps 14 held by bolts 15. The bolts which connect the side sills 8 with the cross tie member 12 are indicated at 16. The lugs 17 position the parts during assembly.

The sills 8 are tied together independently of the cross tie members by tension rods 18 located in the lower portion of the sills, and associated in pairs with the cross tie members. Interference with the crank shaft precludes the use of similar rods near the top of the sills 8, and when additional connection is necessary recourse is had to the shrink links 19 (see Fig. 2) set in the upper faces of the sills 8 and cross ties 12.

Mating with the upper surfaces of the sills 8 and cross tie members 12 are a plurality of upright frames 21. These are castings preferably unitary, as shown, suitably webbed as indicated at 22, and cored to receive the tension rods hereinafter described. The frames are supported primarily by the sills, but they seat against and are bolted to the cross tie members 12 as well. The bolts are indicated at 23. The bolting pads in the lower ends of the frames overlie the shrink links 19.

The frames 21 support the cylinder structure. Preferably this includes an entablature 31 and superposed cylinders 24. The entablature is a frame extending the entire length of the engine and in a sense is a part of the engine frame, serving as a bed plate for the cylinders. The entablature is preferably cast as a unit and is suitably webbed so as to combine strength with light weight. It is bolted to the frames 21 as indicated at 32. The cylinders 24 may be cast individually or in multiple.

The cylinder structure is tied down by tension rods 25, two for each frame, symmetrically arranged. The rods 25 pass through the cylinder castings 24, and entablature 31 and each pair of rods passes through a corresponding frame member 21 and tie member 12.

In engines of the type contemplated one of the main bearings 13 is equipped to serve also as a thrust bearing and prevent motion of the shaft longitudinally. In the drawings the middle tie member 12 of Figs. 2 and 3 is assumed to carry such a bearing, and unlike the other tie members 12 has bolts 26

to assist in holding the tie member in place and relieve the bolts 16 of shear.

The bolts 26 are mounted in holes drilled with their axes in the plane of the joint so that the hole is approximately half in the sill and half in the tie member. (See Fig. 2.) These bolts are easier to place than dowels would be and serve a similar purpose.

The frame is held to the foundation 6 by tie rods 27, which pass through sleeves 28 cast integrally with the frames 21 and through openings in the sills 8.

The frame structure having been described, important proportions and relations of the component elements will be explained.

The construction is such that the joint between the upright frames 21 on the one hand and the sills 8 and members 12 on the other, reinforces the joints between the corresponding members 12 and the sills. Furthermore, the plane of this joint is substantially above the axis of the crank shaft, so that the height of the frames 21 is reduced to the minimum. The use of the entablature 31 also permits a reduction in the height of frames 21.

From the construction and proportioning adopted it becomes possible to machine all components on machines of reasonable size and to ship them on ordinary railroad cars, points of the utmost economic importance.

An oil pan 29 is suspended from the sills, and may be constructed of sheet metal. The studs 33 which hold it in place are accessible from within the crank case.

While a particular construction has been described in some detail, modifications are possible within the scope of the invention.

What is claimed is:

1. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure formed separately from the sills, and including a plurality of bearing-supporting tie-members extending from sill to sill; and a plurality of upright cylinder-supporting frames, each resting on said sills and on a corresponding tie member; and means for rigidly connecting said upright frames to the sills and to the corresponding tie member, and for connecting said tie members with said sills.

2. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure formed separately from the sills, and including a plurality of bearing-supporting tie-members extending from sill to sill and supported solely thereby; and a plurality of upright cylinder-supporting frames, each resting on said sills and on a corresponding tie member; and means for rigidly connecting said upright frames to the sills and to the corresponding tie member, and for connecting said tie members with said sills.

3. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure formed separately from the sills, and including a plurality of bearing-supporting tie-members extending from sill to sill; and a plurality of upright cylinder-supporting frames, each resting on said sills and on a corresponding tie member; and means for rigidly connecting said upright frames to the sills and to the corresponding tie member, and for connecting said tie members with said sills; and tension tie rods extending from sill to sill in association with said tie members.

4. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure, formed separately from the sills, and including a plurality of bearing-supporting tie members, extending from sill to sill; a plurality of upright frames each resting on said sills and on a corresponding tie member; means for rigidly connecting said upright frames to said sills and a corresponding tie member, and for connecting said tie members to said sills; a cylinder structure mounted on said upright frames; and tension tie rods passing through said upright frames and connecting said cylinder structure with that tie member which underlies the upright frame; and tension tie rods connecting said sills and associated with corresponding tie members.

5. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure, formed separately from the sills, and including a plurality of bearing-supporting tie members, extending from sill to sill; a plurality of upright frames each resting on said sills and on a corresponding tie member; means for rigidly connecting said upright frames to said sills and a corresponding tie member, and for connecting said tie members to said sills; a cylinder structure mounted on said upright frames; and hold-down rods engaging said upright frames and passing through said sills.

6. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross frame structure, formed separately from the sills, and including a plurality of bearing-supporting tie members, extending from sill to sill; a plurality of upright frames each resting on said sills and on a corresponding tie member; means for rigidly connecting said upright frames to said sills and a corresponding tie member, and for connecting said tie members to said sills; a cylinder structure mounted on said

upright frames; and tension tie rods passing through said upright frames and connecting said cylinder structure with that tie member which underlies the upright frame; and tension tie rods connecting said sills and associated with corresponding tie members; and hold-down rods engaging said upright frames and passing through said sills.

7. A frame structure as defined in claim 1, in which the means for connecting the tie members with the cross sills includes shrink links set in the upper faces of both and overlaid by said upright frames.

8. A frame structure as defined in claim 1, in which at least one of the bearing-supporting tie members is held against motion in the direction of the length of the sills by bolts set in holes drilled in the meeting faces of the sills and tie members.

9. A frame structure as defined in claim 1 in which the plane of the joints between the upright frame members on the one hand, and the sills and tie members on the other hand, is a substantial distance above the axis of the bearings on the tie members.

10. A frame structure for reciprocating engines, comprising in combination, longitudinal sills adapted to rest on a foundation; an intervening cross-frame structure, formed separately from the sills, and including a plurality of bearing-supporting tie members extending from sill to sill; a plurality of upright frames, each resting on said sills and on a corresponding tie member; an entablature resting on said upright frames; means for rigidly connecting each upright frame to the entablature; means for rigidly connecting each upright frame to the sills and to a corresponding tie member; and means for connecting said tie members to said sills.

In testimony whereof I have signed my name to this specification.

RUDOLF WINTZER.