July 14, 1931. C. H. SWARTZ 1,814,267

CYLINDER SLEEVE AND METHOD OF PRODUCING THE SAME

Filed Sept. 20, 1929

Fig. 1.

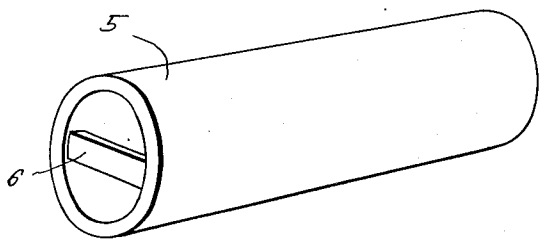


Fig. 2

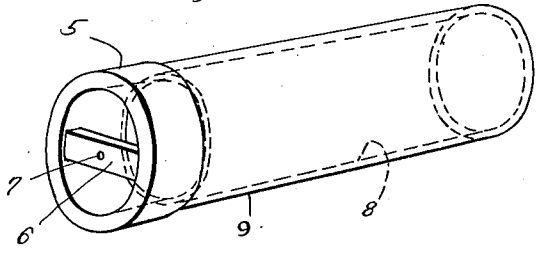


Fig. 3

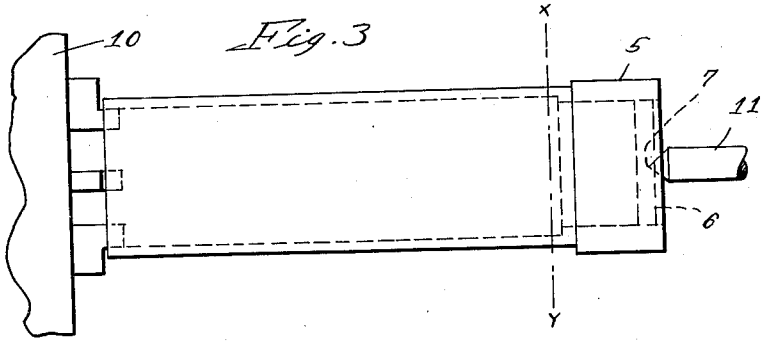
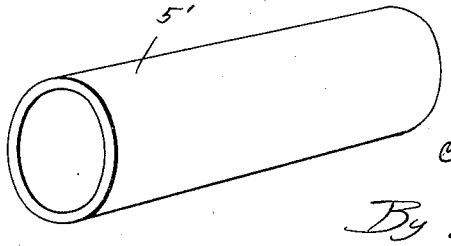


Fig. 4.



Inventor:
Carl H. Swartz
By Wilson & McCanna
Attys.

Patented July 14, 1931 1,814,267

UNITED STATES PATENT OFFICE

CARL H. SWARTZ, OF FREEPORT, ILLINOIS, ASSIGNOR TO STOVER MANUFACTURING & ENGINE CO., OF FREEPORT, ILLINOIS, A CORPORATION OF ILLINOIS

CYLINDER SLEEVE AND METHOD OF PRODUCING THE SAME

Application filed September 20, 1929. Serial No. 393,876.

This invention relates to cylinder sleeves for use in repairing cracked or badly scored engine cylinders, and novel method of producing the same.

In repairing an engine cylinder the practice is to first bore the cylinder about one quarter of an inch larger in diameter. Then, a sleeve is turned down to approximately the diameter of the rebored cylinder allowing .005 of an inch for a press fit in the cylinder bore, the inside of the sleeve being bored only to such an extent that sufficient stock will be left for grinding. In pressing the sleeve into place the cylinder block is first heated to operating temperature and a mixture of litharge and glycerin is spread on the outside of the sleeve to facilitate entry thereof. It has been customary to sell semi-finished sleeves, the outside diameter of which is about five sixteenths of an inch larger than the bore of the cylinder to be repaired and the inner diameter of which is approximately one sixteenth of an inch smaller than said bore, the sleeve being of sufficient length to permit cutting down to the length required. Heretofore these sleeves were cast open at both ends. The manufacturer had no particular difficulty in turning such sleeves down to the semi-finished size; a large lathe and chuck were used in that operation. But the repairman who purchases the sleeve usually has very little equipment and for that reason found it very difficult and inconvenient to chuck such sleeves for the final turning operation; he had to first turn up and insert a plug in one end and then accurately determine and drill a center hole therein, or else it was necessary for him to make up a center to fit the tail stock on the lathe that would be large enough in diameter to fit the inside of the sleeve. In either event it took considerable time and involved too much expense.

It is, therefore, the principal object of my invention to provide as a new article of manufacture a cylinder sleeve having a cross-bar in one end thereof made integral with the sleeve, preferably by casting the same therein. The manufacturer, at the time the sleeve is turned down to the semi-finished size, drills the center hole in the cross-bar while the piece is still centered and this hole is arranged to be used by the repairman later when the sleeve is to be turned down to the final finished size. Thus, the repairman can use an ordinary engine lathe with the usual chuck for the turning operation. The sleeve is procured ready to be mounted in the lathe. There is no necessity for the workman in the garage or repair shop having to turn up a plug to the desired size or look about to find a suitable plug, drive the plug into place and after the turning operation drive the plug out again; the use of plugs and the time consuming operations attendant on their use is avoided. Moreover, there is never any danger of the work running out of true by reason of the plug happening to work loose in the end of the sleeve, as was otherwise the case; the cross-bar is integral with the sleeve and affords a positive centering means. Furthermore, the cross-bar can be used as a place for engagement of a driver pin on the head stock if the sleeve is mounted that way, which, of course, was out of the question where a plug was used. The fact that the sleeve has to be cut down to the desired length anyway after the same is turned down to the exact size desired makes it unnecessary for any extra work being done to remove the cross-bar; that end of the sleeve where the cross-bar is provided can be cut off when the sleeve is cut down to the desired length.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a view of the rough casting showing the cross-bar cast in one end thereof;

Fig. 2 is a similar view showing the semi-finished sleeve as it is sold to the repairman;

Fig. 3 is a view showing one way the sleeve of Fig. 2 can be mounted in a lathe by the repairman for the final machining thereof, and

Fig. 4 is a view of the finished sleeve ready for entry in the cylinder.

The same reference numerals are applied to corresponding parts throughout the views.

In the production of a cylinder sleeve a hollow cylindrical casting 5 is produced with a fairly heavy cross-bar web, or lug 6 cast in one end thereof extending diametrically as

shown. The rough casting then has a center hole 7 located and drilled in the cross-bar 6, as indicated in Fig. 2. The inside of the sleeve is bored, as indicated at 8, absolutely concentric with the center hole 7, and the outside thereof is turned down, as indicated at 9, likewise absolutely concentric with the center hole 7, as by mounting the casting in a lathe with the open end thereof chucked on the head stock and the other end received on the tail stock center. The outside diameter of the semi-finished sleeve is preferably made about five sixteenths of an inch larger than the bore of the cylinder to be repaired, while the inside diameter is made about one sixteenth of an inch smaller than said bore. The sleeve is long enough to permit cutting down to the length desired. Notice that the boring at 8 and the turning at 9 is done from the open end of the sleeve casting toward the barred end; this is with the idea that the barred end may subsequently be cut off when the sleeve is cut down to the length desired.

The repairman buys the sleeve in the form shown in Fig. 2, that is, in the semi-finished form. His first job in repairing a cracked or badly scored cylinder is to bore the cylinder to approximately one quarter of an inch larger in diameter, which makes it almost large enough to accommodate the sleeve, which, as stated before, is usually about five sixteenths of an inch larger in diameter than the bore of the cylinder to be repaired. The sleeve is then mounted on a lathe either between a chuck 10 on the head stock and a center 11 on the tail stock, or between a center on the head stock and a cone on the tail stock, which permits a driver pin to be used engaging the cross-bar, and is turned down to an outside diameter of approximately the size of the rebored cylinder, about .005 of an inch being allowed for a press fit. The inside is bored only to such an extent that sufficient stock will be left for grinding. Then, the sleeve is cut off to the length desired, as indicated by the dot and dash line x—y in Fig. 3, thereby producing the finished sleeve 5′ shown in Fig. 4 which is ready to be pressed into the cylinder. In pressing the sleeve into place the practice is to first heat the cylinder block to operating temperature whereupon the sleeve may be entered without much trouble, especially if a mixture of litharge and glycerin are spread on the outside thereof. After the sleeve is in place the bore thereof, which is now the bore of the cylinder, can be ground to size.

It is believed the foregoing description makes it perfectly clear that a cylinder sleeve made in accordance with my invention obviates several time consuming operations otherwise necessitated and means a great saving in expense. The repairman gets the semi-finished sleeve ready to put in the lathe and does not have to lose time in making it ready as was otherwise the case.

The invention is covered in the appended claims in such a way as to embrace all legitimate modifications and adaptations, such as will undoubtedly occur to others skilled in this art, as a result of my disclosure.

I claim:

1. A new article of manufacture comprising an over-size cylinder sleeve adapted to be eventually turned down to the proper size for a press fit in a cylinder bore, said sleeve being open at one end thereof and having a web in the other end thereof provided with a center hole.

2. A new article of manufacture comprising a cylinder sleeve adapted when turned down to the proper outside diameter to have a press fit in a cylinder bore, said sleeve being open at one end thereof and having a web in the other end thereof provided with a center hole, and said sleeve being furthermore of sufficient length to permit cutting off the webbed end thereof when cutting the sleeve down to the length desired.

3. A new article of manufacture comprising a cylinder sleeve adapted when turned down to the proper outside diameter to have a press fit in a cylinder bore, said sleeve having a lug cast integral therewith extending crosswise of the center of at least one end thereof and having the location of the center indicated thereon.

4. A new article of manufacture comprising a cylinder sleeve adapted when turned down to the proper outside diameter to have a press fit in a cylinder bore, said sleeve having a part permanently mounted in a waste portion of the sleeve in at least one end thereof and provided with a center hole, the said portion being arranged to be cut off when the sleeve is to be inserted in the cylinder.

5. A new article of manufacture comprising a cylinder sleeve in the form of a hollow cylindrical casting having a lug cast integral with one end thereof and extending substantially radially therein and having a center hole provided therein.

6. A new article of manufacture comprising a cylinder sleeve in the form of a hollow cylindrical casting having one end thereof left open and having a cross-bar cast integral therewith extending substantially diametrically of the other end thereof, the said cross-bar having a center hole provided therein.

7. The method of producing a cylinder sleeve comprising the following steps: first, forming a hollow cylindrical sleeve member by casting, with a cross-bar cast in one end thereof; and second, holding the sleeve member centered and machining the same from the open end to a predetermined outside diameter and a predetermined bore and, while the same is centered, drilling a center hole in the cross-bar.

8. The method of producing a cylinder

sleeve comprising the following steps: first, forming a hollow cylindrical sleeve member by casting, with a cross-bar cast in one end thereof; second, holding the sleeve member centered and machining the same a portion of the length thereof from the open end to a predetermined inside and outside diameter and, while the same is centered, drilling a center hole in the cross-bar for a subsequent turning operation that has to be performed on the sleeve, and, finally, cutting the sleeve down to a desired length and thereby removing the barred end.

In witness of the foregoing I affix my signature.

CARL H. SWARTZ.