

March 18, 1941.

E. M. PFAUSER

2,235,643

APPARATUS FOR INSERTING AND REMOVING SHACKLE PINS

Filed Dec. 27, 1937

3 Sheets-Sheet 1

Fig. 1.

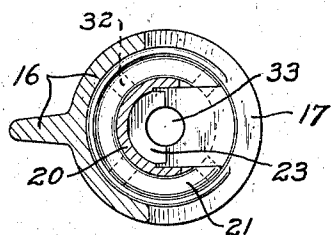
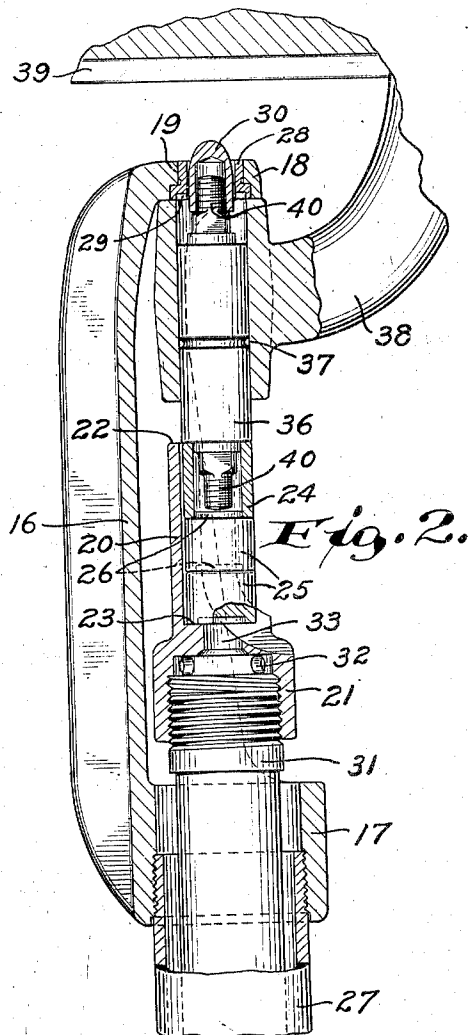
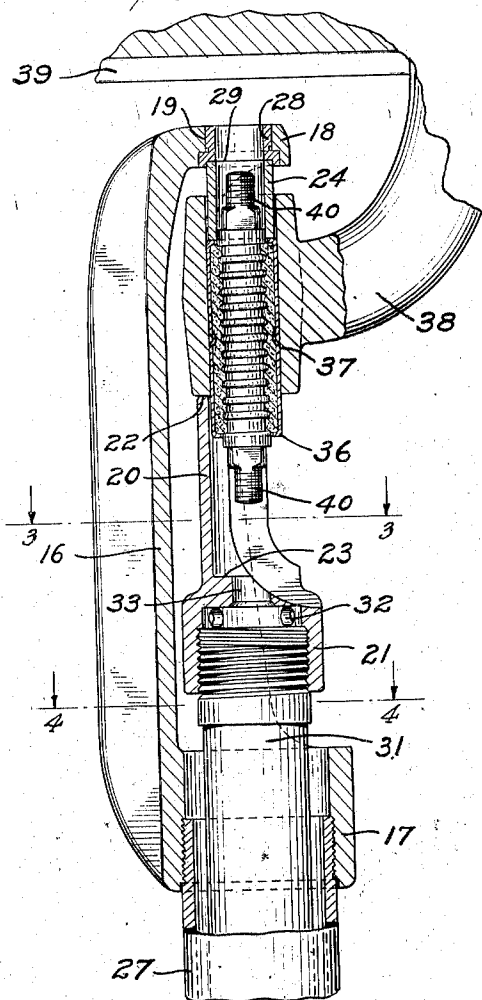


Fig. 3.

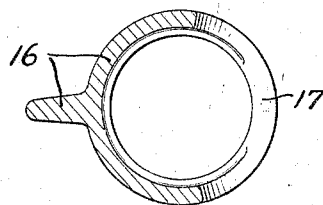


Fig. 4.

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3 Sheets-Sheet 2

Fig. 5.

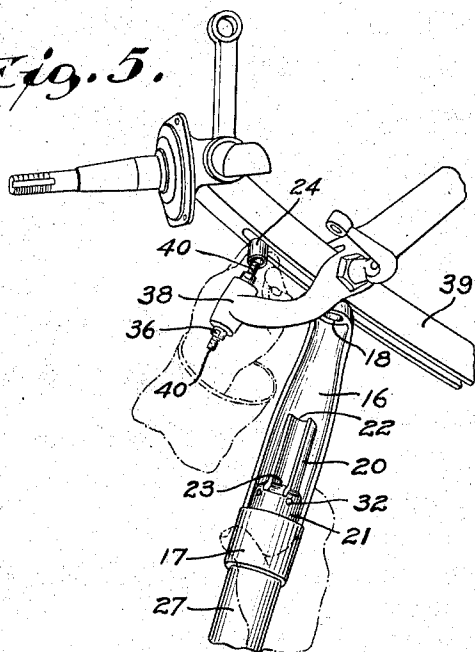


Fig. 6.

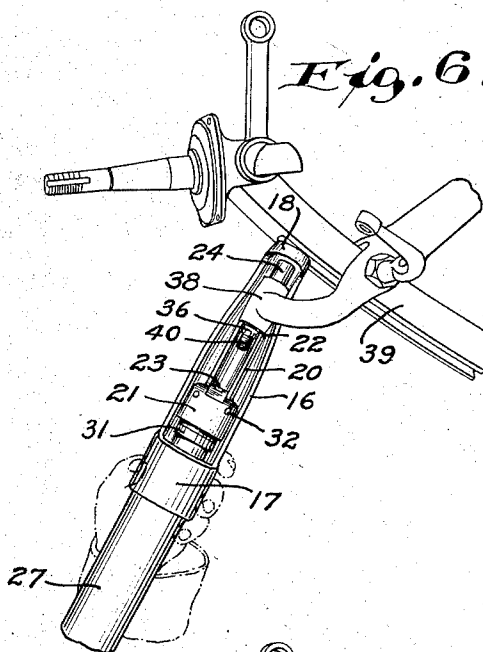


Fig. 7.

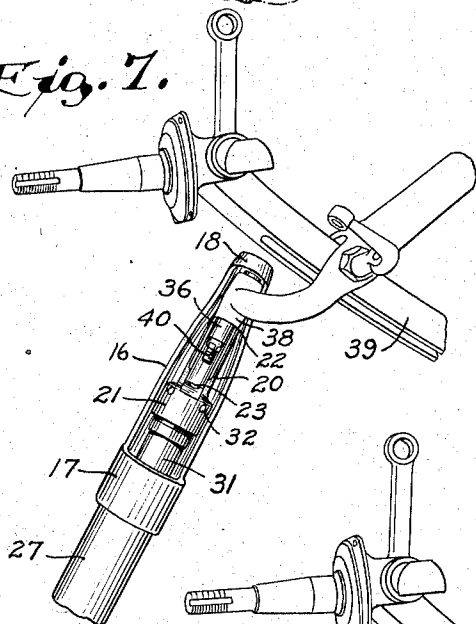


Fig. 8.

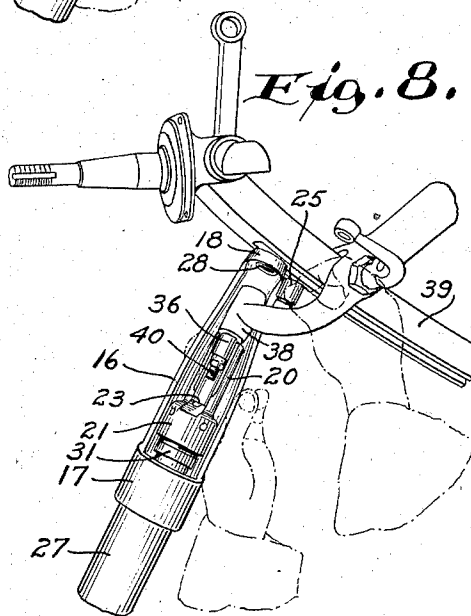
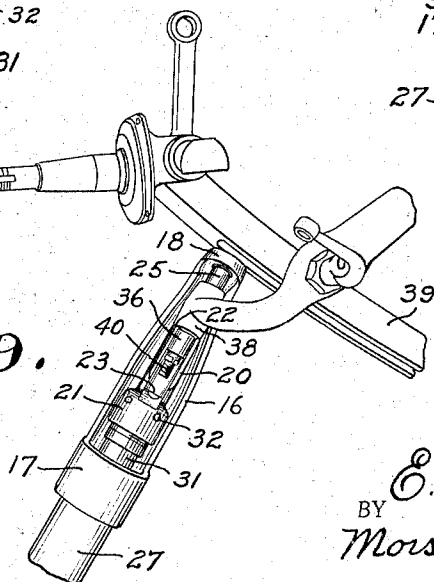


Fig. 9.



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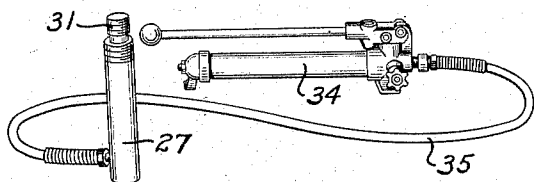
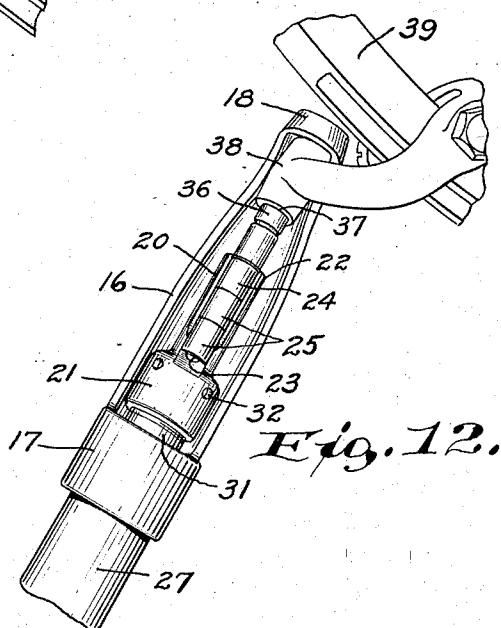
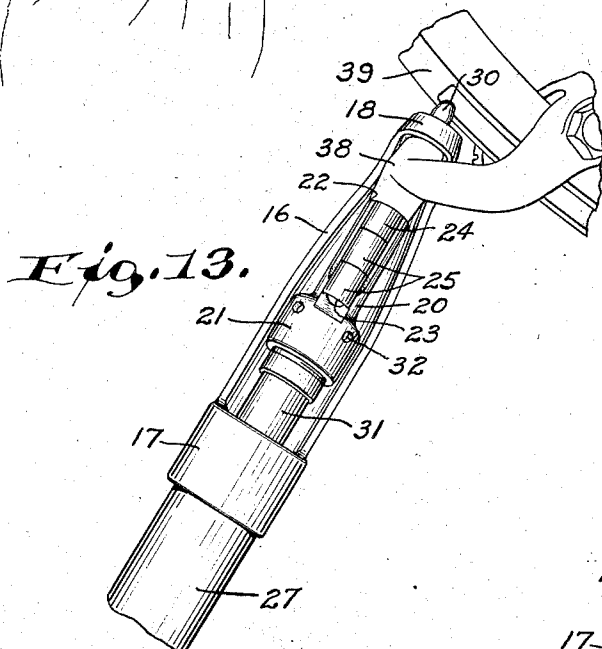
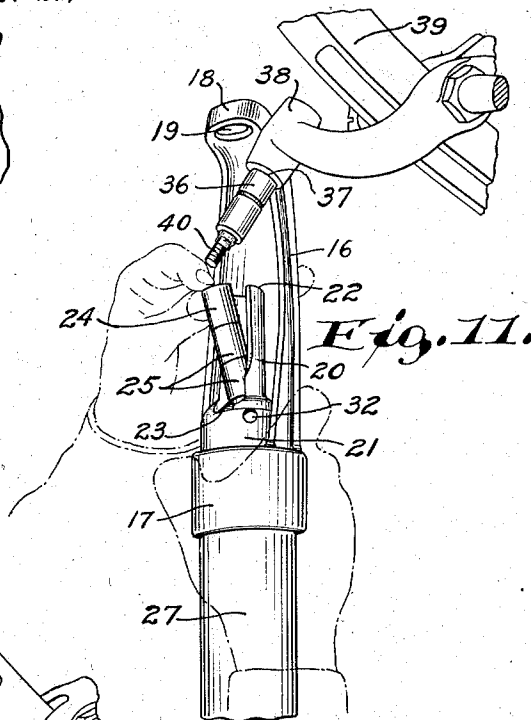
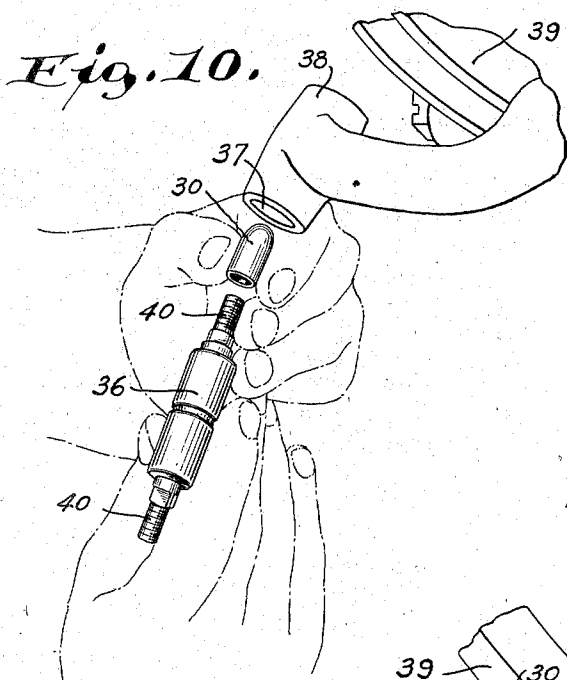
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,235,643

APPARATUS FOR INSERTING AND
REMOVING SHACKLE PINS

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Application December 27, 1937, Serial No. 181,761

6 Claims. (Cl. 29—86.1)

The present invention relates generally to im-
provements in the art of assembling and dis-
mantling relatively inaccessible assemblages, and
relates more specifically to an improved method
of inserting and removing elements such as
shackle pins or studs and to improvements in the
construction of apparatus for effecting such op-
erations.

Generally stated, an object of my present in-
vention is to provide improved instrumentalities
for effecting insertion and removal of pins or the
like into and from snug confining bores located
in relatively obstructed places which are nor-
mally rather inaccessible due to the surrounding
obstructions.

In the art of repairing vehicles such as au-
tomobiles, it is frequently necessary to replace the
spring shackle studs or pins which normally
connect the spring hanger brackets and the
spring ends, with the adjacent ends of the spring
shackle links. These shackle pivot pins are ordi-
narily pressed horizontally into snug confining
bores in the spring hanger brackets and in the
ends of the spring, which bores are located in
front of and in direct alinement with the front
axle beam; and when the pins are in place, there
is limited clearance between the rear threaded
ends of the pins and the front irregular face of
the obstructing axle. The same condition pre-
vails at both the front and rear of some au-
tomobiles, and aside from the obstruction afforded
by the axle beam, the shackle pins are relatively
inaccessible due to the presence of other obstruc-
tions; and since the pins or studs are very snugly
fitted within the spring hanger bracket and
spring bores, and must be inserted or removed
without damaging the bores or the studs, it be-
comes quite a difficult problem to effect pin re-
placements in an effective manner and with
minimum loss of time. The method now com-
monly employed to remove these studs, is to use
a drift pin and sledge, and to cut the studs off
by increments as they are driven back against
the axle. This method is not only slow and
laborious, but also results in damaged bores; and
in many cases it is necessary under prevailing
methods, to burn or chisel the studs out of their
confining bores.

It is therefore a more specific object of this
invention to provide an improved method of
facilitating insertion and removal of shackle
studs or pins in such automobile assemblages,
and to further provide simple, readily manip-
ulable apparatus for effecting such insertion or

removal of the studs without damaging the
spring hanger bracket bores or studs.

Another specific object of my invention is the
provision of an improved jack attachment for
effecting axial removal and insertion of elon-
gated substantially cylindrical elements, which
are normally confined in relatively restricted and
obstructed localities.

Still another specific object of the invention is
to provide a new and useful automobile repair
tool which will enable convenient replacement of
shackle studs or the like with minimum loss of
time.

An additional specific object of the present in-
vention is the provision of an improved pusher
attachment especially applicable to hydraulic
jacks, and adapted to push pins into and from
their confining bores in either direction.

These and other objects and advantages will be
apparent from the following detailed descrip-
tion.

A clear conception of the several features con-
stituting my present invention, and of the mode
of constructing and of utilizing my improved ap-
pliance for the insertion and removal of shackle
pins, may be had by referring to the drawings
accompanying and forming a part of this specifi-
cation in which like reference characters design-
ate the same or similar parts in the various
views.

Fig. 1 is a longitudinal central section through
one of the improved tools, showing the same ap-
plied to a fragment of a hydraulic jack and active
in removing a shackle stud from its confining
bore in a spring hanger bracket, and also show-
ing the shackle pin assemblage in section;

Fig. 2 is another longitudinal central section
through the tool, showing the same applied to
the jack and in the act of pressing a shackle
stud into the bore of a spring hanger bracket;

Fig. 3 is a transverse section through both of
the members of the improved tool assemblage,
taken along the line 3—3 of Fig. 1;

Fig. 4 is another transverse section through
one of the tool members removed from the jack,
and taken along the line 4—4 of Fig. 1;

Fig. 5 is a perspective view showing the first
step involved in effecting removal of a shackle
pin or stud with the aid of the improved tool as-
semblage after the same has been applied to a
hydraulic jack;

Fig. 6 is a similar view showing the second step
of the shackle stud removal;

Fig. 7 is another similar view showing the third
step involved in the pin removal;

Fig. 8 is still another similar view showing the fourth step of the stud or pin removal;

Fig. 9 is another similar view showing the fifth and final step of the removal method;

Fig. 10 is a perspective view showing the first or initial step involved in effecting insertion of a shackle pin or stud within the bore of a spring hanger bracket;

Fig. 11 is a similar view showing the second step of the inserting method;

Fig. 12 is another similar view showing the third step of the insertion;

Fig. 13 is still another similar view showing the final pin insertion step; and

Fig. 14 is a perspective view of a typical hydraulic jack assemblage with which my improved tool is adapted to cooperate.

While the invention has been shown and described herein as being especially applicable for the insertion and removal of shackle pins or studs with the aid of a hydraulic jack assemblage, it is not the intent to thereby unnecessarily restrict the scope, since the improved method is obviously more generally applicable and any other type of jack may be utilized. The term "pin" as used herein is intended to include any elongated element whether circular in cross-section or not, and the term "bore" is intended to include any hole of similar cross-section.

Referring specifically to Figs. 1 to 4 inclusive of the drawings, the improved apparatus shown therein comprises an outer elongated trough shaped member or body 16 having an integral internally threaded collar 17 at one end and an integral abutment flange 18 at its opposite end provided with a bore 19 disposed in axial alignment with the collar 17; an internal trough shaped member or plunger head 20 adapted for movement within the body 16 in axial alignment with the collar 17 and bore 19, and having at one end an integral internally threaded socket or collar 21 and at its opposite end an abutment surface 22, there also being another abutment surface 23 between the collar 21 and the end abutment 22; and a plurality of pusher sections including a sleeve or collar section 24 and one or more follower blocks or solid sections 25 having reduced ends 26 insertable within the collar section and into end recesses of each other, for alignment purposes.

The medial portion of the outer abutment member 16 has a U-shaped transverse cross-section such as shown in Figs. 3 and 4, and the integral end collar 17 is adapted to be detachably attached to the outer element or cylinder 27 of a hydraulic jack. The bore 19 in the abutment flange 18 of the body member 16 is formed for reception of a bushing 28 having a recess 29 adapted to receive and to properly position the outer ends of the sections 24, 25, and this bushing 28 may be made removable from within the bore 19. The intermediate portion of the inner abutment member 20 also has a U-shaped transverse cross-section as indicated in Fig. 3; and end socket 21 is adapted to be detachably attached to the inner element or ram 31 of the hydraulic jack, with the aid of a pin or spanner wrench which may be applied to the holes 32 in the socket 21, and may also be provided with a central clearance opening 33. The members 16, 20 are preferably of sturdy construction, and are freely relatively movable one within the other by the jack mechanism; and both of these members are open on the same side for convenient application to the work.

The particular type of jack mechanism with which my improved attachment cooperates, is of no importance, except that the jack must be sufficiently powerful to accomplish the desired results. In Fig. 14, I have shown a typical portable hydraulic jack assemblage to which my improvement may be conveniently applied, and the outer element or cylinder 27 of this jack communicates with a manually operable pump 34 through a flexible hose 35, thereby permitting disposition of the jack in any desired position. By operating the pump 34, the jack elements 27, 31 may be moved relative to each other along a common axis; and when the members 16, 20 are applied to these jack elements, the abutment 15 flange 18 of the outer member 16 will obviously be moved toward the abutment surfaces 22, 23 of the inner member 20 upon operation of the pump 34.

The invention is especially applicable for the insertion and removal of shackle pin assemblages such as shown in section in Fig. 1, into and from their receiving and confining bores. In Fig. 1, the improved device is shown in the act of removing a shackle pin assemblage or stud 36 from a snug confining bore 37 formed in the spring hanger bracket 38, and this bracket is so formed and supported, that the bore 37 is in direct horizontal alignment with and is disposed closely adjacent the irregular front surface of the axle beam 39. In Fig. 2 the improved assemblage is shown in the act of inserting a shackle stud 36 into the bore 37, and the cap 30 is used when the device is operated in this particular manner, so as to prevent marring of the end threads 40 of the stud 36 in the event of slight misalignment. The sleeve or collar 24 and the bushing 28 have internal bores sufficiently large to permit free insertion of the stud end threads 40 therein, without damaging these threads; and the collar 24, and follower blocks 25 are preferably of such length that the pins or studs 36 may be completely inserted or removed by applying three of these collars and blocks in axially aligned relation to each other and to the studs.

The several steps of the method of removing a shackle stud 36 from within the bore 37 of a spring hanger bracket 38, are clearly depicted in Figs. 5 to 9 inclusive wherein the approximate location and mode of mounting the spring hanger bracket 38 upon the axle 39 are clearly illustrated. In Fig. 5 the improved device is being initially applied to the automobile assemblage. The collar or sleeve section 24 is first placed upon the threaded end 40 of the shackle stud 36 adjacent the axle 39, and the abutment 22 of the inner member 20 has been moved from the abutment flange 18 of the outer member 16, sufficiently to permit disposition of the members 16, 20 in alignment with the stud 36. In Fig. 6 the improved device has been applied to the stud 36, and the abutment flange 18 has been brought into alignment and engagement with the collar section 24, while the abutment 22 of the inner member 20 has been brought into engagement with the bracket 38 adjacent to the pin confining bore therein. In Fig. 7 the jack has been manipulated by operation of the pump 34, so as to cause the abutment flange 18 to move downwardly toward the bracket 38 and abutment 22. This relative movement of the members 16, 20 has caused the collar section 24 to shift the shackle stud 36 out of the bore in the bracket 38, an extent approximately equal to the axial length of the collar section 24. In Fig. 8 the

members 16, 20 have again been separated by actuation of the jack, and a block section 25 is being inserted between the abutment flange 18 and the collar section 24 which is confined within the bore of the element 38. In Fig. 9 the insertion of the block section 25 and disposition thereof in alinement with the stud 36, has been effected, and by subsequently actuating the pump 34 of the jack it will be apparent that the stud 36 will be forced out of the bore, as the abutment flange 18 is moved downwardly to drive the block section 25 into the bore. After the stud 36 has been thus substantially removed from its normal confining bore, the jack structure and the members 16, 20 may be withdrawn, and the shackle stud may thereafter be readily completely removed. From this description as illustrated in Figs. 5 to 9 inclusive, it will be apparent that the shackle pin 36 may be quickly and conveniently removed from within its confining bore without danger of marring the bore 37 of the spring hanger bracket 38. The sectional inserts enable such efficient removal of the stud in spite of the fact that the end thereof is located closely adjacent to the axle 39, and the removal is effected by increments substantially equal to the length of the pusher sections 24, 25.

A shackle pin or stud 36 may be just as readily inserted without danger of marring the stud shell or its threaded ends 40. The several steps constituting the method of effecting such insertion of a stud 36 are clearly depicted in Figs. 10 to 13 inclusive. In Fig. 10 the stud is being preliminarily conditioned for insertion by application of the cap 30 to the thread end 40 which is to be located nearest the axle 39. In Fig. 11 the pusher sections 24, 25 are being disposed within the inner member 20 and against the abutment surface 23 thereof, and the members 16, 20 are about to be applied to the stud 36 one end of which has been slightly inserted within the bore 37 of the bracket 38. In Fig. 12 the jack elements 27, 31 have been positioned in alinement with the bore, and the abutment flange 18 has been brought into engagement with the end of the bracket 38 adjoining the bore. The pump 34 of the jack may be subsequently manipulated, thereby causing the member 20 to move upwardly as shown in Fig. 13, while the flange 18 of the outer member 16 reacts against the bracket 38. The sleeve section 24 engaging the outer end of the shell of the stud 36, and the block sections 25 coacting with the sleeve section 24, will then drive the stud 36 into the bore while the cap 30 prevents marring of the thread 40 adjacent to the axle 39. When the shackle pin or stud has been driven home, the jack may be operated to withdraw the collar section 24 and the abutment flange 18, away from the ends of the stud and the device may thereafter be freely withdrawn. It will thus be apparent that the shackle pin may be quickly and effectively inserted without danger of marring the threaded ends 40 thereof, and the insertion is again effected by relatively moving the abutment portions of the members 16, 20 toward each other by increments.

From the foregoing detailed description it will be apparent that my invention provides a simple and effective method for effecting insertion or removal of the shackle pins or studs, without danger of damaging the bores 37 of brackets 38 or marring the threads at the opposite ends of the studs. The close proximity of the axle 39 to the spring hanger bracket 38 is not detrimental to such insertion or removal, and the improved

apparatus can be quickly and conveniently manipulated to effect the desired operations. The members 16, 20 may obviously be quickly and conveniently applied to the jack elements 27, 31, and by providing the hollow and solid sections 24, 25 these same sections may be utilized for effecting either insertion or removal of the shackle pins. The formation of the outer end inner members 16, 20 is also important since the provision of the spaced abutted surfaces 22, 23 on the inner member 20 and the cooperating abutment flange on the outer member 16, permits interchangeable use of the device for either insertion or removal of the pins. The improved assemblage may obviously be manufactured and sold at moderate cost and has proven highly satisfactory in actual commercial use.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise steps of the method herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and removing shackle pins with respect to their supports, said attachment comprising, an outer elongated member adapted to span the shackle pin and its support and having one end formed for attachment to the end of the external jack element and its opposite end provided with a flange extending across the jack and pin axis, an inner member located between the ends of said outer member and having one end formed for attachment to the corresponding end of the internal jack element and its opposite end provided with an end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, and a pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted.

2. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and removing shackle pins with respect to their supports, said attachment comprising, an outer elongated member adapted to span the shackle pin and its support and having one end formed for attachment to the end of the external jack element and its opposite end provided with a flange extending across the jack and pin axis, an inner member located between the ends of said outer member and having one end formed for attachment to the corresponding end of the internal jack element and its opposite end provided with an end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, a pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said end abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted, and a spacer block formed for disposition between said

medial abutment and said collar when the shackle pin is being inserted.

3. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and removing shackle pins with respect to their supports, said attachment comprising, an outer elongated member adapted to span the shackle pin and its support and having one end formed for attachment to the end of the external jack element and its opposite end provided with a flange extending across the jack and pin axis, an inner member located between the ends of said outer member and having one end formed for attachment to the corresponding end of the internal jack element and its opposite end provided with an end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, a pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said end abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted, and a spacer block formed for coaction with either end of said collar and for interchangeable disposition between said collar and flange and between said collar and medial abutment during removal and insertion respectively of the shackle pin.

4. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and removing shackle pins with respect to their supports, said attachment comprising, an outer elongated C-shaped member adapted to span the shackle pin and its support and having one end formed for screw-thread attachment to the end of the external jack element and its opposite end provided with an integral flange extending across the jack and pin axis, an inner member of U-shaped transverse cross-section located between the ends of said outer member and having one end formed for screw-thread attachment to the corresponding end of the internal jack element and its opposite end provided with a U-shaped end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, and a tubular pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said U-shaped end abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted.

5. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and

removing shackle pins with respect to their supports, said attachment comprising, an outer elongated C-shaped member adapted to span the shackle pin and its support and having one end formed for screw-thread attachment to the end of the external jack element and its opposite end provided with an integral flange extending across the jack and pin axis, an inner member of U-shaped transverse cross-section located between the ends of said outer member and having one end formed for screw-thread attachment to the corresponding end of the internal jack element and its opposite end provided with a U-shaped end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, a tubular pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said U-shaped end abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted, and a spacer block interlocking between said medial abutment and said collar when the shackle pin is being inserted.

6. An attachment for adapting a jack having external and internal elements relatively movable along an axis for the purpose of inserting and removing shackle pins with respect to their supports, said attachment comprising, an outer elongated C-shaped member adapted to span the shackle pin and its support and having one end formed for screw-thread attachment to the end of the external jack element and its opposite end provided with an integral flange extending across the jack and pin axis, an inner member of U-shaped transverse cross-section located between the ends of said outer member and having one end formed for screw-thread attachment to the corresponding end of the internal jack element and its opposite end provided with a U-shaped end abutment spaced laterally from said axis sufficiently to clear the shackle pin when said abutment engages the support while the medial portion of said member is provided with another abutment crossing said axis, a tubular pushing collar adapted to be interchangeably interposed between said flange and the shackle pin when said U-shaped end abutment is active in removing the support from the pin and between said medial abutment and the shackle pin when said flange engages the pin support and the pin is being inserted, and a spacer block formed for interlocking coaction with either end of said collar and for interchangeable disposition between said collar and flange and between said collar and medial abutment during removal and insertion respectively of the shackle pin.

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