Aug. 5, 1958 J. M. PIERCE 2,846,188

TRANSMISSION AND CYLINDER HEAD HOIST

Filed Oct. 20, 1954 3 Sheets-Sheet 1

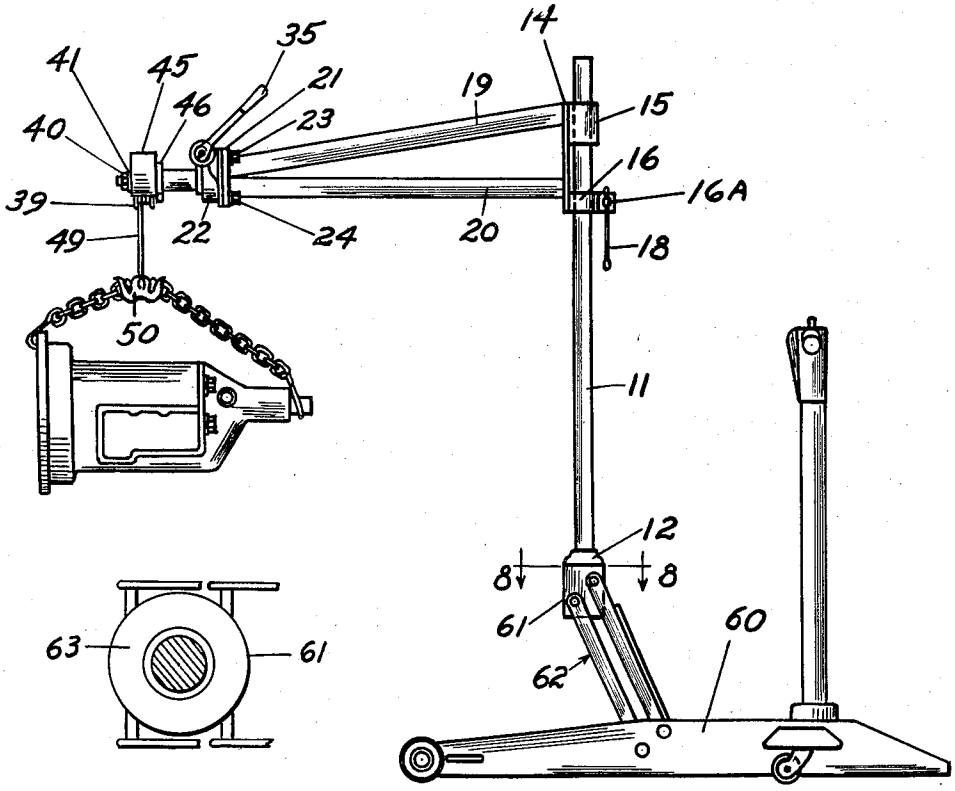


FIG. 8

FIG. 1

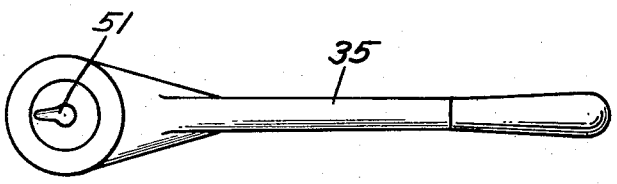


FIG. 7

INVENTOR.

Joseph Martin Pierce

Aug. 5, 1958 J. M. PIERCE 2,846,188

TRANSMISSION AND CYLINDER HEAD HOIST

Filed Oct. 20, 1954 3 Sheets-Sheet 2

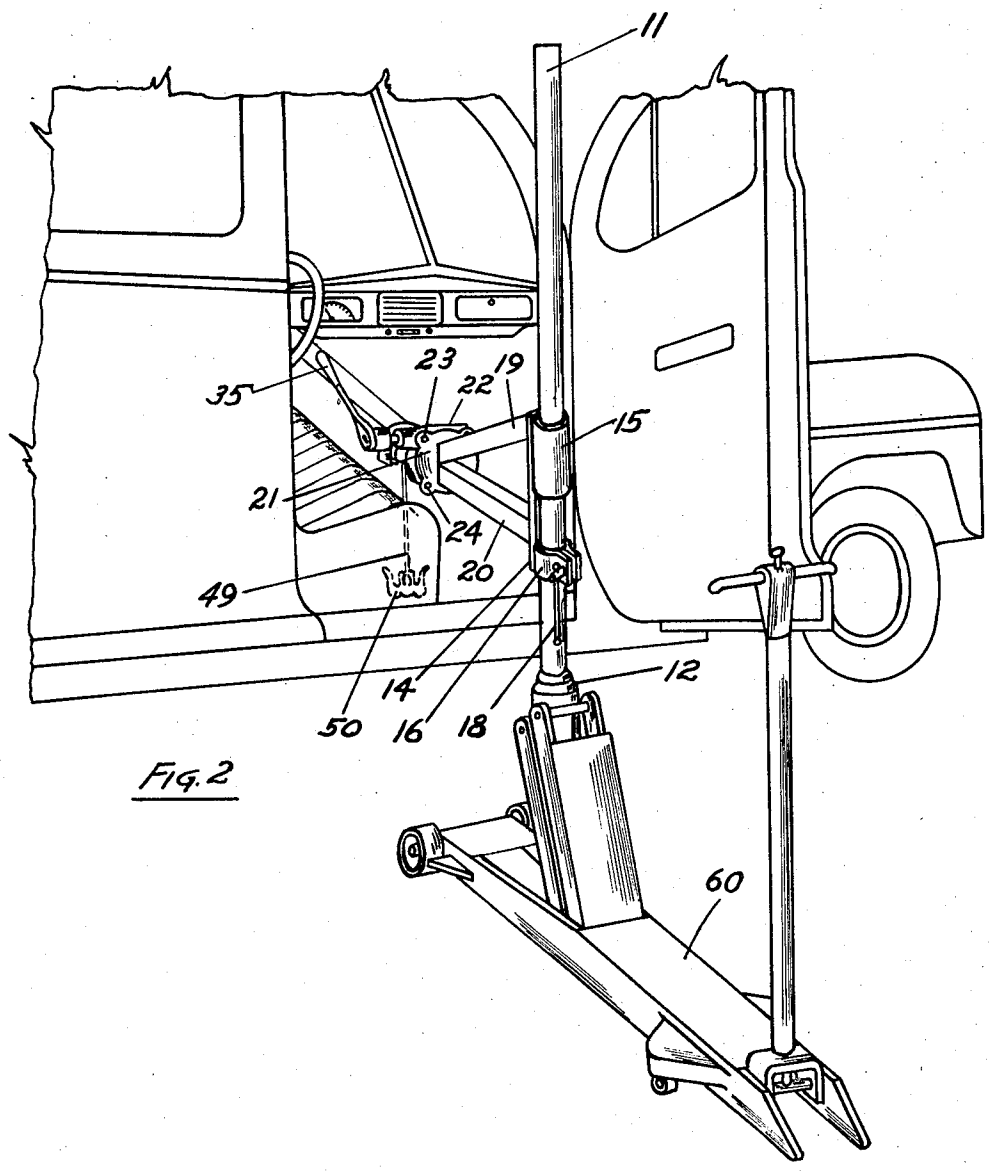


FIG. 2

INVENTOR.

Joseph Marion Pierce

Aug. 5, 1958 J. M. PIERCE 2,846,188

TRANSMISSION AND CYLINDER HEAD HOIST

Filed Oct. 20, 1954 3 Sheets-Sheet 3

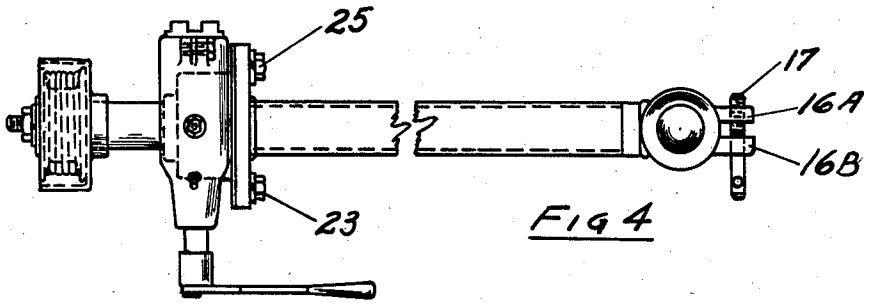


FIG 4

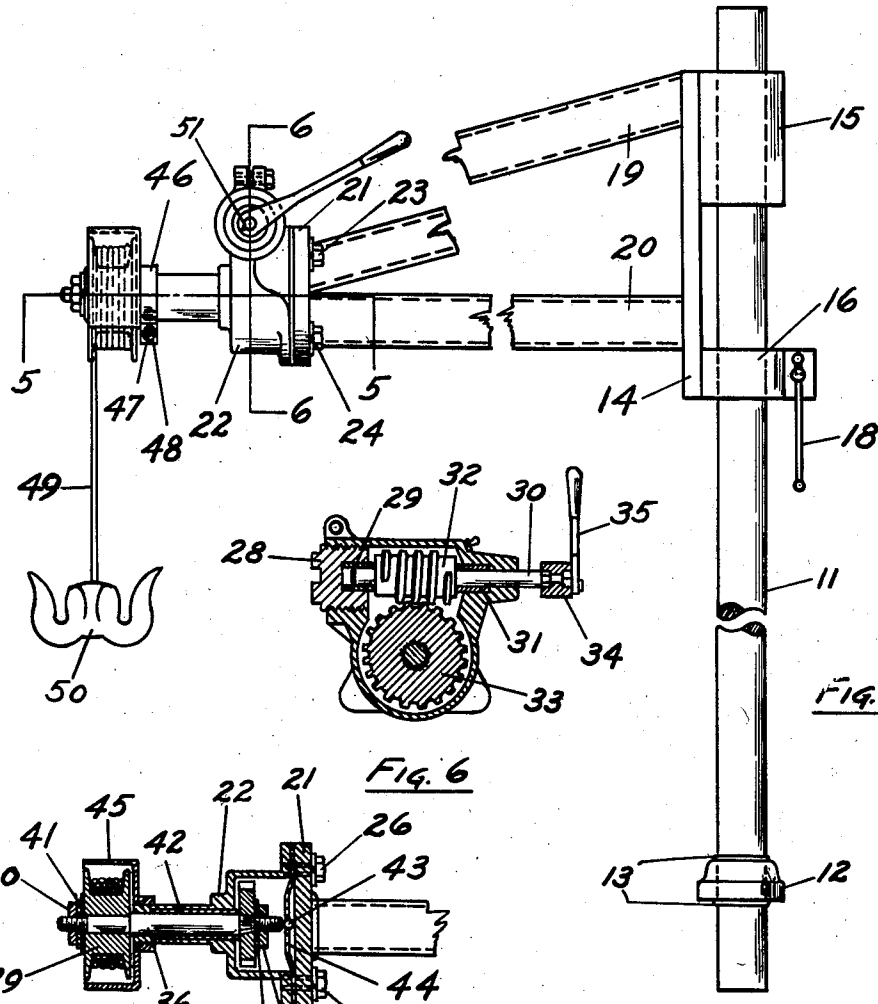


FIG. 3

FIG. 6

FIG. 5

INVENTOR.

Joseph Marley Pierce

United States Patent Office

2,846,188

Patented Aug. 5, 1958

2,846,188

TRANSMISSION AND CYLINDER HEAD HOIST

Joseph Martin Pierce, Aurora, Ill.

Application October 20, 1954, Serial No. 463,348

1 Claim. (Cl. 254—146)

This invention relates to a hoisting mechanism particularly suitable for removing and installing automobile transmissions and cylinder heads.

Hoists, in general, are constructed with a means to raise or lower an object in the nature of a pulley or ratchet crank located at a distance from the lifting end of the hoist. Such construction requires the operator to work at a distance from the hoist, thus limiting the position the operator can assume with relation to lifting means. Also hoist mechanisms of the usual crank and ratchet variety require two hands of the operator, and the range of fine adjustment necessary to align a transmission is totally lacking.

One of the problems during the installation of a transmission is alignment. This requires a very fine adjustment to position the parts to engage and at the same time line up the mounting holes to insert the bolts required to secure the transmission to the clutch housing.

Another problem in servicing automobiles, trucks, and the like, is removing heavy parts, such as transmissions and cylinder heads which are too heavy to be lifted by hand. This problem is especially acute in the case of the so-called "automatic" transmissions, which must be lifted up into the interior of the car and weigh much more than one person can lift; particularly within the confined space of the car interior. Even if the transmission is removed by lowering, difficulty is encountered in alignment because of the cramped spaced and awkward position required and in any event the transmission must be lifted for installation.

It is the general object of this invention to provide a new and improved hoist suitable for removing and installing automobile transmissions and cylinder heads.

Another object of the invention is to provide an improved transmission and cylinder head hoist suitable for use on a conventional garage type jack, having features of construction, combination and arrangement whereby it can be readily operated by one man working within the confines of an automobile body, or under a raised hood of an automobile.

Still another object of the present invention is to provide an improved transmission and cylinder head hoist which provides continuous lifting and lowering movement.

The novel features, which I believe to be characteristic of my invention, are set forth with particularity in the appended claim. My invention itself, however, both as to its construction and mode of operation, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of the entire hoist showing it mounted on a garage type jack and supporting a transmission.

Figure 2 is a view in perspective showing the hoist mounted on a garage type jack with the boom in the inside of an automobile in position to remove a transmission.

Figure 3 is a side elevation of the hoist shown in Figure 1.

Figure 4 is a top plan view of the apparatus of Figure 3.

Figure 5 is a fragmentary sectional view, taken along line 5—5 of Figure 3, showing the hoisting drum and bull gear.

Figure 6 is a fragmentary sectional view, taken along line 6—6 of Figure 3, showing the worm gear, bull gear and ratchet wrench handle.

Figure 7 is an enlarged side elevational view of the ratchet wrench mechanism.

Figure 8 is an enlarged horizontal cross-sectional view of the support socket of a garage jack.

With reference to Figure 1, the support post **11** is preferably made of machined stress proof steel. Collar **12** is slidably received at the lower end of post **11** and secured in position by weld beads **13** which form a suitable bearing surface and support mounting to be rotatably received in the socket of an ordinary garage type jack as hereinafter described in detail.

The sleeve **15** is welded to the face plate **14** on its upper end and is slidably received on the support post **11**. The sleeve **16** with ears **16***a* and **16***b* is welded to the lower end of face plate **14** in vertical alignment with sleeve **15**, and is slidably received on support post **11**. The bolt **17** extends across the split portion of sleeve **16** and is threadably received in ear **16***a* and loosely received in ear **16***b*. Bolt **17** has a handle **18** slidably received in the end to form a crank, so that when bolt **17** is rotated to extend further into ear **16***b*, the split sleeve **16** will be drawn to tight clamping engagement with support post **11**.

The arm **19** is preferably made of square tubular steel and is welded to face plate **14** as shown. Arm **19** extends generally outward and downwardly from plate **14**. Arm **20** is of similar construction and is welded to face plate **14** below arm **19** as shown. Arm **20** is horizontal and mates with arm **19** at its outboard end to form a triangular support truss. The anchor plate **21**, is generally square in shape as can be seen in Figure 2 and has mounting holes bored in its four corners. Plate **21** is welded to the ends of the arms **19** and **20**, forming a mounting plate for the hoisting mechanism and additionally securing these arms together.

The gear housing **22** is secured to plate **21** by bolts **23**, **24**, **25**, and **26**. Bearing cap **28** is fitted with bushing **29** which receives one end of shaft **30**. Bushing **31** is fitted into the gear housing in alignment with bearing cap **28** to receive shaft **30**. Worm gear **32** is secured to shaft **30** in position to engage bull gear **33** when mounted in the gear housing as shown. The outboard end of shaft **30** is hexagon shaped to receive a standard socket wrench. Coupling **34** is a standard socket wrench adapter from a ratchet wrench to a hexagon nut. The ratchet handle **35** may be any of the types well known. In brief such mechanisms include a toothed ratchet wheel cooperatively associated with a pawl so that as the handle is turned in one direction the pawl engages the wheel to turn the same and, when the handle is turned in the opposite direction the pawl rides over the toothed wheel without turning the same.

The shaft **36** is machined and threaded at one end to receive bull gear **33** with nut **38** and washer **37** to secure bull gear **33** to the shaft. The opposite end of shaft **36** is machined and threaded to receive cable drum **39** with nut **40** and washer **41** to secure cable drum **39** to the shaft. Shaft **36** with bull gear **33** and cable drum is assembled in bushing **42** which is fitted in gear housing **22** to form a bearing for shaft **36**. Ball bearing **43** is mounted in pressure plate **44** to apply pressure against the end of shaft **36** in an outward direction.

Safety guard housing **45** is mounted to enclose the upper portion of cable drum **39** and is secured to gear housing by collar **46** which has drilled ears to receive bolt **47** and nut **48**. As bolt **47** is rotated into nut **48** the collar **46** is drawn to tight clamping engagement with the outboard end of gear housing **22**.

Cable **49** is secured to cable drum **39** at one end and wound around the drum **39**. Hook **50** is attached to the free end of cable **49** to receive a chain or cable placed around the transmission or other object to be lifted or lowered.

In use the platform of a standard garage type floor jack **60** is removed and the hoist mechanism is mounted on the jack by inserting the lower end of the support post **11** in the socket **61** of the lift head mechanism **62** of the floor jack so that the collar **12** rests on the annular marginal seat **63** of the socket of the floor jack. The floor jack can then be adjusted to any desired height to position the entire hoist as desired.

Handle **18** is rotated to move bolt **17** out of ear **16***b* releasing the clamped engagement of split sleeve **16** and the hoist truss and mechanism can be raised or lowered in order to fit easily into the body of an automobile directly above the transmission. At the desired height handle **18** is then rotated to move bolt **17** to extend further into ear **16***b* thereby moving ear **16***a* closer to ear **16***b* and drawing the two ears tight in clamping engagement with support post **11**.

Ratchet handle **35** is rocked counterclockwise to rotate worm gear **35** which in turn rotates bull gear **33** and thus rotates cable drum **39** unwinding the cable **49** and lowering hook **50** to a desired height. A suitable chain is secured around the transmission and engaged in chain hook **50**. Ratchet handle **35** is then rocked clockwise to raise the transmission as needed. The operator may work from either side of the automobile being repaired using one hand to guide the transmission as it is removed from locking engagement with the motor of the automobile and the other hand to rock handle **35** for lifting or lowering. Lever **51** on the ratchet handle changes the direction of ratchet rotation for lifting or lowering. No braking is necessary in raising or lowering the transmission as the worm and bull gear design resists rotation under the load of a transmission.

Once the transmission is freed from the motor it may be lowered to the floor and removed or it may be raised into the interior of the car and then the entire jack, hoist and transmission easily removed and rolled to any desired location.

In the removal of cylinder head a similar procedure is employed. The hoist may be inserted under the raised hood from either side or directly from the front. The operator can work at any position close to his work without interference from the hoist. A suitable chain is bolted to the head to be removed and hooked over chain hook **50**. Ratchet handle **35** is then rocked with one hand while the other is used to tap the head with a hammer to loosen it. Once the head is loose it is guided evenly by one hand while the other hand rocks ratchet handle **35** raising the cylinder head with ease over the studs which secure it in place.

In its construction and design the worm and bull gear combination are of the slow type, requiring little or no braking device to prevent rotation under the ordinary load conditions encountered in removing or installing a transmission or cylinder head.

In addition, the worm and bull gear combination provide a continuous movement for precision lifting and lowering. The ratchet handle can be used in any position that is convenient for the operator while working in a cramped space and can be moved in short strokes in any position affording the operator the best leverage on the ratchet handle. The direction of rotation can be changed with one finger by moving the control lever **51** on the ratchet handle from side to side.

While this invention is susceptible of embodiments in many different forms, there is shown in the drawing and described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention, and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claim.

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

In a hoist of the character described, a platformed wheeled supporting base, a vertical support post rotatably mounted on the platform of the wheeled supporting base, means for raising or lowering the platform, a pair of spaced sleeves slidably mounted on said post, clamp means for adjustably securing one of said sleeves on said post, a crane arm assembly extending horizontally from said sleeves, said crane arm assembly consisting of a first cantilever arm secured to one of said sleeves and extending laterally therefrom and a second cantilever arm angularly secured to the other of said sleeves and extending to meet said first cantilever arm to form the apex of a triangular truss, a gear housing secured to the apex of the crane arm assembly, a pair of shafts in said housing, a worm gear on one of the shafts, a bull gear on the other shaft in mesh with the worm gear, said bull gear shaft extending horizontally through the side of the gear housing on the side opposite of the apex of said crane arm, a cable drum connected to the extension of the bull gear shaft in juxtaposition to the gear housing, a lifting cable on said drum, a manually operated lever rotatably mounted on the gear housing adjacent to the apex of the crane arm assembly and connected to said worm gear shaft, and ratchet means adjustably connecting said worm gear and lever so that the oscillation of the lever intermittently rotates the drum for winding and unwinding the lifting cable, whereby an operator can position the winding cable and the gear housing over a work piece and have one hand free to guide a work piece and at the same time actuate the gear housing lever with the other hand.

References Cited in the file of this patent

UNITED STATES PATENTS

1,789,025	Shepard, Jr. et al.	Jan. 13, 1931
1,884,296	Schwerin	Oct. 25, 1932
2,433,921	Nelson	Jan. 6, 1948
2,568,827	Schallock	Sept. 25, 1951
2,577,338	Leach	Dec. 4, 1951