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ADJUSTABLE AXLE SHAFT SPACER BLOCKS

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Fig. 1

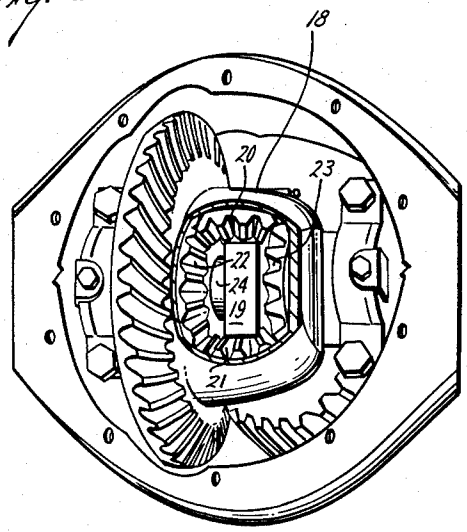
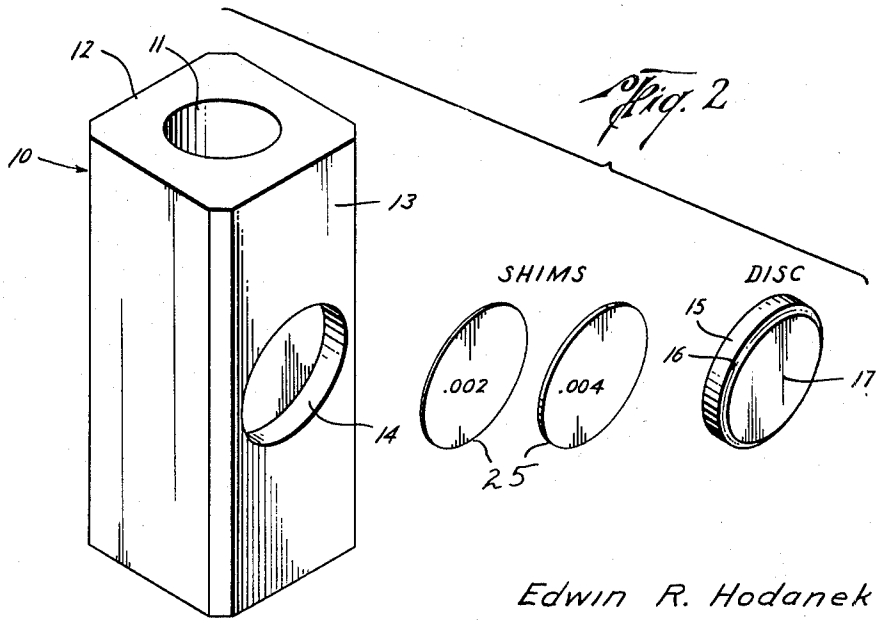


Fig. 2



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ADJUSTABLE AXLE SHAFT SPACER BLOCKS

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4 Claims. (Cl. 74—713)

This invention relates to final drives for automobiles, and more particularly to spacer blocks to be used in such final drives to space opposed axles apart.

For a number of years, some makes of automobiles have employed a spacer between the axles in the final drive of the automobile. As these automobiles grow older, the final drive end of the axles wear. As the weight of the vehicle is shifted from side to side during driving, a troublesome klunk or knock occurs.

In the past, there have been available oversize replacement blocks to replace the original block when this wear occurs. These oversize blocks have been available in only three sizes and frequently have not been the proper size to completely eliminate play between the axles. Thus, it has been possible to reduce the klunk in some cases, but not to completely eliminate it in all cases.

It is an object of this invention to provide a single spacer block which will eliminate all axle play in the final drive of an automobile employing a spacer block regardless of the amount of wear of the final drive ends of the axles.

Another object is to provide a spacer block for final drives employing spacer blocks between axles in which only a single spacer block need be stocked by parts houses, thus reducing inventory of these blocks to one-third of that previously necessary.

Another object is to provide a spacer block for final drives of the type employing spacer blocks between axles which may be incorporated as original equipment in the final drive and which can be adjusted from time to time to eliminate play between the axles as wear occurs.

Other objects, features and advantages of the invention will be apparent from the specification, the drawing and the claims.

In the drawing wherein there is shown by way of illustration a preferred embodiment of this invention and wherein like reference numerals indicate like parts:

Fig. 1 is a view through the coverplate opening of a conventional type of differential employing the spacer block of this invention; and

Fig. 2 is a schematic exploded view of the adjustable spacer block of this invention.

Referring first to Fig. 2, the spacer block indicated generally at **10** is of generally elongate rectangular shape. All dimensions of the block conform generally to the block which is original equipment in the final drives for which this block is a replacement.

In final drives such as the one illustrated in the drawing, the block is mounted on the shaft means for the pinions of the final drive. For this purpose, a bore **11** extends lengthwise through the block and is dimensioned as in original equipment to receive the pinion shaft means and mount the spacer block **10** on the pinion shaft means.

The block **10** has opposed sides **12** and **13** which extend parallel to each other and when the block is assembled in the final drive, confront respectively the final drive ends of the axles driven by the final drive.

In one of said faces, adjustable means are provided

for increasing the effective width of the block and thereby taking up any play between axles caused by wear. In order to provide this adjustable means, the side wall **13** of block **10** is provided with a recess **14** which is preferably milled with straight side walls and a flat bottom. The recess **14** is positioned to underlie one of the axles of the final drive.

A disc **15** is provided whose diameter is substantially equal to the diameter of recess **14** to provide a snug fit when the disc **15** is positioned within the recess **14**. A plurality of shims **25** of stepped thickness are provided. These shims are of slightly smaller diameter than the diameter of recess **14** so as to be easily positioned therein. The shims of course are used to shim up the disc and extend it outwardly from the block **10** so that the effective width of the block **10** at the level where it is in abutment with the ends of the axles is increased. These shims are preferably provided in stepped thickness so as to permit their use singularly or in combination to provide the desired spacing of the disc from the bottom of the recess **14**. By way of example, these shims may be in thickness of .002", .003", .004", .008", and .016". These five shims may be combined in proper combinations to give an oversize block from .002" to .033" in steps of .001".

To provide for ease of insertion of the spacer block between the ends of the axles, the outer face of the disc is beveled at its periphery to provide a wedge surface **16**. Preferably, the diameter of the recess **14** is such that the disc **15** is of a size to permit this bevel **16** and leave an abutment surface **17** of at least equal diameter to the butt end of the axles. As both the side wall **12** of the spacer block and the surface **17** of the disc are wear surfaces, these parts should be fabricated of hardened steel to resist wear.

When a vehicle employing a final drive of the spacer block type develops an objectionable klunk, the coverplate (not shown) is first removed from the rear of the final drive exposing the final drive as postured in Fig. 1. With the wheels of the vehicle off the ground so that the axles may move longitudinally with freedom, the play between the axles and block is measured using a conventional feeler gauge. This measurement determines the total thickness of shims to be placed in the recess **14** behind the steel disc. The pinion shaft (not shown) is then removed from the subhousing **18** to release the spacer block **19** which, as shown, is positioned between the two spaced pinion gears **20** and **21**. Removal of this pinion shaft permits the withdrawing of the spacer **19**. If the final drive was equipped with the spacer block of this invention as original equipment, then the disc **15** may be removed and the desired thickness of shims inserted in recess **14** to build up the disc and provide an oversized spacer which will take-up the wear between the opposed axles (one of which is shown at **24**) which carry the pinion driven gears **22** and **23**.

If a spacer of the type which has previously been conventional equipment, that is, without the feature of this invention is found in the final drive, then it will be discarded and a spacer as taught by this invention substituted in its stead. In this case, a slightly different measuring step is necessary as wear will have occurred on both the ends of the axles and the side walls of the original equipment spacer. In this case, one end of the replacement spacer, that is, endwise of the spacer block from the milled recess is introduced between the ends of the axles. A feeler gauge is employed to determine the play between the block and axles and the amount of this play is the thickness of the shims which need be placed behind the disc to take-up all play between the axles. After this measurement has been made, the necessary combination of shims is placed in the recess and the disc inserted into the recess. The new spacer block is then inserted into

position between the ends of the axles and between the bevel gears **20** and **21**. The final drive may then be completed, re-assembled and all axle klunk will be found to have been removed.

From the above it will be seen that the objects of this invention have been accomplished. There has been provided a spacer block which may be provided as original equipment or which may be used as a replacement part, the width of which is adjustable to take-up play between axles of a final drive. If the block is incorporated as original equipment, then replacement blocks will seldom be needed and it will only be necessary for repairmen to purchase shims when it is desired to remove axle klunk. For cars presently in service, the one spacer block of this invention takes the place of the three different sizes normally stocked by parts houses and thus substantially reduces their inventory. The spacer block also provides for selected widths of spacer blocks in steps of .001" and therefore all objectionable klunk can be removed from a final drive.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. In an automobile final drive having spaced pinions in a subhousing, said pinions driving opposed and spaced gears carried by the axles to be rotated by the final drive, a spacer block separate from and carried by the subhousing between the pinions and between the axles and providing a spacer for spacing the ends of said axles apart, said block having a pair of opposite side walls spaced apart approximately the distance between said axle-ends when such axle-ends are in positions most remote from each other, and having a recess in one of said side walls

in a position to directly oppose the end of one of said axles when said block is in place in said subhousing, and a bearing disc having a thickness dimension approximately equal the depth of the recess snugly fitting in the recess.

2. The final drive set forth in claim 1 in combination with shim means in the recess and behind the disc spacing the disc from the bottom of the recess by an amount substantially equal to the total endwise play of said axles with said block and disc in place between them without the shim means.

3. An axle-end spacing device for use in an automobile final drive of the type having spaced pinions in a subhousing, with said spaced pinions driving opposed and spaced gears carried by the axles to be rotated by the final drive, said device comprising a spacer block separate from and adapted to be carried by the subhousing between the pinions and between the adjacent ends of the axles and providing a spacer for spacing the ends of said axles apart, said block having a pair of opposite side walls spaced apart approximately the distance desired to be maintained between the said axle-ends and having a recess in one of said side walls in a position to directly oppose the end of one of said axles when said block is in place in said subhousing, and a bearing disc having a thickness dimension approximately equal to the depth of the recess snugly fitting in the recess.

4. An axle-end spacing device in accordance with claim 3 in combination with shim means in the recess and behind the disc, spacing the disc from the bottom of the recess to provide for spacing axle-ends apart by the distance between said side walls plus the thickness of said shim means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,315,217	Eason	Sept. 9, 1919
1,513,966	Church	Nov. 4, 1924
1,828,929	Ghiselli	Oct. 27, 1931
1,883,725	Guilmette	Oct. 18, 1932
2,569,533	Morgan	Oct. 2, 1951
2,627,190	Boettcher	Feb. 3, 1953
2,722,140	Cabell	Nov. 1, 1955

FOREIGN PATENTS

276,789	Germany	Feb. 1, 1912