

Aug. 7, 1923.

1,463,882

M. H. FULLER

COMBINATION WORK AND POWER STAND

Filed Feb. 21, 1921

4 Sheets-Sheet 1

Fig. 1.

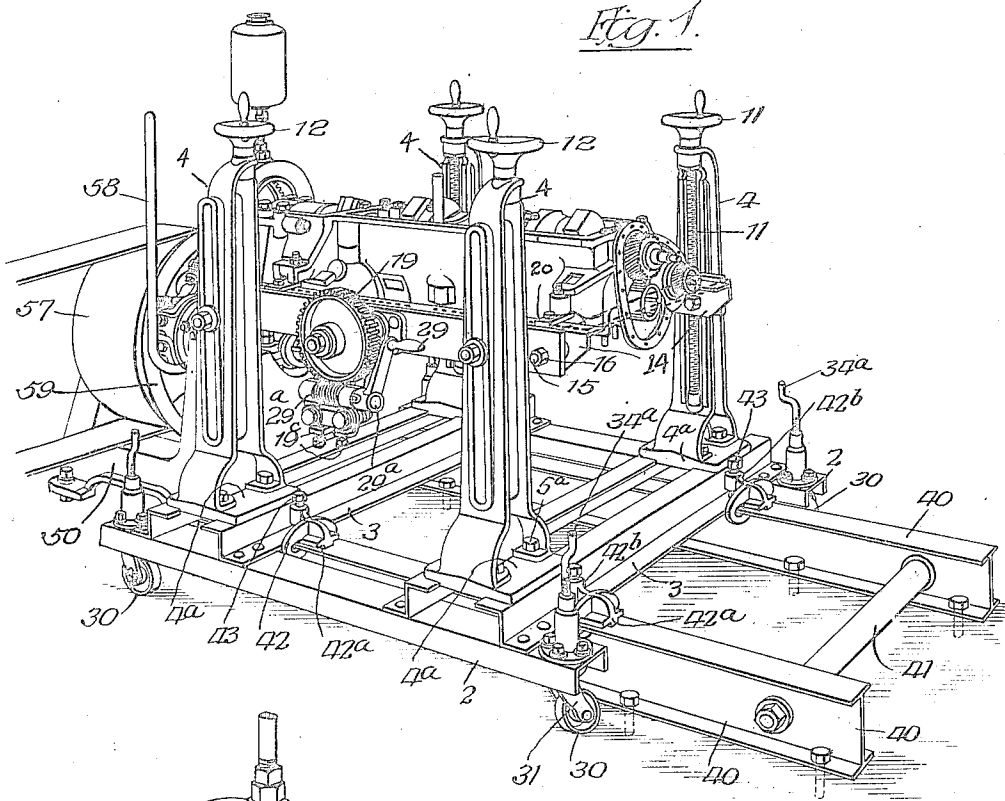
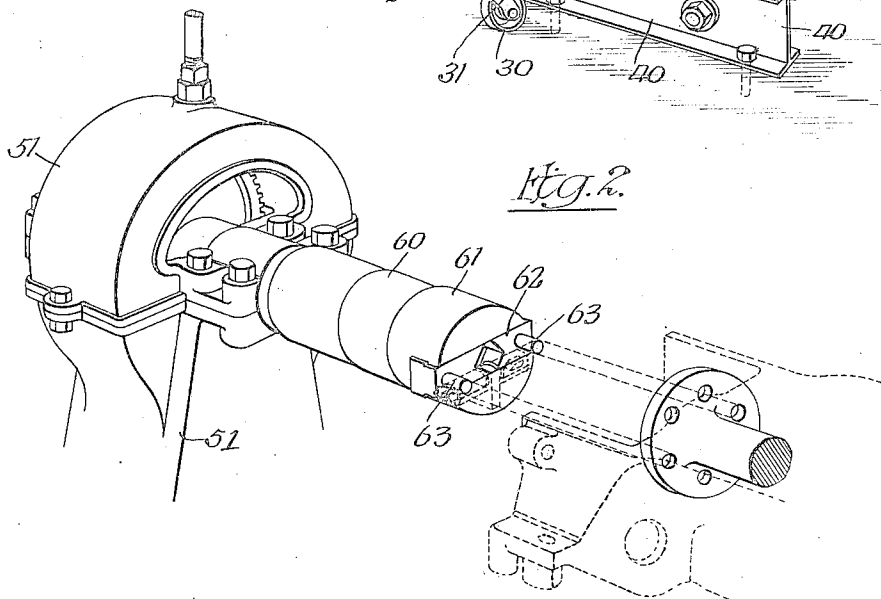


Fig. 2.



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Aug. 7, 1923.

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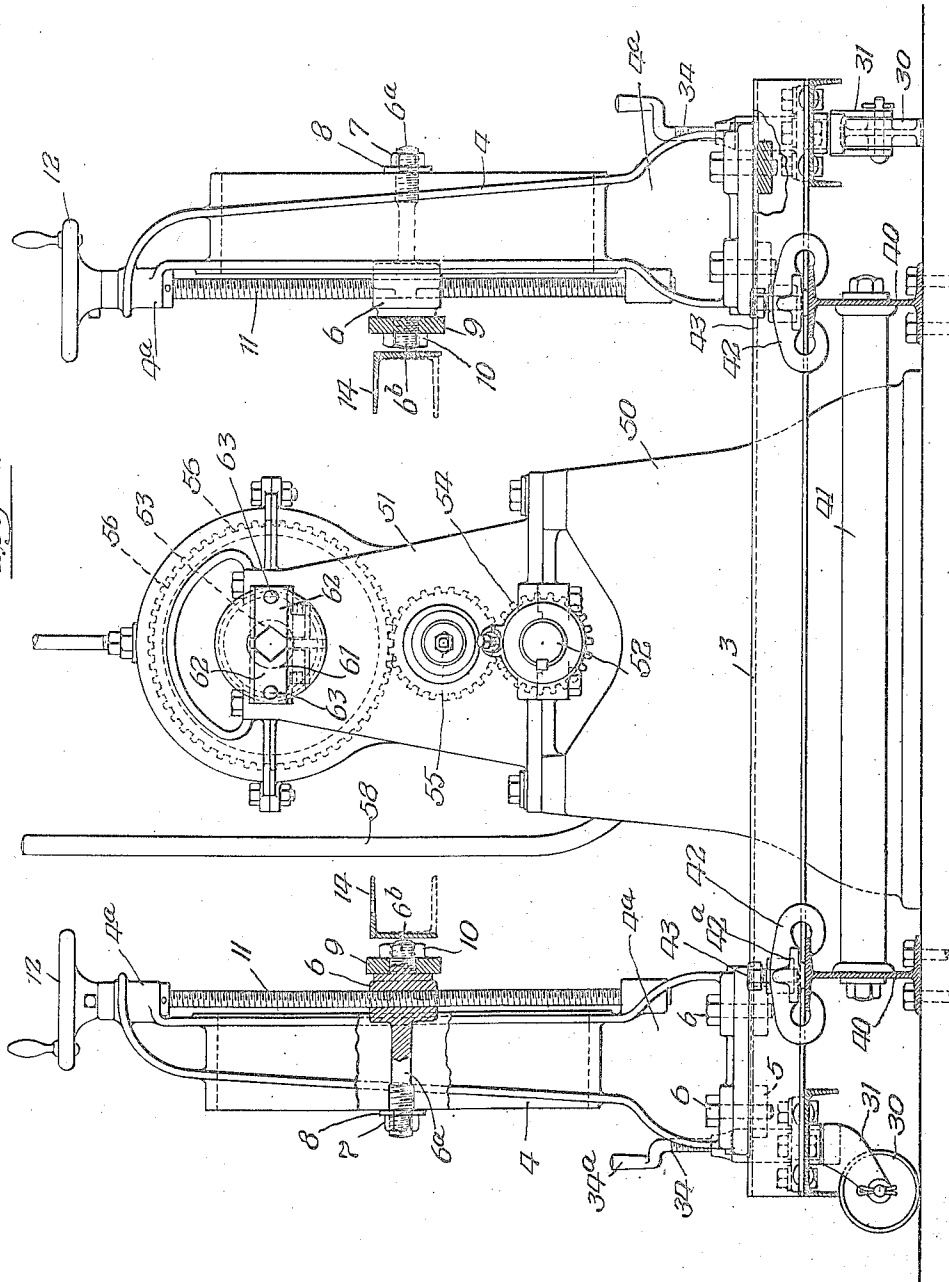
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Fig. 4.



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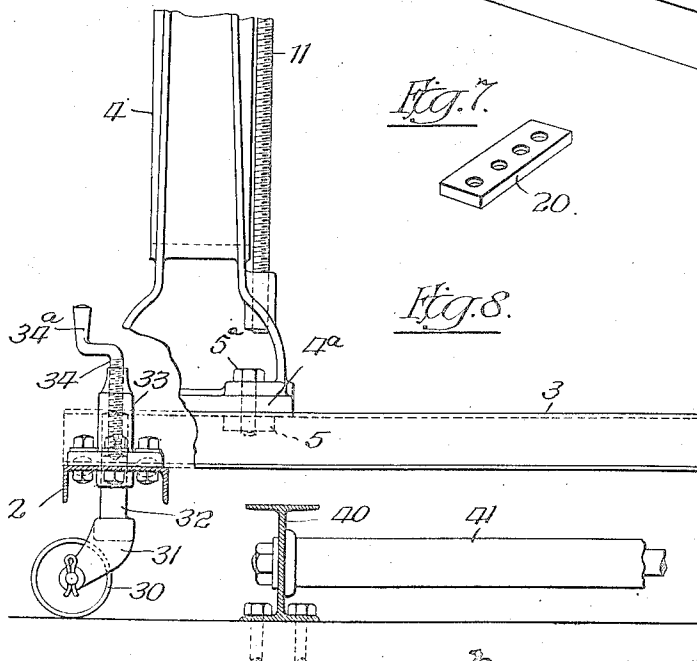
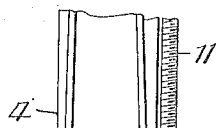
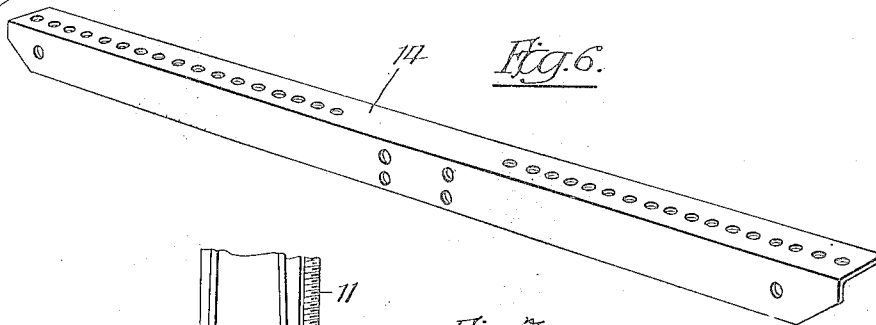
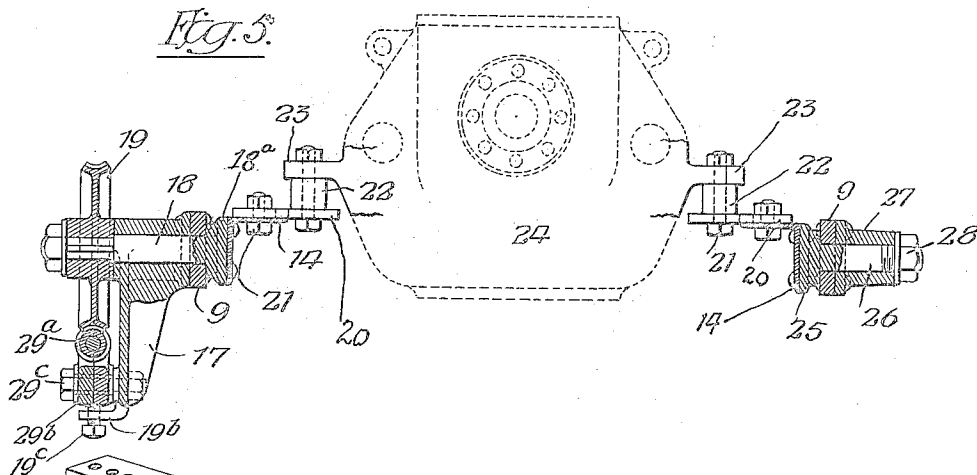
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COMBINATION WORK AND POWER STAND

Filed Feb. 21, 1921

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

MORRIS H. FULLER, OF CHICAGO, ILLINOIS, ASSIGNOR TO SERVICE STATION EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

COMBINATION WORK AND POWER STAND.

Application filed February 21, 1921. Serial No. 446,769.

To all whom it may concern:

Be it known that I, MORRIS H. FULLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combination Work and Power Stands, of which the following is a specification.

This invention relates to that class of machine-shop appliances whose usefulness more particularly pertains to the requirement of an establishment such as the modern automobile service station in the handling of detached complete motors and what are commonly called engine blocks, and the invention has especially to do with the matter of holding an object of that character while work is being done upon it by way of rebuilding or repair, and in conjunction therewith the holding of such engine block during the performance of the process of burning-in the bearings for the crank shaft; as also holding a complete motor during so-called running-in or limbering. It is manifest that the more extended and more varied is the range of usefulness of a single appliance or combination of appliances, the more desirable from the standpoint of the user and in this regard I state the leading object of my invention to be the supplying of a complete outfit comprising a sturdy work stand designed to conveniently and firmly hold engine blocks of varying types and sizes with capacity for easily effecting changes in position to suit different kinds of operations that may be called for, in the way of rebuilding or repair, and comprising also a power head or stand through which to drive the crank shaft for burning-in, running-in and limbering purposes; the work stand being portable so that it can be used at any location desired while the power stand is permanently planted at an appropriate place for receiving and transmitting power and has fixedly associated with it a base structure adapted to receive and sustain the portable work stand with the engine crank shaft in proper alignment with a drive shaft of the power stand as effected by facile adjusting equipment carried by the work stand whose portability or movability as a unit provides for readily putting such aligned crank shaft into rotative engagement with the power shaft.

My invention consists primarily in a combination of the character just indicated, embracing instrumentalities for rigidly holding an engine block or a complete motor in the work stand when adjusted or set at the burning-in or running-in position and for securely anchoring the work stand to the permanent base structure, and may also be said to consist in various subsidiary devices and combinations enhancing the serviceability of the work stand as such and likewise that of the power stand; all as set out in their essentials by the appended claims,—an example of a comprehensive form of mechanical means for embodying the invention being precedently described in detail and being illustrated in full by the accompanying drawings which form part of this specification.

Of said drawings Fig. 1 represents a complete outfit in perspective with a typical engine block set for a burning-in operation; Fig. 2 represents the power head in perspective together with the flanged end of the engine crank shaft and a dotted line illustration of part of the engine block, these latter parts being represented as spaced away from the power head for the purposes of the illustration; Fig. 3 shows the major portion of the outfit in side elevation; Fig. 4 shows it in vertical cross-section looking toward the power stand with one of the work stand columns or uprights broken away and some further sectional illustrations, the main section being taken substantially on the line 4—4 of Fig. 3; Fig. 5 shows a vertical cross-section of the central portion of the work stand on the line 5—5 of Fig. 3; Fig. 6 shows one of the engine-supporting angle bars in perspective; Fig. 7 shows one of the engine-attaching plates used in connection therewith; Fig. 8 is a fragmentary section of the work stand with a portion of the base structure below, see line 8, Fig. 3.

Referring first to Fig. 1, the numeral 2 designates side channel bars of the base of the work stand to the upper sides of which are riveted transverse Z-bars 3 of which there are two pairs spaced apart and with the members of each pair spaced from each other so as to provide transverse ways along which columns or uprights 4 may be slid for purposes of adjustment. Each upright or

column has a foot flange 4^a resting upon the top surfaces of confronting upper flanges of the Z-bars, clamp plates 5 being put under those flanges and bolts 5^a being run through the base of the column and screwing into the said clamp plates. (Fig. 3.) There are four of these uprights or columns and their adjustment crosswise the base of the stand provides for accommodating engine blocks of differing widths. Each of these columns is hollow throughout the greater portion of its height and faced on the inner side so as to provide a vertical way for a nut slide 6 (Fig. 4), which is flanged to fit against the inner side of the column and has formed as an integral part of it an outwardly projecting long bolt 6^a and an inwardly projecting short bolt 6^b. The long bolt extends through the open center of the column casting and receives on its threaded end a nut 7 between which and the outer side of the column is interposed a washer 8, this arrangement providing for the clamping of the nut to the column at any position of vertical adjustment. The short bolt extends through a hole in a substantial side bar 9 and receives a nut 10 for clamping that side bar to the nut slide 6. There extends through the tapped vertical hole of the latter a long screw 11 which runs up loosely through an overhanging boss 4^a at the top of the column and is surmounted by a handle-equipped wheel 12 by which the screw is turned to raise and lower the nut slide. The construction is the same for each of the four columns and the two columns at one side support between them the side bar 9 at that side of the stand while the two columns at the other side similarly support the other side bar 9. These side bars constitute the main horizontal sustaining members and it is obvious that they may be raised and lowered along the inner sides of the columns for the purpose of setting an engine block or motor at the proper elevation, assuming of course that the nuts 7 are loosened. The weight of the bars and attached parts and that of the engine block or motor will then be imposed upon the screws 11 and suspended from the overhanging bosses 4^a of the columns. The hubs of the wheels 12 are suitably faced for their bearing upon the tops of said bosses and it will be obvious that the turning of said wheels in one direction will cause the screws to lift the side bars 9 whereas the turning of said wheels in the opposite direction will permit the said side bars and the load carried thereby to lower. The inner faces of the columns adjacent the nut slides may be correspondingly marked off so as to provide a ready index for securing corresponding settings of the four nut slides. Of course when the desired setting has been obtained, then the nuts 7 will all be tightened with the effect of clamping the slides to the

columns and relieving the screws of the weight of the side bars and attached parts and the work.

Adjacent the inner side of each of the said bars 9 there is a channel bar 14 and these channel bars have central pivotal connection with the bars 9 as best shown in Fig. 5. This is for the purpose of providing a tilting holder for the engine block so that it may be variously positioned to facilitate work that is being done upon it when the portable stand is being used as such away from the power stand. When serving in conjunction with the power stand the tilting capacity of the work holder does not come into play. For such operations as burning-in, running-in and limbering the engine block or the engine assembly must maintain a horizontal position. Therefore provision is made for bolting the ends of the angle bars 14 to the ends of the side bars 9. The numeral 15 (Figs. 1 and 3) designates bolts run through registering holes in these parts and the numeral 16 designates clamping nuts on these bolts, spacing washers being interposed between the angle bars and the side bars.

Reverting now to the matter of the pivotal mounting of the angle bars, there is riveted against the outer side of one of these supporting bars 9 a depending bracket 17 (Fig. 5), the same being suitably flanged for the purposes of the riveting and formed as a bearing for a short shaft 18 whose reduced outwardly extending portion has keyed to it a worm wheel 19 and whose inwardly extending portion projects through said bar 9 and has pinned to or formed integrally with it a collar 18^a which is flanged and riveted to the angle bar 14. Obviously the turning of the worm wheel will turn that angle bar. Now the horizontal flanges of the two angle bars are made with lines of perforations as most clearly shown in Fig. 6, so that bracket plates 20 may be bolted thereto at various positions and these bracket plates are also perforated for varying engagement therewith of other bolts which are run through the ears of the engine block, as shown in Fig. 1.

In Fig. 5 these bolts are shown at 21 and spacing collars 22 are shown between the bracket plates 20 and the ears 23 of the engine block 24. In the illustration shown there are four points of suspension of the engine block and it will be obvious that when the same is bolted to the bracket plates 20 and the latter are bolted to the angle bars these two bars are rigidly connected together so that the turning of the one to which the worm wheel 19 is connected will necessarily turn the other along with the engine block itself. The angle bar on the far side of the stand has riveted to its central portion a collar 25 similar to the aforesaid collar 20 and

pinned to or integral with a short shaft 26 which extends through the adjacent side bar 9 and a bearing piece 27 which is riveted to that side bar, said shaft being confined in place by a nut 28 screwed upon its threaded outer end with a washer interposed between it and the bearing piece 27.

The turning of the holder on its pivot is done by operating a crank handle 29 (Figs. 1 and 3) on a worm 29^a which is in mesh with the worm wheel 19 and journaled in a split bearing 29^b. For purposes of adjustment to ensure the proper meshing of the worm and the worm wheel the holes in this bearing which receive the bolt 29^c for securing the bearing to the bracket 17, are slightly elongated and said bracket is made with a pair of lateral lugs 19^b through which set screws 19^c work against the under side of the bearing. It will be understood that the worm gearing itself serves to retain the holder at different positions to which it may be turned, for although the worm when turned will rotate the worm wheel and so turn the holder, any tendency of the holder to turn of its own accord will be effectually resisted by the worm.

It will be understood that engine blocks and engine assemblies can be variously accommodated in the holder. The angle bars 14 may be reversed as indicated by dotted lines in Fig. 4, to meet certain conditions as, for example, when a more or less completely assembled engine unit is to be carried by the work stand at a lowered position therein and right-side-up as contrasted with the inverted position of the engine block for the burning-in process shown in Fig. 1. Other means of attachment may be employed than the plate 20. In some instances the work may rest directly upon the horizontal flanges of the angle bars. Then there may be three point suspension instead of four point suspension such as illustrated in the drawings, a cross bar being used to connect the side angle bars at or near one end of the holder as indicated by dotted lines in Fig. 1. Some makes of engines are better adapted for such three point suspension than for a four point suspension.

For purposes of portability the work stand is mounted upon casters 30. These are journaled in hangers or brackets 31 having shanks 32 which extend up into housings 33 bolted to projecting end portions of the base channel bars 2. Screws 34 are put through tapped openings in the tops of these housings and bear upon the upper ends of the shanks of the caster brackets, as best illustrated in Fig. 8, and these screws are formed with crank handles 34^a. The purpose of this arrangement is to provide for the lowering of the work stand when it has been brought over the permanent base structure presently to be described, upon which structure it will

rest and to which structure it will be securely clamped when burning-in, running-in or limbering operations are to be performed.

The base structure just referred to comprises a pair of I-beams 40 which are laid upon the floor (ordinarily concrete) and anchored thereto by lag screws or other suitable means. The I-beams are connected together by tie-rods 41 and may be likened to a pair of rails over which the work stand is run when it is to be put into operative relationship with the power stand, presently to be described. For the purpose of securely anchoring the work stand to this permanent base structure I employ a number of specially constructed clamps engaged with the top flanges of the I-beams and with the foot flanges of certain of the Z-bars 3. Four such clamps are here shown located at the four corners of the base of the work stand. A description of one will suffice for all. It has a central yoke-shaped portion 42 whose branches take the form of hooks that engage under the flanges of the I-beam as best shown in Fig. 4, sufficient lateral clearance being allowed to provide for application of the clamp to the rail or I-beam at the desired location by sidewise and up-and-down movement without the necessity of going to the end of the rail and sliding the clamp over it. A ribbed projecting portion 42^a of the clamp bears upon the top of the I-beam and an opposite projecting portion 42^b takes the form of a tapped boss which receives a set screw 43 (Fig. 3). The clamp will be positioned so that the boss 42^b will overhang the foot flange of the Z-bar 3, so that by turning the set screw 43 down upon that flange a rocking effect will be produced upon the clamp which results in its taking a powerful grip upon the I-beam while at the same time strongly clamping the base of the work stand. It will be obvious that clamps of this sort applied at the four corners of the work stand will anchor it most rigidly to the permanent base structure.

The power stand comprises a base permanently set at one end of the permanent rail structure, and a head 51 in which are journaled two drive shafts 52 and 53, one above the other. Upon the lower shaft there is a gear 54 which meshes with an intermediate gear 55, and on the upper shaft there is a much larger gear 56 which meshes with that intermediate gear. There is a pulley 57 on the lower shaft to receive power from any available source and a clutch is employed to connect the pulley with the shaft, being worked by a handle 58, and there is a hand wheel 59 for manually turning the shaft (for particulars in this regard reference may be had to Patent 1,332,678 issued March 2, 1920, to Service Station Equipment Company assignee of

H. E. Patrick et al.). The gearing above described provides for running the upper shaft at considerably lower speed than the lower shaft. This upper shaft will be used when any operation is to be performed requiring relatively slow turning of the engine crank shaft, such as the burning-in operation. When other operations are to be performed which involve more rapid turning of the crank shaft, such as the limbering of a complete engine assembly, then the lower directly driven shaft 52 will be used. Each of the shafts has a projecting end adapted to have rotatively engaged therewith a detachable coupling 60, the one here shown being that commercially known as the Karge universal coupling which automatically compensates for any slight misalignment of drive shaft and crank shaft. As an improvement of my own I mount upon one member of this coupling a chuck head or block 61 which is made with an under-cut diametrical slideway receiving slide pieces 62. These carry projecting pins 63 for engagement with holes in the flange on the end of the engine crank shaft. These flanges and their bolt holes vary in different engines and I make provision for an adjustment to take care of this. The slide pieces 62 are cut with screw-threads and a right and left-hand screw 64 is engaged therewith and journaled in the chuck head or block 61. By turning this screw the pins 63 can be brought to the proper position for engaging bolt holes in the flange of the crank shaft. The slide pieces are made V-shaped at their inner ends so as to constitute jams to receive and clamp the shank of one member of a universal joint such as commonly used in machines of this general character for making a connection with a transmission shaft when performing a limbering operation.

I claim:

1. The combination of a power head, an extended base structure in fixed relation thereto; a portable stand comprising a base, uprights, and a work holder; and means for rigidly relating the said stand to the said base structure for its support thereby and its anchorage thereto; the aforesaid power head having a drive shaft and the aforesaid work holder being adapted to receive and securely hold a motor; with provisions for aligning the shaft of the motor with the said drive shaft and operatively connecting it therewith.

2. The combination of a power head; base rails in fixed relation thereto; a portable stand comprising base, uprights and work-holder; and means for rigidly relating the stand to the said base rails for its support thereby and its anchorage thereto; the aforesaid power head having a drive shaft and the aforesaid work-holder being

adapted to receive and securely hold a motor; with provisions for aligning the shaft of the motor with the said drive shaft and operatively connecting it therewith.

3. The combination of a power head; an extended base structure in fixed relation thereto; a portable stand comprising a base, uprights, and a pivoted work holder; and means for rigidly relating the said stand to the said base structure for its support thereby and its anchorage thereto, the aforesaid stand having means for turning and setting the work holder at various positions with provisions for maintaining it in a horizontal position and for vertically adjusting it when so positioned, and the aforesaid power stand having a drive shaft with provisions for making operative connection between the same and a shaft of a motor carried by the holder of the work-stand.

4. The combination of a power head; base rails in fixed relation thereto; a work stand on casters with means for raising and lowering it, said stand comprising a base to rest upon the rails when lowered, and columns or uprights and a holder; and removable clamps engaging the rails and the base of the work stand with the latter positioned to hold such an object as an engine block up to the power head; the latter having a drive shaft with provisions for coupling it to the engine shaft.

5. The combination of a power head; base rails in the form of I-beams in fixed relation thereto; a work stand on casters with means for raising and lowering it, said stand comprising a base to rest upon the rails when lowered, and columns or uprights and a holder; and removable clamps of yoke form adapted to hook under the top flanges of the I-beams and having portions bearing on the tops of the latter and bosses to overhang parts of the base of the work-stand with set-screws in said bosses.

6. The combination of a power head; an extended permanent base structure in fixed relation thereto; a portable work stand comprising base members adapted to rest upon said permanent base structure, columns erected on said base members, adjusting screws extending vertically along the columns, nut slides on said screws, side bars secured to the nut slides, and a work holder between said side bars; and means for clamping the base members of the work stand to the permanent base structure; the power head having a drive shaft with provisions for coupling it to the shaft of an engine in the holder of the work stand.

7. The combination of a power head, a base structure, and a work stand adapted to hold an engine block; the power head having a drive shaft with a coupler piece carrying slides equipped with pins to engage holes in the flange of the engine shaft, and also

carrying means for adjusting the slides towards and from each other.

8. The combination of a power head, a base structure, and a work stand adapted to hold an engine block; the power head having a drive shaft with a coupler piece carrying slides equipped with pins to engage

holes in the flange of the engine shaft, and also carrying means for adjusting the slides towards and from each other, and said slides being formed as chuck-jaws at their inner ends for such purpose as described. 10

MORRIS H. FULLER.