

C. G. SPRADO.  
ROD CONNECTION.  
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923,724.

Patented June 1, 1909.  
2 SHEETS—SHEET 1.

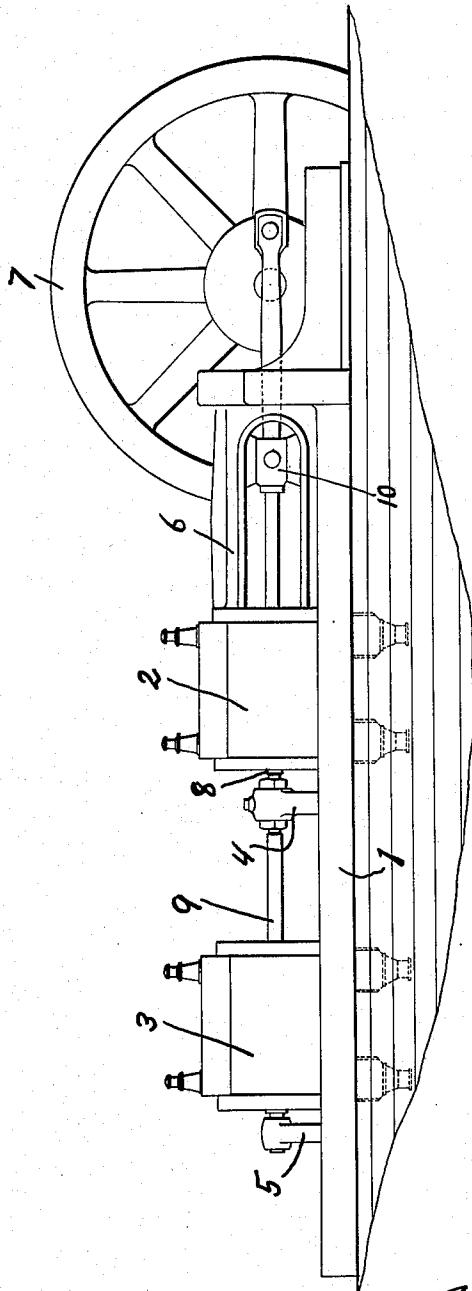


Fig. I.

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2 SHEETS—SHEET 2.

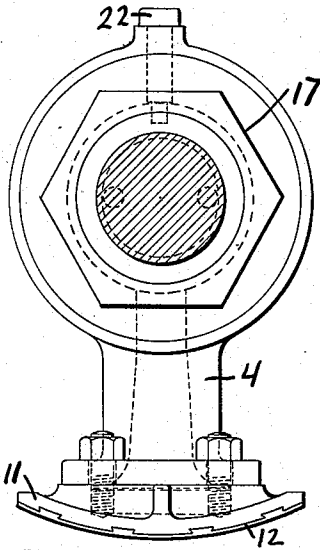


Fig. II.

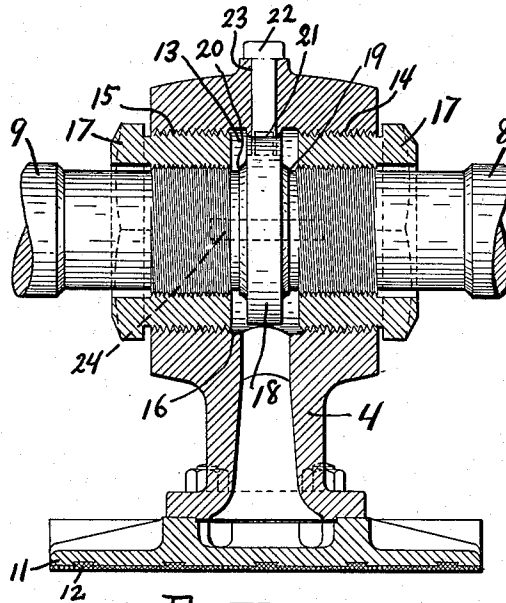


Fig. III.

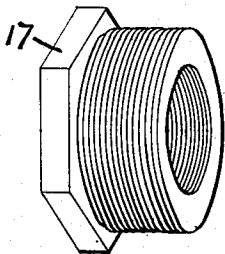


Fig. V.

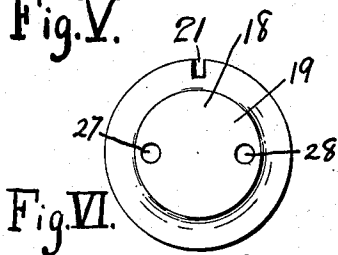


Fig. VI.

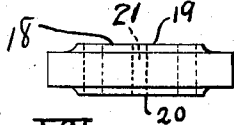


Fig. VII.

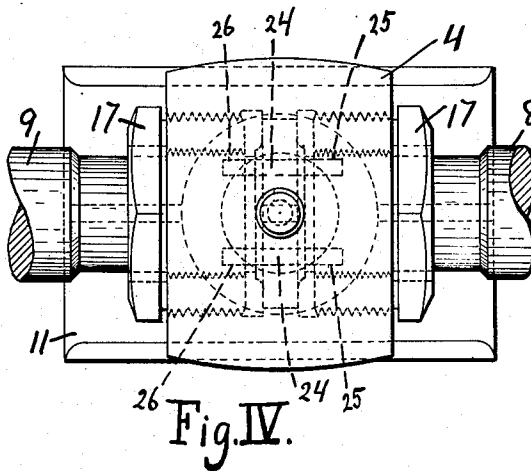


Fig. IV.

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# UNITED STATES PATENT OFFICE

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## ROD CONNECTION.

No. 923,724.

Specification of Letters Patent.

Patented June 1, 1909.

Application filed December 7, 1906. Serial No. 346,715.

*To all whom it may concern:*

Be it known that I, CARL G. SPRADO, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Rod Connections, of which the following is a specification.

This invention relates to apparatus for uniting rods, such as piston rods, connecting rods, etc. thereto; and it relates specifically to machine element connecting means which are especially adapted for use in connection with apparatus where parts should be frequently disconnected, as for example, in gas engines where an impure gas is used, it being found cheaper in practice to clean the engine rather frequently instead of cleaning the gas before it is supplied to the engine.

In the drawings which accompany this specification and form a part thereof, and on which the same reference characters are used to designate the same elements in each of the several figures,—Figure 1 represents an elevation of a gas engine embodying this invention. Fig. 2 represents an end view in elevation of a guide. Fig. 3 represents a vertical longitudinal section through the center of the guide. Fig. 4 represents a plan view of the guide. Fig. 5 represents a perspective of one of the differential nuts. Fig. 6 represents an elevation of the spacing washer; and Fig. 7 represents a plan view of the same.

On the drawings the numeral 1 represents the bedplate of a gas engine, which bedplate supports the cylinders 2 and 3 and forms slides for the slipper guides 4 and 5 and supports the front guides 6 and the fly wheel 7.

The engine as shown, is of a common double-acting, four cycle, tandem type of gas engine, and the invention which forms the subject matter of this application is specially applicable for securing the piston rod 8 of the front cylinder 2 with the piston rod 9 of the rear cylinder 3, in order that these piston rods may be readily separated for dismantling the engine and that they may be readily reunited without special attention being paid to any adjustments so that when reunited they will occupy exactly the same relation to each other that they did before they were disassembled. This, of course, is an important point especially with tandem engines as it is possible with ordinary

coupling mechanism to so shorten the distance between the pistons that the pistons will break the heads of the cylinders.

While this invention is shown and described in connection with the intermediate guide 4, it is not intended to limit its use to any specific guide or crosshead, as the principle of the invention is such that it can be used in connection with any suitable crosshead, as the guide 5, or the crosshead 10 of the engine illustrated by the drawings accompanying this specification. The drawings have disclosed it only in connection with the guide 4 in order to reduce the several figures of the drawings to the smallest possible number, and also to add to the clearness of the specification.

The guide 4, as shown by Figs. 2 and 3 of the drawings, is provided with the slide plate 11 with the babbitted surface 12, this being an ordinary form of slipper guide. It is also provided with an aperture 13 extending preferably throughout the length thereof, and this aperture is provided with two screw-threaded portions 14 and 15 and with a plane portion 16.

The numeral 17 represents a differential nut which is in the form of an annular bushing provided with a suitable head for the engagement of a wrench or other tool, and this nut is provided with screw threads upon its outer surface, said threads being of the same pitch and adapted to engage with the threads of the screw threaded portions 14 or 15 of the guide 4.

The ends of the piston rods 8 and 9 are screwthreaded and the interior of said differential nut is provided with screw threads of the same pitch and adapted to coact with the screw threads on the ends of the piston rods 8 or 9.

The longitudinal pitch of the threads on the exterior and interior of the differential nut, and the threads in the crosshead and on the piston rods are, however, not the same. While the threads are of the same hand, the longitudinal pitch of the threads on the exterior of the differential nut is coarser than that of the threads on the interior of said nut. As, for example, the exterior threads may have a pitch of  $2\frac{1}{2}$  threads per inch, while the pitch of the interior threads may be three threads per inch.

It will be seen that this arrangement of the differential nut provides a very efficient and

powerful means for uniting the guide 4 and the piston rod 8, or the piston rod 9, as well as a very convenient means.

Other advantages which result from the use of this differential nut on account of its relation to the other parts of the structure are as follows:

In order for the differential nut to jar loose or to turn one way or another, it must produce a relative movement between the piston rod 8 and the guide 4, and as its own unbalanced weight about its axis is the only force which can produce a turning movement, it is apparent that with this connection the nut cannot jar loose.

If the piston rod 8 were free to revolve upon its axis, it could screw out from the nut 17; but a form of crosshead such as the ordinary form of engine crosshead, or any equivalent form of crosshead which possesses the property of nonrotatability is secured to the front end of piston rod 8, so piston rod 8 is not able to turn and unscrew itself from the nut 17.

The numeral 18 represents an abutment adapted to be contacted by the end of the piston rod 8 in order to establish a fixed relation as to the length of the piston rod which enters the guide 4. In the present form, however, in which the guide 4 is adapted to be used with two piston rods, the abutment 18 takes the form of a spacing washer of a size enabling it to be readily inserted into the aperture 16. Said washer is provided with two faces 19 and 20, adapted to be contacted respectively by the ends of the piston rods 8 and 9, and it is further provided with an aperture 21 which is adapted to receive the flattened end of a bolt 22 which is passed through an aperture 23 provided in the guide 4 for that purpose, the bolt 22 coacting with the aperture 21 to retain the spacing washer 18 in angular position.

In the construction as shown by the drawings, an ordinary form of slipper guide 5 is used at the rear end of the piston rod 9 and in order to keep piston rod 9 from turning about its axis and unscrewing from its nut 17, dowel pins 24 are provided which are adapted to be received in apertures 25 and 26 provided in piston rods 8 and 9 respectively, which dowel pins, by uniting piston rod 9 and piston rod 8, prevent said first mentioned rod from turning, as said last mentioned rod is kept from turning by the crosshead 10 or its equivalent.

The spacing washer 18 is provided with apertures 27, 28, through which the dowel pins 24 pass. The pin 22 entering the aperture 21 in the spacing washer 18 holds the guide 4 in proper angular position because the washer 18 is locked to the rod 8 by the pins 24 and the rod is fixed by the crosshead 10 as stated. There is no relative turning

between either rod 8, 9 and the guide 4 so long as the pins 24 are in position in the recesses 25, 26 in either rod and the pin 22 is in position in aperture 21 in the spacing washer 18. This insures proper operation of nuts 17.

The operation of the device is as follows: Suppose it be required to disconnect piston rod 8 from the guide 4, for example. The nut 17 is turned to travel outwardly. The piston rod 8 travels outwardly at a slightly less speed than the nut 17. When the parts have been thus disconnected, further disassembling of the engine may proceed in the ordinary manner. The parts having to be reassembled, the nut 17 is first screwed upon rod 8 to the limit, then the threads on the outside of the nut 17 are engaged with the threaded portion 14 of the guide 4 and the nut being turned in the reverse direction, will travel into the guide 4, but the piston rod 8 will travel slightly slower until the end of said rod abuts against the spacing washer 18, the dowel pins 24 meanwhile having entered the apertures 25 in the piston rod. Suppose, however, that with the construction shown by Fig. 3 it is desirable to disassemble both piston rods, the operation is the same for each as just stated for one, and the operation in reassembling of one is the same as that just stated, but the first one of the rods to be reassembled has no rigid abutment with which to contact so that it is screwed in until it is in about the proper position when the second rod is assembled, the function of the spacing washer 18 being to always maintain the ends of the piston rods the same distance apart, which results, in a tandem engine as shown, in the pistons of the engine always being separated by the same distance, while in reassembling the parts no particular attention has been paid at all to the actual distance separating the pistons.

The different positions occupied by the spacing washer 18 within the guide 4 in actual practice vary but little, but a considerable difference might exist between these different positions without any serious consequence resulting therefrom, as the guide 4 does not approach in practice within some little distance of the stuffing box gland.

What I claim is,—

1. The combination in a rod coupling, of a member having a screw-threaded aperture therethrough, two screw-threaded rods adapted to enter said aperture, two tubular nuts provided internally and externally with screw threads and adapted to screw upon the rods and within the member, a spacing member adapted to be contacted by each of the rods, and means for locking the rods and the said apertured member from relative rotation.

2. The combination in a rod coupling, of

a member having a screw-threaded aperture therethrough, two screw-threaded rods adapted to enter said aperture, two tubular nuts provided internally and externally with screw-threads and adapted to screw upon the rods and within the member, a spacing member adapted to be contacted by each of said rods, means for locking said spacing member to said apertured member, and

means for locking said rods to said spacing member. 10

In testimony whereof, I affix my signature in the presence of two witnesses.

CARL G. SPRADO.

Witnesses:

G. F. DE WEIN,  
FRANK E. DENNETT.