May 28, 1963 G. N. CHARTIER 3,091,432

LOAD MOVING DEVICE

Filed May 8, 1961 2 Sheets-Sheet 1

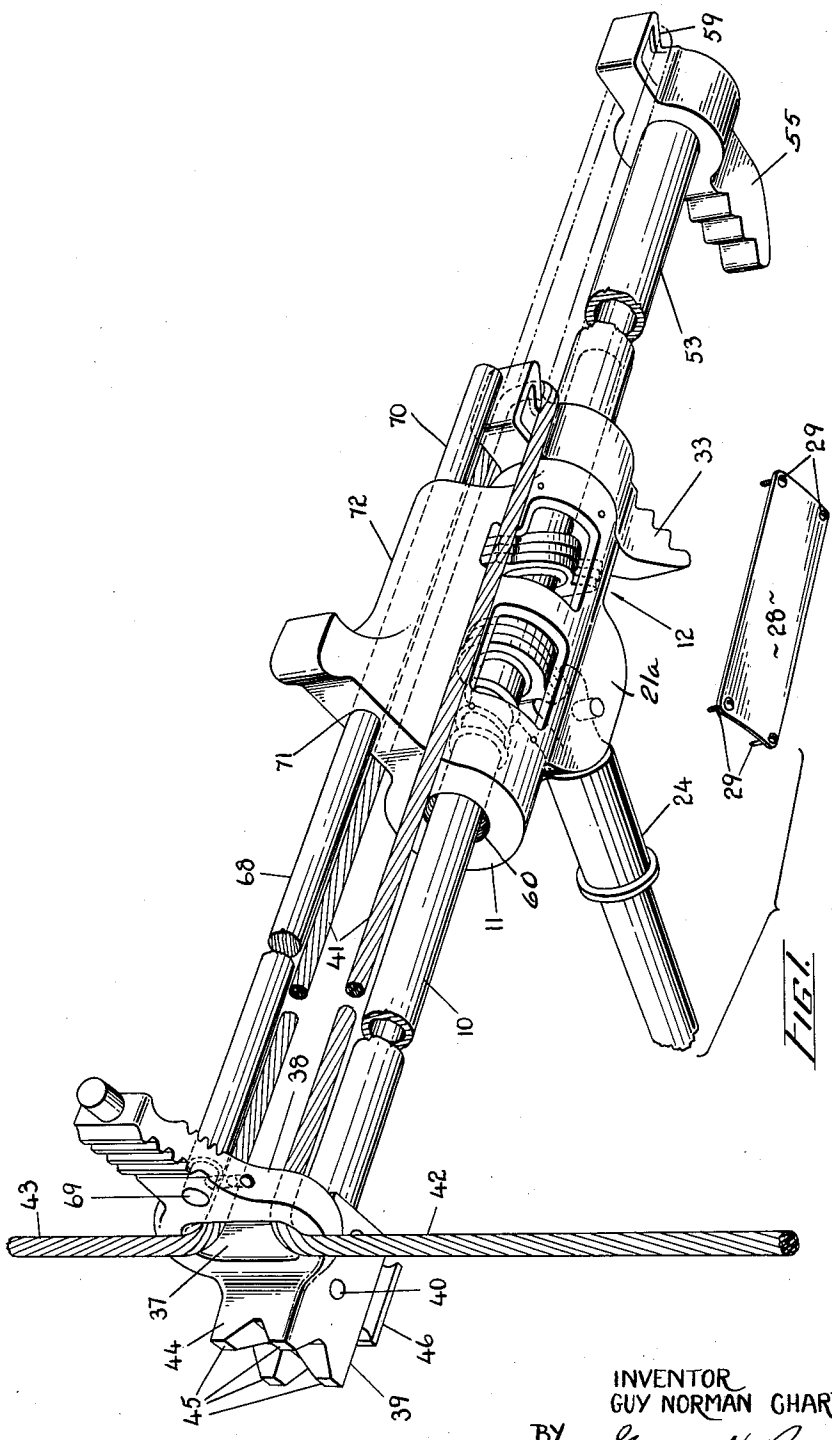

FIG. 1

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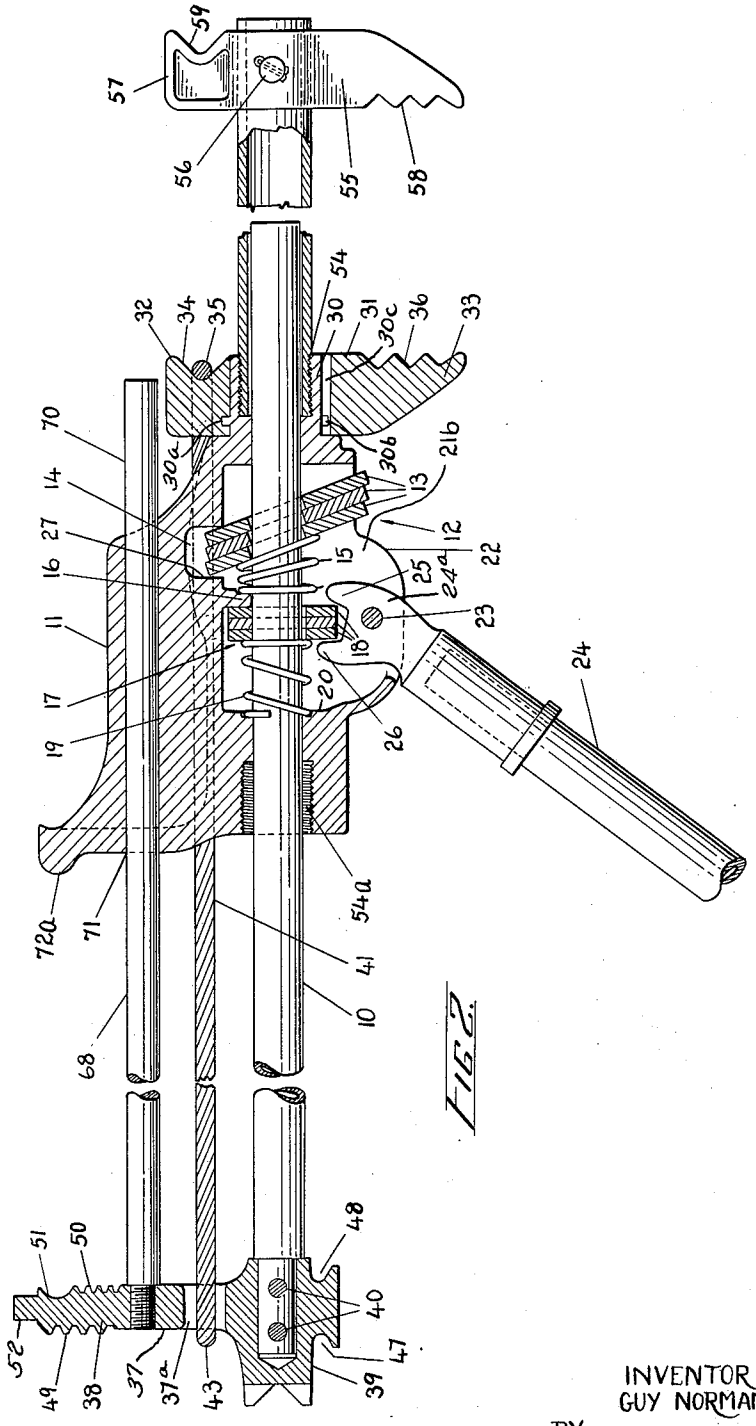

FIG 2

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LOAD MOVING DEVICE

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This invention relates to a multi-operation tool and more particularly to a tool having a novel structure which is operatively adaptable for many uses, especially in automobile repair work and the like.

An object of the present invention is to provide a tool which is capable of being used to perform many operations, such as, lifting objects, spreading objects apart or moving them together, which heretofore required the use of more than one tool.

A further object of the present invention is to provide a portable and readily operable tool of novel construction which, in addition to being adaptable to lift objects, spread objects apart or move them together, is equipped to receive a chain or cable thereby enabling the tool to perform these operations through greater distances. The tool is particularly suitable in automobile repair work involving body and other heavy parts of an automobile.

The above objects and other objects which will become apparent from a reading of this specification are attained by using the tool of this invention which comprises in combination with a jack comprising a leg; a hollow body slidably mounted on the leg, said body having a jaw-like, load-engaging projection protruding substantially perpendicular to the leg; means actuating said hollow body for selective travel along said leg; and a load carrying member rotatably mounted on said body, the member having a cable engaging end portion and an oppositely-disposed, load engaging end portion; a foot mounted on one end of the leg, said foot having a heel portion and a toe portion separated by an apertured sole portion aligned with the cable engaging portion, said toe portion cooperating with said load engaging projection to spread objects apart or move them together when the body is moved on said leg by said actuating means.

For a better understanding of the construction and operation of the tool, reference is to be had to the following description and accompanying drawings in which,

FIGURE 1 is a perspective view of the device embodying the invention, with a cover plate on the hollow housing removed to show the hollow body actuating means; and

FIGURE 2 is a side view, partly in cross-section, of the device of FIGURE 1.

Although particularly suitable in automobile repair work, the tool of this invention is useful in other trades or industry.

Referring to FIGURES 1 and 2, the tool comprises a leg **10** extending through a hollow body **11** slidably mounted thereon. The leg, in the embodiment shown, is circular in cross-section but it may have a polygonal cross-section such as square or hexagonal. With a polygonal cross-section, any tendency of the hollow body to rotate on the leg is effectively inhibited.

Within the hollow body **11**, are disengageable holding means **12** and actuating means **17**. As shown in FIGURES 1 and 2, the hollow body **11** is held in a rest position on leg **10** by the holding means **12** which comprise a set of three washers **13** disengageably mounted on leg **10** and having a side portion thereof seated in recess **14**, the washers **13** being in a canting position for gripping or locking engagement with leg **10**. Acting upon the washers **13** is a compression spring **15** mounted on leg **10** and arranged between washers **13** and the upper surface of abutment **16** protruding inwardly from the inner wall of hollow body **11**. The washers **13** are automatically or manually disengaged from gripping engagement with leg **10** as hereinafter described.

The actuating means **17** comprise a second set of three smaller washers **18** mounted on leg **10** and having a side portion thereof held against the under surface of abutment **16** by compression spring **19** mounted on leg **10** between washers **18** and one inside end **20** of hollow body **11**.

The number of washers may be increased or decreased depending principally on the desired load-bearing capacity of the tool.

The hollow body **11** is provided with spaced-apart projections **21***a* and **21***b* parallel to leg **10** and with an opening **22** therebetween. Joining lateral projections **21***a* and **21***b* is a pivot pin **23** which has operating lever **24** pivotally mounted thereon so that its one end **24***a* may move within opening **22**. The end **24***a* of lever **24** is provided with a pair of jaws **25** and **26** each operatively engageable with washers **18**.

In the operation of the tool, lever **24** is moved counter-clockwise so that jaw **25** forces washers **18** into canting position for gripping engagement with leg **10**. By further counter-clockwise movement of lever **24**, leg **10** moves relative to the hollow body **11** and shoulder **27** of recess **14** simultaneously changes position relative to leg **10** to disengage automatically washers **13**. When lever **24** is returned by a similar clockwise movement to its original position, jaw **26** co-acting with spring **19** returns washers **18** to their starting position, and simultaneously spring **15** returns washers **13** to their original holding position as shown in FIGURES 1 and 2. In this manner, the hollow body **11** travels along leg **10** in step-by-step increments and the total distance travelled is controlled by the number of strokes of the operating lever **24**.

Under load conditions, the travel of hollow body **11** along leg **10** may be reversed in the following manner:

(1) Operating lever **24** is moved counter-clockwise until washers **18** engage leg **10** whereby the load is transferred from washers **13** to washers **18**;

(2) While maintaining the load on washers **18**, washers **13** are manually disengaged;

(3) While washers **13** are in a disengaging position, washers **18** are allowed to approach a position substantially perpendicular to leg **10** by a clockwise movement of operating lever **24** so that hollow body **11** controllably slides along leg **10**. The distance travelled by hollow body **11** relative to leg **10** may be selectively arrested by returning washers **18** to gripping engagement with leg **10** through the clockwise movement of operating lever **24**.

Other means could be employed to selectively move hollow body **11** along leg **10**. For instance, a suitable crown and pinnion gear arrangement operatively connected to an operating lever could be used, the size and ratio of gears being predetermined to produce the desired movement of the hollow body **11** relative to the leg **10**.

In FIGURE 1, cover plate **28** is shown detached from hollow body **11** so that the holding and actuating means, **12** and **17** may be seen. When the tool is to be used the cover plate **28** will be fastened to hollow body **11** by 4 corner screws **29**.

One end of hollow body **11** is in the form of a cylinder **30** on which is removably and rotatably mounted a load carrying member **31**. Extending radially from the cylinder **30** is a pin-like projection **30***a* which engages in an annular slot **30***b* in the inside wall of load-carrying member **31** so that projection **30***a* slides in slot **30***b* when the load carrying member is rotated on cylinder **30**. A longitudinal slot **30***c*, symmetrical and perpendicular to slot **30***b*, is also provided in the inside wall of member **31**. By rotating the load carrying member **31** on cylinder **30** until projection **30***a* registers with slot **30***c*, it may be lifted off cylinder **30** by sliding projection **30***a* along

slot 30*c* from slot 30*b* to the top of cylinder 30. A reverse operation is followed to mount the load carrying member 31.

The load carrying member 31 has oppositely-disposed, projecting end portions 32 and 33, end portion 32 having a groove 34 in its upper surface for engaging a cable 35 and end portion 33 having a serrated gripping section 36 in its upper surface for engaging a load.

When the cable 35 is used with the tool, an intermediate portion in the form of an uncrossed loop 41 of the cable 35 is looped over groove 34. The ends of the cable pass through opening 37*a* in a sole portion 37, separating a heel portion 44 and a toe portion 38, of a foot 39 which is removably keyed to one end of leg 10 by a pair of pins 40. The opening 37*a* is aligned with the grooves 34 of end portion 32 during the operation of the tool equipped with the cable. One of the cable end portions 42 and 43 which have been passed through opening 37*a*, is anchored to some fixed member (not shown) while the other cable end portion is attached to a movable load (not shown), the end portions 42 and 43 being at an angle of less than 180° to loop 41 and usually, as shown in FIGURE 1, at substantially a right angle to loop 41. When the hollow body 11 is actuated for travel along leg 10 away from foot 39, loop 41 is moved under tension so as to slide over groove 34 and end portion 43 is drawn through opening 37*a* thereby moving the load relative to the anchored end of the cable. By reversing the travel of hollow body 11 along leg 10 as hereinbefore mentioned, an elevated load may be selectively lowered.

Generally speaking, the tool equipped with a chain or cable may be used to move any load having a size and/or weight which may be handled in accordance with the load-bearing capacity and operation of the tool.

In addition to the operations which may be performed by the tool outfitted with a chain or cable other embodiments of the tool which are to be described below, enable the tool to be used to lift objects, spread objects apart or move them together, without a chain or cable.

The heel portion 44 of foot 39 is supported by 4 corner posts 45 which may be used as a base when the tool is used essentially as a jack. In such cases, load carrying member 31 is desirably rotated so that either end portion 32 or 33 is positioned under the object to be raised, e.g. a bumper of a car, and operating lever is accessible to the operator. The hollow member is then actuated for travel away from foot 39 causing the load carrying member 31 to engage and subsequently raise the object.

On the side of heel 44 is a load-engaging projection 46 comprising a pair of oppositely-disposed, spaced-apart grooves 47 and 48. The load-engaging projection 46 cooperates with either end portion 32 or 33 of load carrying member 31 to spread objects apart or move them together when the hollow body 11 is moved on leg 10 by the actuating means 17. To move objects apart either groove 34 or serrated gripping section 36 engages one object while groove 47, engages another object and hollow body 11, after being rotated on leg 10 so that operating lever is conveniently and operatively accessible to an operator, is moved relative to leg 10. A similar procedure is followed to spread objects apart except that hollow body 11 is in a reverse position on leg 10 accomplished by simply removing it and remounting it in an upside down condition so that groove 34 and section 36 face towards, rather than away from foot 39.

The toe portion 38 of foot 39 is provided with gripping serrations 49 and 50 on its lower and upper faces respectively and a groove 51 parallel to the length of opening 37*a* and between serration 50 and a cylindrically shaped end 52 of toe portion 38. Serrations 49 and 50 cooperate with either end portion 32 or 33 of load carrying member 31 in a manner similar to that described in connection with grooves 47 and 48 to spread objects apart or move them together. The procedure is the same as

previously described in connection with grooves 47 and 48. The serrations 49 and 50 are used instead of grooves 47 and 48 in situations where the grooves cannot engage the object because of the distance between the groove and the object or in situations where the serrated surface provides a better gripping engagement with the object than the groove.

The cylindrical end 52 of toe portion 38 is also used in cooperation with load carrying member 31 in a similar manner as just previously described for spreading objects apart or moving them together. The cylindrical end 52 engages an object which can only be engaged by means of a hole or other opening in the object, the hole or opening having a configuration which will not permit engagement by grooves 47 or 50 or serrations 49 or 50. For an example of the use of cylindrical end 52, reference is made to automobile repair work where the object to be engaged is a body section having a relatively large, smooth surface except for a small circular opening.

Cooperating with groove 51 of toe portion 38 to spread objects apart is a jaw-like, load engaging projection 72*a* protruding from hollow body 11 substantially perpendicular to leg 10, projection 72*a* and groove 51 having inter-engageable, mating faces. When hollow body 11 rests against foot 39, so that projection 72*a* is mating with groove 51, the combination of projection 72*a* seated in groove 51 may be inserted in a space, which is too small to receive the cooperating parts of the tool hereinbefore described, between two objects in order to spread the objects apart by actuating hollow body 11 along leg 10.

As an additional feature of the tool of this invention, cylinder 30 is provided with inner threads 54 into which may be fitted one end formed with screw threads of a hollow extension leg 53 as shown in FIGURES 1 and 2. The extension leg 53 is hollow to accommodate leg 10 which during an operation may extend beyond hollow body 11. A load carrying member 55 is removably keyed to the other end of extension leg 53 by pin 56, member 55 being provided with projecting end portions 57 and 58 which are similar to projections 32 and 33 respectively of load carrying member 31 except that projection 58 is in a reverse position to that occupied by projection 33. In cases where the objects to be spread apart or moved together are so far apart that load-carrying member 31 in cooperation with foot 39 cannot be used to perform these operations, extension leg 53 outfitted with the load carrying member 55 at one end may be used whereby load-carrying member 55 cooperates with foot 39 in a similar manner as described for load-carrying member 31. For instance, after extension leg 53 is selectively threaded into cylinder 30 until the hollow body is mounted on leg 10 for convenient and accessible operation of operating lever 24, projecting end portion 59 may be used in cooperation with groove 47 of heel projection 46 for spreading objects apart.

Threads 54*a*, similar to threads 54, are provided in the other end opening 60 of hollow body 11 so that extension leg 53 may be screwed therein when hollow body 11 is reversibly mounted on leg 10 for spreading objects apart as described above.

To strengthen leg 10 and increase the load-bearing capacity of my tool when it is outfitted with cable 35, a bar 68, shown in FIGURES 1 and 2, may be removably mounted on foot 39 by screwing one end of bar 68 in a threaded opening 69 in the sole portion 37 of foot 39 between opening 37*a* and serration 50 as shown in FIGURE 2. The other end portion 70 passes freely through a longitudinal aperture 71 in hollow body 11.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. In combination with a jack comprising a leg; a hollow body slidably mounted on the leg, said body having a jaw-like, load engaging projection protruding sub-

stantially perpendicular to the leg; means actuating said hollow body for selective travel along said leg; and a load carrying member rotatably mounted on said body, the member having a cable engaging end portion and an oppositely-disposed, load engaging end portion; a foot mounted on one end of the leg, said foot having a heel portion and a toe prtion separated by an apertured sole portion aligned with the cable engaging portion, said toe portion cooperating with said load engaging projection to spread objects apart or move them together when the body is moved on said leg by said actuating means.

2. The tool according to claim 1, the additional feature of a load engaging projection on said heel cooperating with said load engaging end portion to spread objects apart or move them together when the body is moved on said leg by said actuating means.

3. The tool according to claim 2, in which said load-engaging heel projection comprises a pair of oppositely-disposed, spaced apart grooves.

4. The tool according to claim 1 in which said projection and said toe portion have inter-engageable mating faces.

5. The tool according to claim 1, in which said heel portion is supported by four corner legs.

6. The tool according to claim 1, the additional feature of a hollow bar mounted on said hollow body to form an extension of said leg, the inside cross-section of the hollow bar permitting said leg to enter the hollow bar when the leg extends beyond the hollow body, the load carrying member being mounted on said hollow bar.

7. The tool according to claim 1, wherein the toe portion has serrated upper and lower faces engageable with an object and a cylindrically shaped end engageable in circular openings in objects.

8. In combination with a jack comprising a leg; a hollow body slidably mounted on the leg, said body having a jaw-like, load engaging projection protruding substantially perpendicular to the leg; means actuating said hollow body for selective travel along said leg; and a load carrying member rotatably mounted on said body, the member having a cable engaging end portion and an oppositely-disposed, load engaging end portion; a foot mounted on one end of the leg, said foot having a heel portion and a toe portion separated by an apertured sole portion aligned with the cable engaging portion, said heel portion having a load engaging projection comprising a pair of oppositely-disposed, spaced apart grooves cooperating with said load carrying member to spread objects apart or move them together when the body is moved on said leg by said actuating means, said toe portion cooperating with said load carrying member independently to spread objects apart or move them together when the body is moved on said leg by said actuating means.

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