

Oct. 28, 1924.

O. M. BROWN

1,513,031

DEVICE FOR REMOVING AND REPLACING ENGINE CAM SHAFTS AND BUSHINGS

Filed Feb. 21, 1922

2 Sheets-Sheet 1

Fig. 1.

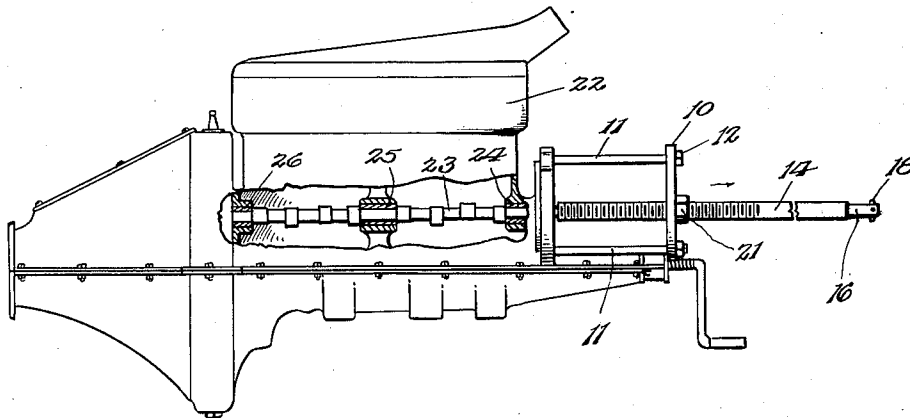


Fig. 2.

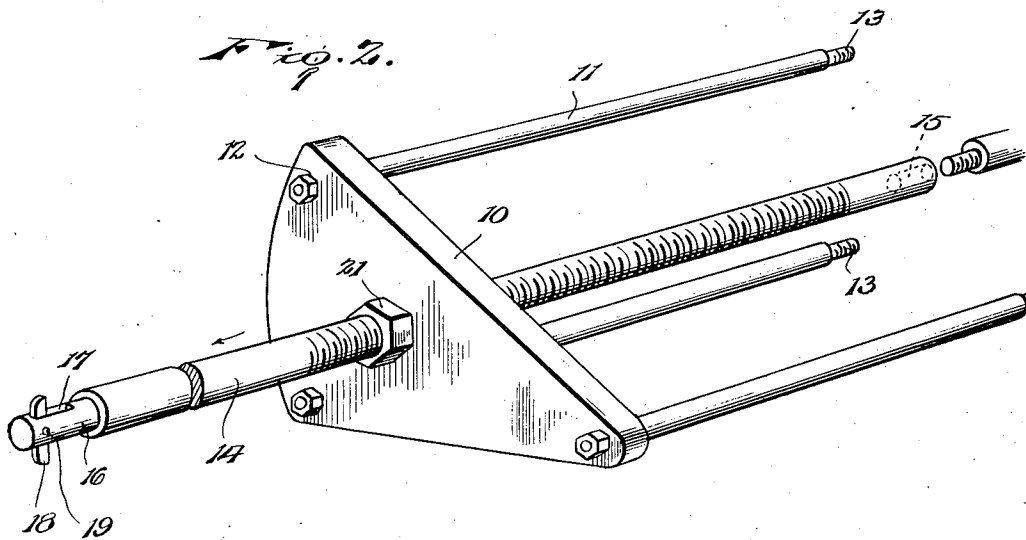
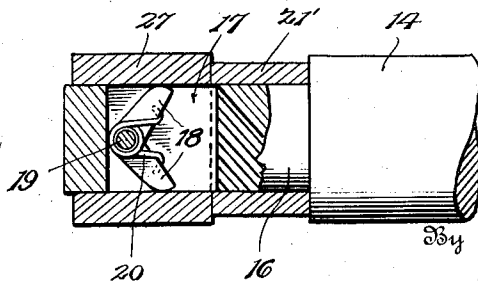


Fig. 6.



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Fig. 3.

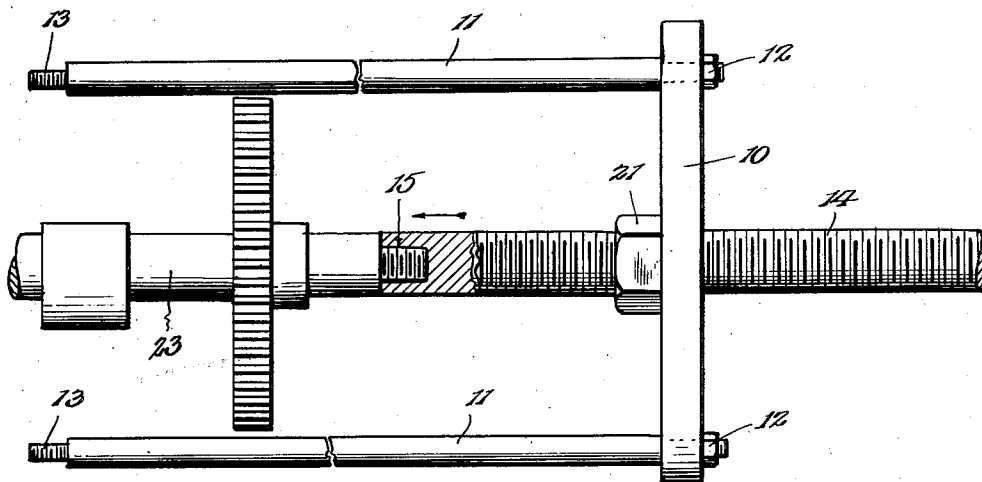


Fig. 4.

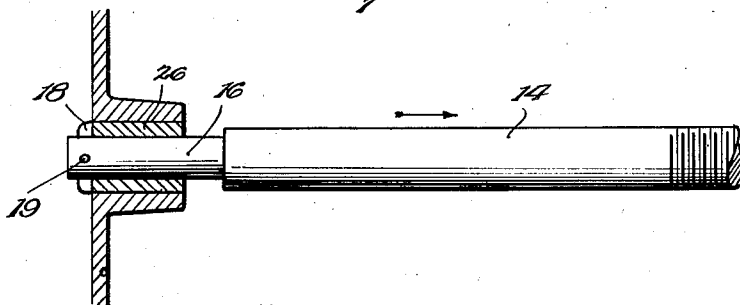
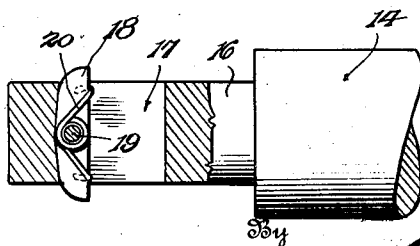


Fig. 5.



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UNITED STATES PATENT OFFICE.

OLIVER M. BROWN, OF KANSAS CITY, MISSOURI.

DEVICE FOR REMOVING AND REPLACING ENGINE CAM SHAFTS AND BUSHINGS.

Application filed February 21, 1922. Serial No. 538,249.

To all whom it may concern:

Be it known that I, OLIVER M. BROWN, citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Devices for Removing and Replacing Engine Cam Shafts and Bushings, of which the following is a specification.

This invention relates to an improved device for removing and replacing the cam shaft and bushings of a Ford engine and seeks, as one of its principal objects, to provide a device whereby the cam shaft as well as the front, center and rear bushings for the shaft may be removed and replaced without the necessity for removing the engine from the vehicle chassis.

The invention has as a further object to provide a device which may be operated to pull upon the cam shaft for withdrawing the shaft and which, when replacing the shaft, may be operated to push thereon.

And the invention has as a still further object to provide a device which will be simple in its construction and which may be readily applied to a Ford engine or removed therefrom.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a side elevation showing my improved device in connection with a Ford engine, parts being broken away and illustrated in section,

Figure 2 is a perspective view of the device,

Figure 3 is a plan view showing the manner in which the device is employed for pushing on the cam shaft,

Figure 4 is a fragmentary plan view showing the manner in which the device is used for withdrawing the rear bushing of the cam shaft,

Figure 5 is a fragmentary section showing the mounting of the dogs of the device, and

Figure 6 is a fragmentary sectional view showing the manner in which the rear bushing of the cam shaft is replaced.

In carrying the invention into effect, I employ a bracket comprising a preferably triangular shaped body plate 10 and detachably connected to said plate is a plurality of supporting rods 11. These rods are

the plate and carry nuts 12 rigidly connecting the rods with the plate. At their opposite ends the rods are threaded as indicated at 13.

In conjunction with the bracket, I employ an operating bar 14 threaded for a portion of its length and provided at one end with a threaded socket 15. At its opposite end, the bar is formed with a reduced extension 16 defining an annular stop shoulder at the base thereof and formed in said extension is a slot 17. Pivoted at their inner ends in said slot are dogs 18 held by a pivot pin 19 common thereto and surrounding said pin to coact at its ends with said dogs is, as shown in detail in Figure 5, a spring 20 normally operating to project the dogs outwardly to active position extending at opposite sides of the extension. However, the dogs may, of course, be swung to inactive position lying within the slot. The bar 14 is freely received through a suitable opening formed centrally of the body plate 10 of the bracket and threaded upon the bar is a nut 21, while in conjunction with the extension 16 a spacing sleeve 21' is employed.

In order to clearly bring out the manner of use of my improved device, I have, for convenience, shown the invention in connection with a Ford engine 22 having a cam shaft 23 for which is provided the usual front bushing 24, center bushing 25 and rear bushing 26 journaling the shaft. In order that the shaft may be displaced, the engine radiator of the vehicle is first removed so that access may be readily had to the timing gear case. The commutator is then removed as is also the timing gear case cover. The intake manifold with the carbureter is then removed, as is also the exhaust manifold, so that access may be readily had to the push rod tappets of the engine. These tappets are raised out of engagement with the cam shaft and secured in raised position so that the shaft may be drawn forwardly. The threaded ends 13 of the rods 11 are then, as shown in Figure 1, engaged in appropriately located openings for the bolts employed to secure the timing gear case cover, when the body plate 10 is secured upon the outer ends of said rods by the nuts 12. The bar 14 is then inserted through the body plate and rotated to engage the threaded terminal at the forward end of the cam shaft, as shown in Figure 3, in the socket 15

of the bar, the nut 21 being applied at the forward side of the body plate 10. Accordingly, by then turning the nut in a clockwise direction, the nut will coact with the body plate for moving the bar forwardly and accordingly withdrawing the cam shaft, the front bushing 24 and center bushing 25 being withdrawn with the shaft. After the shaft has been thus displaced, the bar 14 is turned end for end upon the plate 10 when, as shown in Figure 4, the extension 16 of the bar is inserted through the rear bushing 26 for the cam shaft. As the extension is advanced through the bushing, the dogs 18 will, of course, be swung inwardly by the bushing until the dogs clear the bushing at its inner end, when said dogs will spring outwardly behind the bushing to coact with the inner end edge thereof. Accordingly, the nut 21 being disposed at the forward side of the plate 10, this nut may be turned in a clockwise direction for drawing the bar 14 forwardly and pulling the bushing 26 from its bearing. I accordingly provide a device whereby the cam shaft, as well as the bushings therefor may be readily displaced.

To renew the cam shaft bushings and replace the cam shaft, the spacing sleeve 21' is, as illustrated in Figure 6, first fitted over the extension 16 of the bar 14, when the new rear bushing for the cam shaft, as conventionally illustrated at 27, is then fitted over the extension to abut the sleeve, the sleeve being employed to limit the bushing in its inward movement upon the extension so that the bushing will hold the dogs 18 inactive. The bar 14 is then positioned to direct the bushing 27 into the rear bearing for the cam shaft and to facilitate this operation, the bottom pan of the engine is preferably removed while the nut 21 is arranged at the rear side of the plate 10. Accordingly, the nut may be turned in a clockwise direction to coact with the plate for moving the bar rearwardly and forcing the bushing 27 into place. This done, the bar is then withdrawn and turned end for end upon the plate 10, when the socket 15 thereof is, as shown in Figure 3, engaged with the forward end of the cam shaft while the nut 21 is again arranged at

the rear side of the plate. Accordingly, the nut may be turned to coact with the plate for shifting the cam shaft rearwardly, a new center bushing and a new forward bushing for the shaft having been previously arranged thereon so that the shaft, together with the center and forward bushings, will be moved into place, the rear end of the shaft being received in the new rear bushing 27 previously installed. I accordingly provide a device which may, as will now be clear, be readily operated for withdrawing the cam shaft and bushings therefor and may also be operated for replacing new bushings and replacing the shaft with equal facility while the necessity for removing the engine from the vehicle chassis is eliminated. A marked saving in labor is thus effected and while I have illustrated and described the device as particularly designed for use in connection with Ford engines still, I do not wish to be limited in this regard, since the device will prove equally efficient when employed with other makes of engines when applicable.

Having thus described the invention, what is claimed as new is:

1. A device of the character described including a bracket, an operating bar adjustable thereon, a bushing engaging dog carried by the bar, the bar being provided at the rear of said dog with a stop shoulder, and a spacing sleeve to surround the bar abutting said shoulder.

2. A device of the character described including a bracket, an operating bar adjustable thereon and provided with a reduced extension forming a shoulder at the junction of said extension with the bar, a bushing engaging dog carried by the extension, and a spacing sleeve to surround said extension in the rear of the dog abutting said shoulder.

3. A device of the character described including a body plate, spaced rods secured to said plate and threaded at their forward ends for engagement with an engine, and an operating bar adjustable through said plate but free with respect thereto.

In testimony whereof I affix my signature.

OLIVER M. BROWN. [L. S.]