

Aug. 27, 1935.

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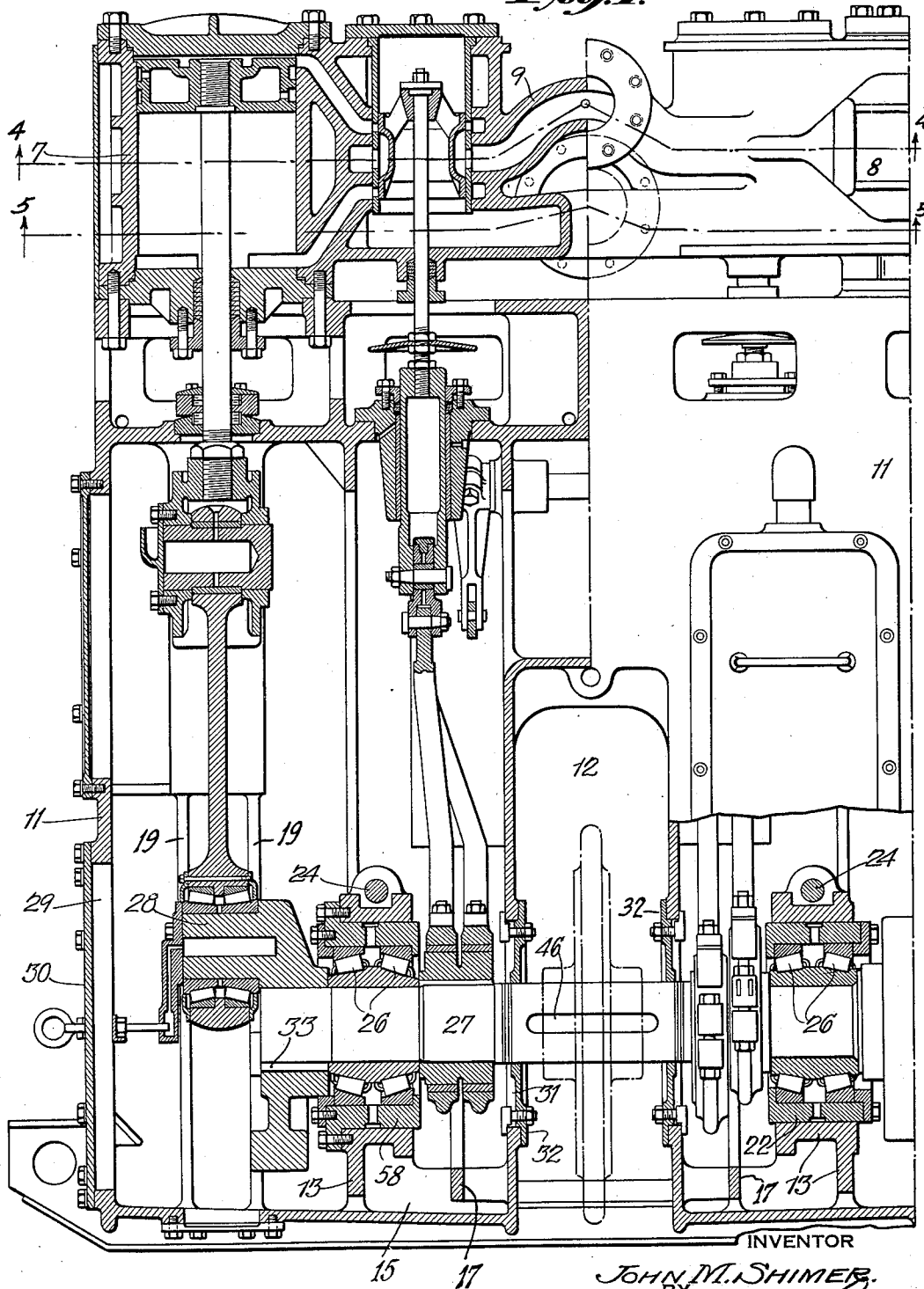
2,012,778

TWIN CYLINDER STEAM ENGINE

Original Filed April 21, 1931

3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

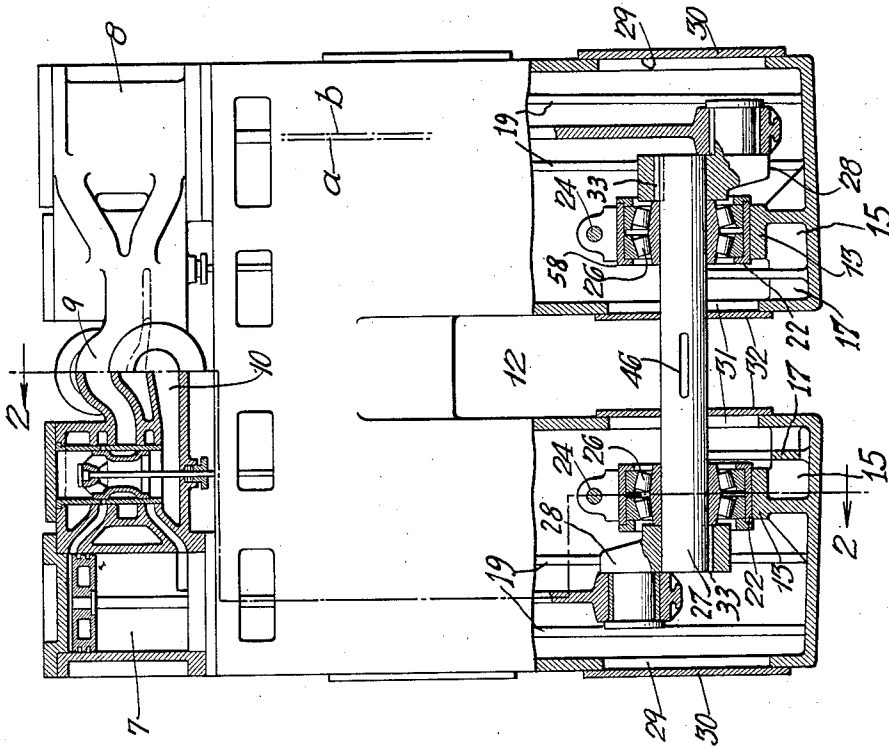
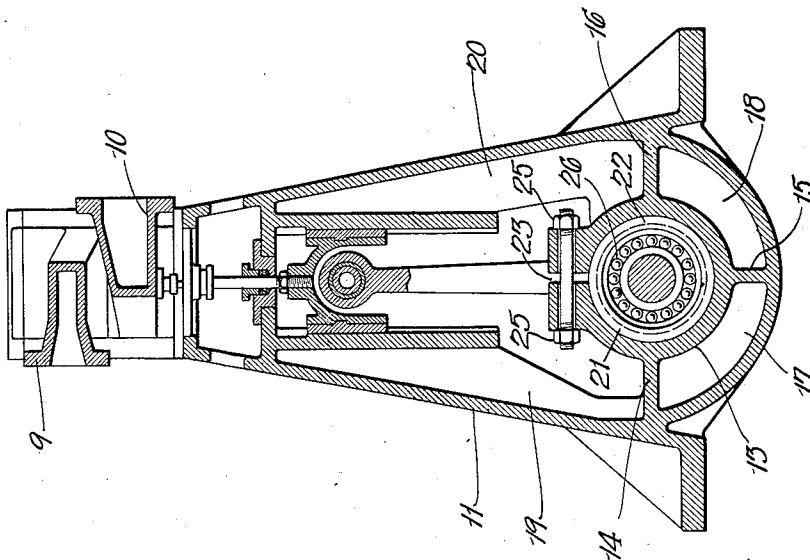


Fig. 3.



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Fig. 6.

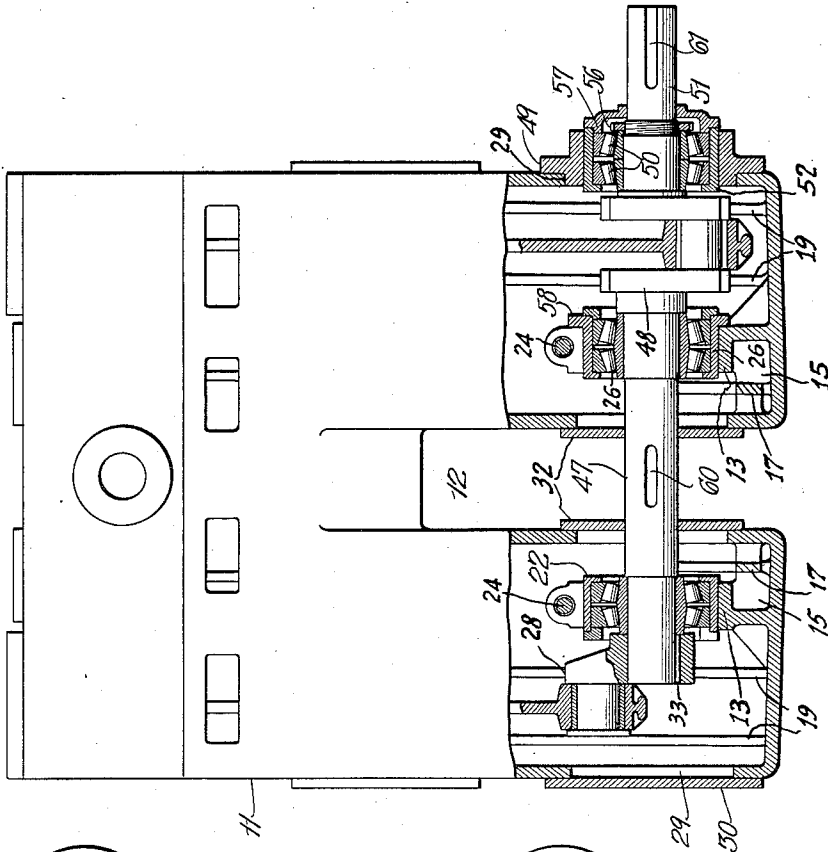


Fig. 4.

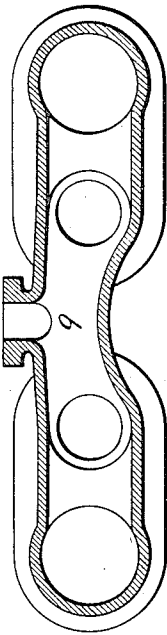


Fig. 5.



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TWIN CYLINDER STEAM ENGINE

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Original application April 21, 1931, Serial No. 531,715. Divided and this application February 23, 1933, Serial No. 658,175

3 Claims. (Cl. 121—194)

This invention relates to twin cylinder steam engines and, more particularly, to steam engines of the double acting type having twin cylinders cast together as a single casting. This application is a divisional application of application Serial No. 531,715, filed April 21, 1931.

In the twin cylinder engine shown in the above application, the lower part of the crank case is divided into two compartments, one for each cylinder, by means of a pair of spaced walls through which the crank shaft passes so that a power take-off may be provided between the spaced walls. The shaft is supported by bearings, one in each crank case compartment, and these bearings are in turn supported in a structure braced to the walls of the compartments so as to provide a rigid and permanent support for the bearings. The shaft may also continue through one or both ends of the crank case compartments. The invention of the present application is directed more particularly to the bracing and bearing supports and to openings in the walls of the crank case whereby the crank shaft and its bearings may be inserted into place in a direction longitudinally of the shaft and may thereby be readily removed and inserted.

Fig. 1 is a view, partly in elevation and partly in central vertical section, of a vertical double acting steam engine having twin cylinders cast together as a single casting;

Fig. 2 is a view principally in elevation of a steam engine of the type shown in Fig. 1, parts being omitted for the sake of simplicity, so as to better illustrate my invention;

Fig. 3 is a section on the line II—II of Fig. 2; Fig. 4 is a horizontal section through the steam intake manifold taken on line 4—4 of Fig. 1;

Fig. 5 is a horizontal section through the exhaust manifold taken on line 5—5 of Fig. 1; and

Fig. 6 is a view in elevation of a modified form of my invention with a power take-off at one end of the crank shaft, and with a floating outboard bearing, parts being broken away to facilitate illustration.

In Figs. 1, 2, 3, 4 and 5, I have illustrated one embodiment which my invention may assume, it being understood that this embodiment is merely illustrative and is not intended as a limitation of my invention. These figures illustrate how various parts of a twin cylinder steam engine may be formed integral.

In the preferred embodiment of my invention shown in Figs. 1, 2, 3, 4 and 5, the steam cylinders 7 and 8 are integral with steam intake manifold 9 and with steam exhaust manifold 10 and hence

with each other. Frame 11 is cast integral with bearing supports 13 and is divided in its lower portions, leaving between the two divisions an open space 12. Within each division is disposed a support 13 for one of the main bearings of the engine. By means of webs 14, 15 and 16, the support 13 is braced so that it is rigid with the frame 11. Between the webs 14 and 15 is a stiffening web 17 and between the webs 15 and 16 is a similar web 18. Webs 19 and 20 extend upwardly from the webs 14 and 16, respectively. The web 19 does not cooperate directly with the support 13, while the web 20 does directly and rigidly brace the support 13. The support 13 is in the form of a ring surrounding the main bearing; and a minor portion of this support, indicated by the numeral 21, is flexible so as to permit clamping within the same of the housing 22 of the main bearing. The ring shaped support 13 is split at 23, as shown in Fig. 3. The two parts of the clamp are provided with openings through which extends a stud 24. Nuts 25 on the two ends of the stud may be drawn up to clamp the housing 22 within the support 13. Bearing support 13 also can be widened by inserting a wedge in opening 23 in order to facilitate the assembly of the crank shaft with the frame 11 so that the main bearings may be received within the bearing supports 13.

The main bearings are constituted by roller bearings 26. In order that the crank shaft 27 may be assembled with the frame so as to be rotatably supported by the roller bearings 26, the cranks 28 are made separate from the shaft 27. Openings 29 are provided in the frame 11 in alignment with the main bearings, these openings 29 being supplied with cover plates 30. The crank shaft 27 extends across the space 12 through openings 31 in the frame 11, these openings being supplied with apertured cover plates 32. It will be apparent that inasmuch as the cranks 28 are made separate from the crank shaft 27, it is possible to mount the races of the roller bearings 26 on the shaft 27. The assembly of the crank shaft and roller bearings may be positioned within the supports 13; and by means of the studs 24 and the nuts 25, the housings 22 of the roller bearings 26 may be secured in position. The cranks 28 may be pressed onto the crank shaft 27. In the embodiment shown, keys 33 secure the cranks 28 to the shaft 27.

In assembling the crank shaft and mounting it in its bearing supports 13, the roller bearings 26 and their raceways are mounted in the proper spaced position on the crank shaft then, the covers 30 and 32 having been removed from their re-

spective openings, the crank shaft is inserted through the opening 29 and is extended through the openings 31 until the roller bearing raceways are in proper position in their respective mountings 13. They may then be secured in position by tightening the bolts 24. Thereafter the cranks are keyed onto the shaft and the spaces 29 and 31 are closed by their respective covers 30 and 32. It will be understood that the covers 31 are not mounted on the crank shaft 27 but are merely apertured to permit the latter to extend there-through. They may be made in sections so that they may be placed in position and removed.

The construction and arrangement of the cylinders and pitmen form the subject-matter of the parent application Serial No. 531,715 and are, therefore, not described in detail herein.

In the embodiment of my invention shown in Figs. 1 and 2, the power take-off member, such as a gear or sprocket, may be keyed at 46 to the crank shaft 27. This power take-off member is accordingly disposed intermediate the cranks 28. In the embodiment shown in Fig. 6, the frame and the steam end of the engine are identical with that shown in Fig. 2. The crank shaft 47 has a crank 48 formed integral therewith. The openings 29 are identical with the openings shown in Fig. 2. Inasmuch as the second crank 28 is formed separate from the crank shaft 47, the shaft may be supported in roller bearings similarly, as in the embodiment shown in Fig. 2. The cover plate 49 shown in Fig. 6 is provided with a pair of roller bearings 50 for rotatably supporting the projecting end 51 of the crank shaft 47. These roller bearings are contained within a housing 52 fitting an opening in the cover plate 49. The inner races of the bearings are held in position on shaft 47 by a nut 56. The outer races may be adjusted within the housing 52 by a gland member 57, which serves also as an oil seal. The main bearing 26 is contained within a housing 58 which is secured in position in the bearing support 13. The housings 22 and 52, on the other hand, may slide relative to their respective supports 13 and 49. This takes care of possible expansion, stresses in the bearings and in the crank shaft. A power take-off member may be secured by the key 60 to the shaft 47 in the space 12 between the two divisions of the frame 11; and on the projecting end 51 may be secured by the key 61 or other suitable means a second power take-off member. It will be apparent, therefore, that I have provided a steam engine which may be supplied with a crank shaft on which is mounted a single power take-off member, or with a crank shaft on which is mounted a pair of power take-off members. In the embodiment shown in Fig. 2, this power take-off member is disposed in the space 12; in the embodiment shown in Fig. 6, one of the power take-

off members is disposed intermediate the cranks and the other on a projecting end of the crank shaft. The steam engine is, therefore, adapted to a variety of different driving connections.

While I have described in specific detail two embodiments of my invention, it will be apparent that various additions, substitutions and changes can be made therein, without departing from this invention, and under the scope of the following claims.

What I claim is:

1. A twin cylinder steam engine comprising a crank case having two compartments, one for each cylinder, said compartments being separated by a pair of spaced walls forming a power take off space intermediate said compartments, a crank shaft extending through said intermediate power take off space into said compartments, roller bearings removably mounted in said case secured to and supporting said crank shaft, said case having openings through which said crank shaft extends and of a size to permit passage of said bearings therethrough, and closures for said openings about said crank shaft.

2. A twin cylinder steam engine comprising a crank case having two compartments, one for each cylinder, said compartments being separated by a pair of spaced walls forming a power take off space intermediate said compartments, a crank shaft extending through said intermediate power take off space into said compartments, roller bearings removably mounted in said case secured to and supporting said crank shaft, said case having openings through which said crank shaft extends and of a size to permit passage of said bearings therethrough, and closures for said openings about said crank shaft, the closure in one wall of said crank case carrying the outer bearing for said crank shaft.

3. A twin cylinder steam engine comprising a crank case having two compartments, one for each cylinder, said compartments being separated by a pair of spaced walls forming a power take off space intermediate said compartments, a crank shaft extending through said intermediate power take off space into said compartments, roller bearings removably mounted in said case secured to and supporting said crank shaft, said case having openings through which said crank shaft extends and of a size to permit passage of said bearings therethrough, and closures for said openings about said crank shaft, said case having bearing supports supported from the bottom of the case by supporting and stiffening webs to form a rigid support throughout the lower semi-circumference of said bearing and split at the upper part to permit release of said bearings.

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