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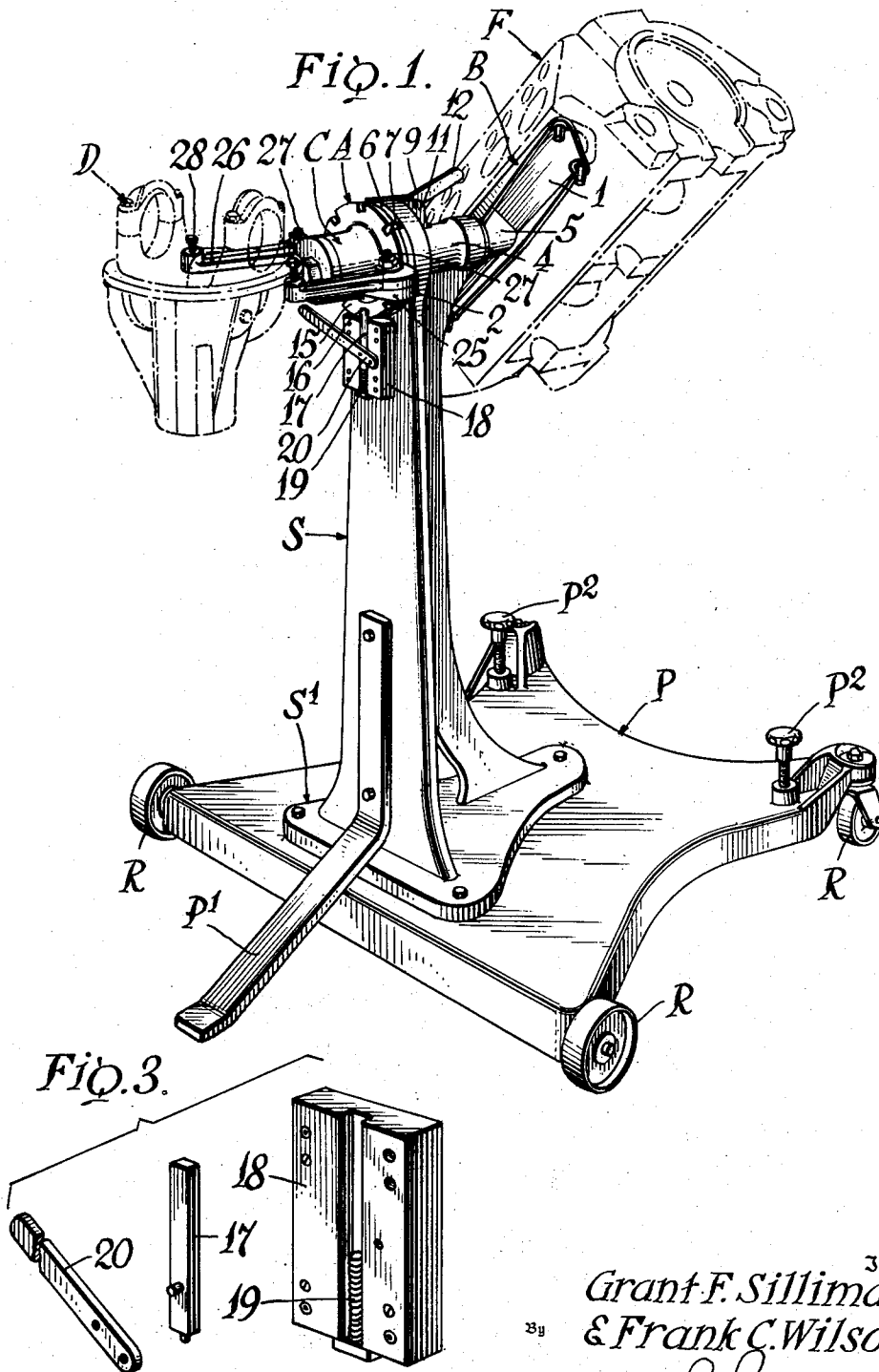
F. C. WILSON ET AL

2,654,147

ADAPTER FEATURES OF MOTOR STANDS

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2 Sheets-Sheet 1



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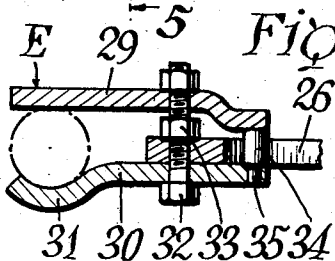
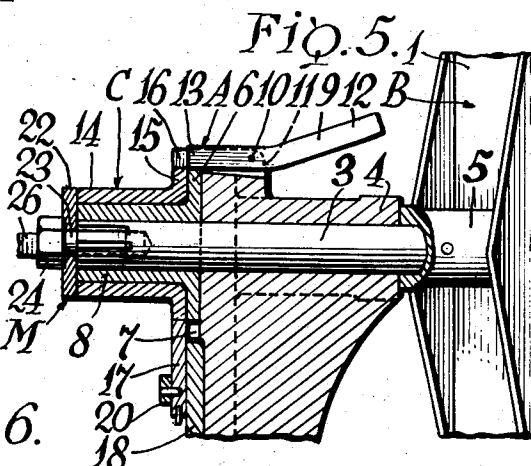
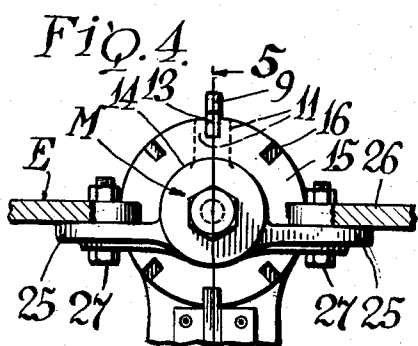
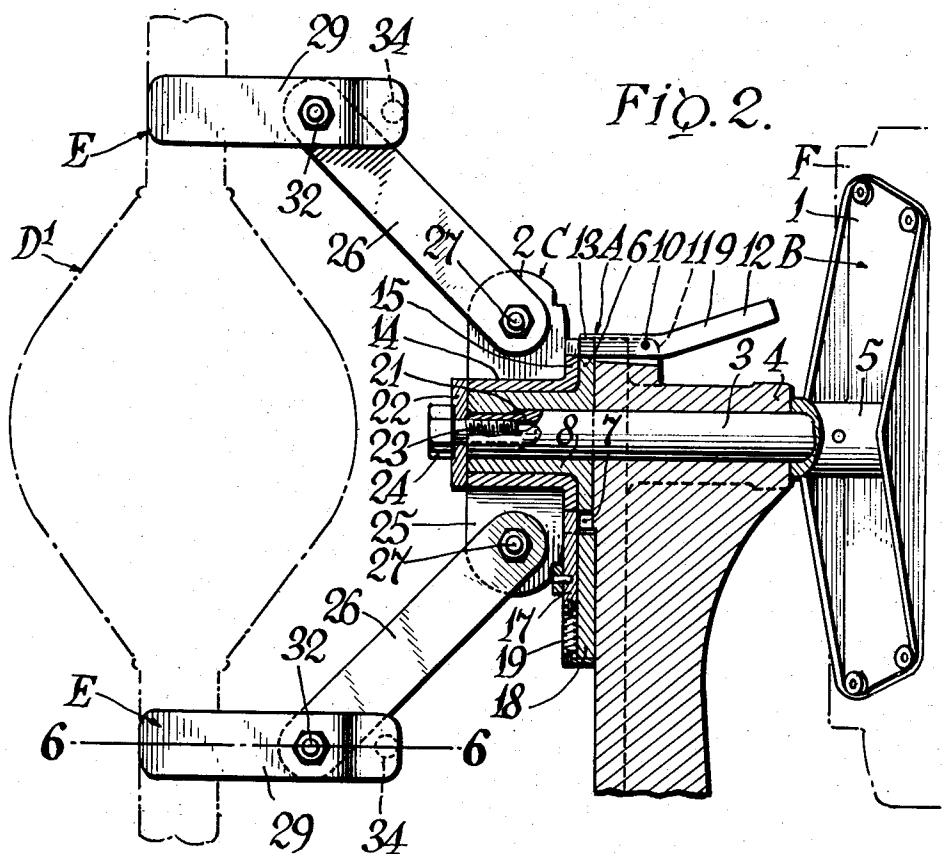
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ADAPTER FEATURES OF MOTOR STANDS

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Inventor
Grant F. Silliman
& Frank C. Wilson,
John S. Bourne Attorney

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ADAPTER FEATURES OF MOTOR STANDS

Frank C. Wilson and Grant F. Silliman, Arcade, N. Y., assignors to The Manufacturers and Traders Trust Company, Jack A. Ahern and David D. Nash, all of Buffalo, N. Y., as executors of the estate of Kirke R. Wilson

Application September 2, 1949, Serial No. 113,818

3 Claims. (Cl. 29—289)

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In sundry repair and assembly operations in connection with parts of automobiles and other vehicles driven by internal combustion engines upright standards are employed which carry "adapters" for the direct support of the "work," i. e. the part requiring repair or assembly operations. The standards project from a supporting base which may be directly attached to the floor or, for the purpose of portability, to a roller mounted platform and at their upper ends have provision for the mounting of the adapters, the unit so characterized being designated as a "motor stand," although the part upon which work is to be done may be any part of the automobile or vehicle which may be supported by the motor stand, for example, among numerous other parts, the cylinder block, the transmission casing and the differential casing. The adapter comprises a horizontal shank which is supported by the standard at its upper end and means carried by the shank for direct supporting attachment to the work, provision being made for the angular adjustment of the part supporting means about the axis of the shank whereby the work may be supported at any angle best suitable to facilitate the particular job.

This invention relates to improvements in the adapter features of motor stands of the character generally described.

One object is to provide a novel assembly of an upright supporting standard and a pair of adapters such that different parts, requiring repair or assembly operations, may be simultaneously supported at opposite sides of the standard and in substantial lateral balance with respect thereto, may be worked upon simultaneously, and may be individually adjusted, each during the use of the other and without interference with such use, to any angular position best suited to facilitate the particular work to be done. Thereby a construction is provided of optimum compactness in the support of the parts requiring repair, that is to say with the parts attached for support requiring substantially no greater floor space than a single adapter as heretofore used; in which the lateral balance, with respect to the standard, of the parts to be repaired insures the stability of their support by the standard; and by means of which substantial savings in repair and operational costs are effected, the work being expedited and accomplished with minimum equipment and with minimum labor.

A further object is to enable the use of a pair of adapters for the purposes and advantages set

forth in the preceding paragraph, without any modification of the standard motor stands.

In the copending application of Grant F. Silliman, Serial No. 106,309, a novel construction of adapter is shown which has the characteristic of being "universal" as explained in the specification of that application. A further object of the invention is to enable either or both of the pair of adapters to be of the "universal" construction disclosed in said application of Grant F. Silliman.

A further object is to utilize the standard shank feature of the known adapters as an element of the assembly referred to in the second paragraph of this specification and otherwise to provide a construction such that if the use of a pair of adapters should not be necessarily required a single adapter having the standard shank feature may be used and also such that any single adapter of known construction as used with a standard motor stand may readily be combined with the other features of the novel assembly which constitutes the invention, these objects being accomplished without any substantial departure from the standard shank feature of the adapter construction.

With the above objects in view the invention is generally characterized by the combination of a supporting standard and a pair of work supporting adapters coaxially mounted at the upper end of the standard in symmetrical relation thereto and at opposite sides thereof, with one of the adapters having a shank mounted for turning movement in the upper end of the standard and positively positioned with respect to the standard, the shank supporting both adapters from the standard, and the other adapter having a sleeve concentrically mounted for turning movement with respect to the shank. According to the invention the mounting of the adapters relatively to one another and to the standard is such that each adapter is independently angularly adjustable about the common axis of the shank and the sleeve to any one of several positions in which it may be latched by the cooperation of companion elements, one of which is carried by the adapter and the other of which is carried by the standard; and is also such as to enable the operative relation of the standard, the adapters and the latching means to be maintained by an assembly plate removably attached to the shank and cooperating with it and with the sleeve, the removal of the plate enabling such substitution in a similar relation for each or both of the adapters of an adapter or adapters of different form in accordance with the characteristics of the particu-

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lar part or parts upon which repair work is to be done.

In the accompanying drawings:

Figure 1 is a perspective view showing the standard motor stand and the adapter features of the invention mounted at its upper end, a cylinder block and a differential casing being shown by dot and dash lines as supported at opposite sides of the motor stand by the adapters in their assembled relation.

Figure 2 is a vertical sectional view through the upper portion of the motor stand with sundry parts of the adapter features shown in elevation and perspective.

Figure 3 is an "exploded" perspective view of the various elements of a latching device utilized in the construction shown in Figures 1 and 2.

Figure 4 is a rear elevation with parts shown in section, showing an adjustably altered position of one of the work supporting adapters.

Figure 5 is a sectional view on the line 5-5 of Figure 4.

Figure 6 is a detail sectional view on the line 6-6 of Figure 2 showing a clamping element which may be associated with either or both arms of the "universal" adapter.

The standard S of the motor stand projects in upright relation from the usual supporting base S' which may be secured by suitable fastening bolts either directly to the floor or to a platform P mounted on supporting rollers R whereby the motor stand may be readily moved from one location to another, the front pair of rollers R being in the form of casters. When the standard S is mounted on the platform P it is provided at its rear side with a rearwardly and downwardly inclined floor engaging prop P', the function of which is to prevent the motor stand from tipping rearwardly under any unbalancing force when the adapter features are in use. The platform P carries the usual floor engaging shoes, illustration of which is deemed unnecessary and the purpose of which is to prevent the platform from shifting or rolling when the adapter features are in use. The shoes are raised from the floor or lowered to engage the floor by the usual hand operated screws P².

The adapter features are indicated generally at A and are mounted at the upper end of the standard S. These features include two adapters indicated generally at B and C. The adapter B carries work supporting means 1 and the adapter C carries work supporting means 2. The work supporting means 1 and 2 are located respectively at opposite sides of the standard S, that is to say the work supporting means 1 is located adjacent the front side of the standard and the work supporting means 2 is located adjacent the rear side of the standard. In the drawings the work supporting means 1 and 2 are shown as simultaneously utilized for the support of different parts upon which repair or assembly operations are to be performed. Thus in Figure 1 the work supporting means 1 is shown as attached to a cylinder block F indicated generally by dot and dash lines and the work supporting means 2 is shown as attached to a differential casing D, similarly indicated. It will, of course, be understood that any parts which requires repair or assembly work may be attached for supporting purposes to the work supporting means 1 and 2. For example in Figure 2 the part upon which repair or assembly operations are to be performed is a differential casing D' of a different type from that shown in Figure 1

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and the part 2 is equipped with clamp elements E for the purpose of its supporting attachment to the casing D'.

In the contemplation of the invention either or both of the adapters, in respect to the work supporting means, may accord with the known practice in which the work supporting means is individually fashioned with regard to the support of a particular part or, as preferred, either or both adapters may carry work supporting means in accordance with the construction shown in the said copending application of Grant F. Silliman, Serial No. 106,309. As herein shown the adapter B conforms to the prior construction in that the work supporting means 1 which it carries is specially designed for supporting attachment to a particular part which, as shown in the drawings, is the cylinder block F of the conventional automobile motor and the work supporting means 2 of the adapter C conforms to the invention disclosed in said copending application of Grant F. Silliman, Serial No. 106,309. Either of the work supporting means 1 and 2, e. g. the work supporting means 1 as herein shown, may be rigidly secured to an end portion of a horizontal shank 3 which is mounted in a horizontal sleeve 4 as a bearing, the sleeve 4 being provided at the upper end of the standard S. The shank 3 and sleeve 4 conform to standard construction. It will, of course, be understood that the work supporting means mounted upon an end of the shank 3 may accord with the construction of either of the work supporting means 1 or 2 as herein shown.

The shank 3 is mounted for rotatable adjustment in the bearing sleeve 4 beyond which it projects at each end, the work supporting means which it directly carries, e. g. the means 1, including a centrally located positioning collar 5 rigidly secured to an end portion of the shank and abutting an end of the sleeve, thereby insuring the proper location of the shank in the sleeve. The work supporting means 1 is angularly adjustable about the axis of the shank 3 and it is for this purpose that the shank is mounted in the sleeve 4 as a bearing. The work supporting means 1 is held against displacement from any angular position to which it may be adjusted by a latching device which may be of the construction heretofore used with the prior individual adapters. This device includes an index plate 6 of disc outline which is formed with a series of suitably spaced peripheral notches 7 and is also formed with a central collar 8 to fit over the rearwardly projecting portion of the shank 3, the collar 8 being suitably splined to the shank 3 and being removable from it by an endwise relative outward movement. The latching device for the work supporting means 1 is completed by a detent lever 9 which is pivoted, as at 10, between a pair of ears 11 formed on and projecting outward from the sleeve 3, the forwardly projecting arm 12 of the lever 9 serving as a finger piece and the rearwardly projecting arm 13 being engageable with latching effect, as shown in Figure 2, in any one of the peripheral notches 7. In order to effect an angular relocation of the part upon which repair or assembly work is being done, e. g. the cylinder block F, the arm 12 of the lever 9 is depressed, thereby to disengage the arm 13 from the notch 7 in which it was previously engaged; the work supporting means 1 is thereupon grasped and, used as a lever, is turned to bring the supported part into the desired position, the shank 3 and

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the plate 6 participating in the turning movement of the part 1. The position in which the part 1 is relocated will accord with the registry of a notch 7 with the recess provided between the ears 11 whereupon the detent lever 9 is manipulated to engage its arm 13 in such notch, thereby to secure the vehicle part in the particular angular position to which it has been moved.

The adapter C is mounted coaxially with respect to the shank 3 and includes a sleeve 14 which provides a tubular shank rotatably mounted upon the collar 8 as a journal, the sleeve 14 having at its inner end a circumscribing annular index flange 15 which abuts the index plate 6. The flange 15 is a part of a latching device by means of which the work supporting means 2 and the part which it carries and upon which work is to be done may be set in any angular position best suitable to facilitate the particular job. For latching purposes the flange 15 is formed with a series of suitably spaced peripheral notches 16, similar to the notches 7. As shown in Figures 1 and 2 the latching device for the adapted C is completed by an axially movable latch finger 17 which is slidably fitted in a channel formed in a supporting block 18 attached to the standard S, a spring 19 acting upon the lower end of the finger 17 serving normally to hold said finger in latching engagement with one of the notches 16. In order to move the finger 17 against the pressure of the spring 19, thereby to effect its disengagement from any of the notches 16, the block 18 carries a pivoted arm 20 which is connected by a loosely fitting pivot to the finger 17 and incidentally confines the finger in its guide channel. When the angular position of the part carried by the adapter C is to be altered the finger 17 is disengaged from the index flange 15 and the adapter and the part which it carries are thereupon turned to bring the part to the desired position in which one of the notches 16 will be in alignment with the finger 17. At such time the arm 20 is released and the spring 19 moves the finger 17 into engagement with its alining notch 16, thereby to secure the part in its relocated position.

It will be noted that the angular adjustment of each adapter B or C is made independently of the other, that is to say, the work supporting means 1 may be relocated independently of the work supporting means 2 and vice versa. Thus Figures 4 and 5 assume that the adapter C has been adjusted to a position ninety degrees distant from the position in which it is shown in Figures 1 and 2 with its work supporting means 2 positioned horizontally instead of vertically while the adapter B remains held in the position in which it is shown in Figures 1 and 2. It will, of course, be obvious that by following the procedure above described the work supporting means 2 could be held positioned vertically as shown in Figures 1 and 2 and the work supporting means 1 of the adapter B could be located in a different angular position. This capacity for the independent angular adjustment of the adapters effects substantial economy in that, assuming for example, that the adapter C is to be adjusted and the adapter B is to be held, the adjustment of the adapter C will not interfere with the work that is being done at the same time upon the part F supported by the adapter B.

The longitudinal axis of the sleeve 4 is in the central vertical plane (extending from front to rear) of the standard S. Thereby the shank 3

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has a central location between the sides of the standard. In the great majority of repair operations the work supporting means are located substantially centrally with respect to the work which they support. Accordingly the locations of the shank 3 and the coaxial sleeve 14 provide for the support of the work in substantial lateral balance with respect to the standard and also provide the advantage of optimum compactness in that substantially no greater floor space is required for the simultaneous support of two parts to be repaired than has heretofore been required where the motor stand supports but a single part to be repaired.

The adapters B and C and the standard S are maintained in assembled relation by suitable means cooperative with the rear or freely projecting portion of the shank 3, the sleeve 14 rotatably mounted on the collar 8, and the collar 5 upon the forwardly projecting portion of the shank 3. The rearwardly projecting portion of the shank 3 is preferably substantially lineally coextensive with the sleeve 14 whereby the end faces of the shank 3 and the sleeve 14 are substantially flush. While the means, indicated generally at M, for maintaining the parts in assembled relation may be of any suitable construction it is preferably of the construction shown. As shown the means M consist of an axially extending threaded recess formed in the free projecting end of the shank 3, an assembly plate 2 subtending the shank 3, the collar 8 and the sleeve 14 and located adjacent the rear ends of these parts, and a securing screw having its shank passing through a central opening in the plate 22 and engaged in the recess 21 and its head 24 bearing against the plate 22. The plate 22, connected to the shank and bearing against the outer end face of the sleeve 14, cooperates with these parts and with the collar 5 to maintain the adapters and the standard S in assembled relation, the plate 22 thereby being in functional effect a clamping element and the collar 5 as abutting the front face of the sleeve 4 being in functional effect a companion clamping element. Compatibly with this function the plate 22 is not tightened to a degree sufficient substantially to oppose the free manual angular adjustment of the adapters B and C.

The adapter C may, of course, be of any suitable construction in which the work supporting means is carried by the tubular shank 14. The drawings show an adapter of a preferred construction, viz. the construction disclosed in the aforesaid application of Grant F. Silliman, Serial No. 106,309. This construction comprises coplanar ears or lugs 25 carried by the shank 14 and projecting at opposite sides thereof, and a pair of arms 26, each of which is pivoted as by a bolt fastener 27 to an ear or lug 25, the arms 26 being independently adjustably movable in a common plane parallel to the common plane of the ears 25. The arms 26 severally project in any appropriate angular relation to one another from the tubular shank 14 and conjointly support the work, either by direct attachment thereto as shown in Figure 1 or through the intermediary of a suitable clamp as shown in Figures 2 and 6.

As shown in Figure 1 the vehicle part D is suitably secured to the outer end of the arms, for example, by bolts 28. In many instances the arms may be so directly attached. In such cases the only requirement is that the part upon which work is to be performed have threaded openings in which the bolts may be engaged or otherwise

have suitable provision for the direct supporting attachment of the arms. If these openings or other provisions are not formed in the part as originally manufactured the part may be appropriately modified in the repair shop or garage. In sundry other instances, however, it may not be desirable or practical that the part have threaded openings to enable its direct attachment to the arms 26. For example, it is not desirable that a differential casing have threaded openings or recesses. In the instance of a differential casing, and in various other instances where threaded openings or recesses are not desirable or practical, the clamp elements E (Figures 2 and 6) may be carried by the arms, preferably in independently pivotally adjustable relation.

Each clamp element E comprises companion clamping leaves 29 and 30, either of which, e. g. the leaf 30, may have a curved terminal formation, as 31, if necessary to conform to the outline of the part to be held. The clamping leaves 29 and 30 are adjustably tied together and at the same time connected to the free end of an arm 26 by a bolt 32, the head of which abuts one clamping leaf and the securing nut of which abuts the other clamping leaf. The bolt 32 passes through openings in the adjacent end of the arm 26 and the connecting clamping leaves; these, as angularly adjusted as a unit, are held against displacement relatively to the arm 26 by a lock nut 33. In order that the clamping leaves may exert appropriate clamping pressure and also to prevent their relative pivotal displacement, one leaf, e. g. the leaf 29, is formed at its inner end with an inwardly projecting shouldered pin 34 having a reduced terminal portion 35 which fits in an opening in the inner end of the companion clamping leaves. The arms, as provided with the clamping elements E, are independently and relatively adjustable in order that the adapter may be used for the support of any part, regardless of its nature or particular design, which may best be carried by the clamping elements.

The bolts 28 (Figure 1) and the clamping elements E (Figures 2, 4 and 5) are devices carried by each arm at its free end for the supporting attachment of the arm to the vehicle part. The adjustable movement of the arms about their pivots 27 suitably locates the two supporting attachment devices with reference to the vehicle part according to its nature or particular design. The bolt fastenings 27 at once provide pivots for the arms 26 and devices for securing the arms in any relative positions into which they may be adjusted. In effecting the adjustable movement of the arms and their attachment by means of the supporting attachment devices to the vehicle part the nuts of the bolt fastenings are backed off sufficiently to permit the easy adjustable movements of the arms. When the arms have been properly positioned the supporting attachment devices are connected to the vehicle part whereupon the nuts of the bolt fastenings 27 are tightened in order to hold the arms against loose play and thereby to minimize any shearing stresses incident to unbalanced weight of the vehicle part or to the repair or assembly operation which may be performed upon the vehicle part.

We claim:

1. An assembly of the upright standard of a motor stand, the standard having front, rear and lateral sides, comprising, in combination, a horizontal sleeve at the upper end of the standard with its axis in the fore and aft central vertical plane of the standard, a horizontal shank journaled for adjustable rotation in the sleeve, the shank being centrally located between the lateral sides of the standard, a positioning collar fixed to one end portion of the shank and abutting an end face of the sleeve, the other end portion of the shank projecting beyond the standard, a disc-shaped index plate keyed to the projecting end portion of the shank for removal from it and held in abutting relation to the adjacent face of the standard, a horizontal sleeve provided as a part of an adapter and rotatably mounted in surrounding and coaxial relation to the projecting end portion of the shank, the sleeve being formed with a circumscribing index flange which abuts and confines the index plate, the index plate and the index flange each being formed with spaced peripheral notches, a manually releasable detent movably mounted upon the standard and engageable with any of the notches of the index plate, a second manually releasable detent movably mounted upon the standard and engageable with any of the notches of the index flange, each detent being releasable independently of the other whereby to enable the adapter and the shank to be angularly adjusted independently of each other and releasable means connected to the projecting end portion of the shank and bearing with functional clamping effect upon the end face of the sleeve, the releasable means cooperating in such effect with the collar on the shank, thereby to hold the shank, the sleeve and the index plate in assembled relation relatively to one another and to the standard and to permit the independent adjustment of the adapter and the shank about the common axis of the shank and the sleeve.

2. An assembly as set forth in claim 1 wherein the rear ends of the shank and the sleeve are substantially coplanar and the releasable means comprises an axially extending threaded recess in the shank, an assembly plate bearing against the rear end face of the sleeve, and a securing screw passing through the assembly plate and having its shank engaged in the recess and its head bearing externally against the assembly plate.

3. An assembly as set forth in claim 1 wherein the index plate is provided with a collar fitted upon the projecting end portion of the shank, and the horizontal sleeve is rotatably mounted upon the collar of the index plate.

FRANK C. WILSON.
GRANT F. SILLIMAN.

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