W. S. LITTELL.

CRANK OR CAM SHAFT ALINEMENT INDICATOR AND STRAIGHTENER.

APPLICATION FILED MAR. 19, 1919.

1,308,501.

Patented July 1, 1919.

2 SHEETS—SHEET 1.

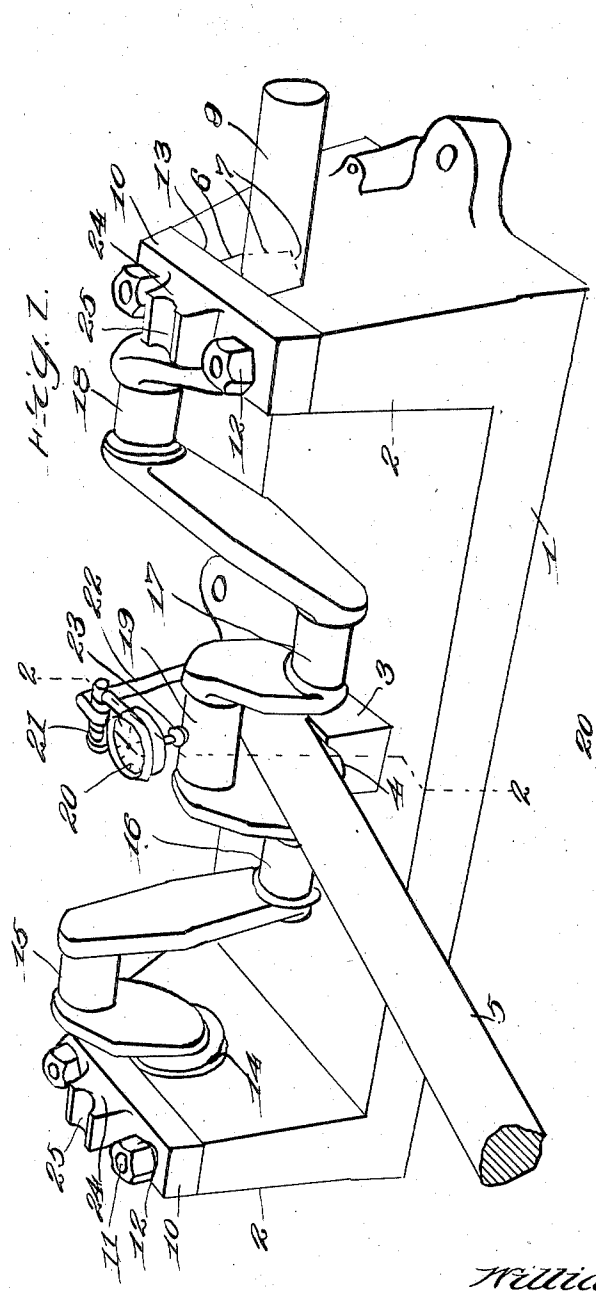


Fig. 1.

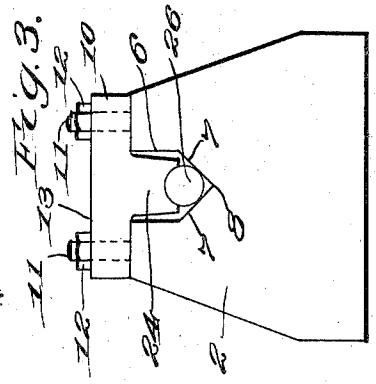


Fig. 3.

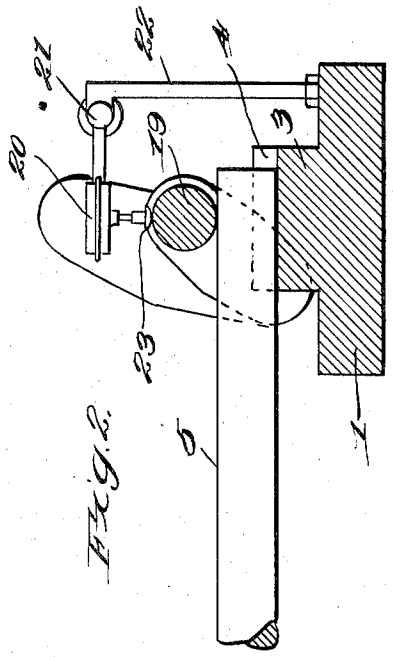


Fig. 2.

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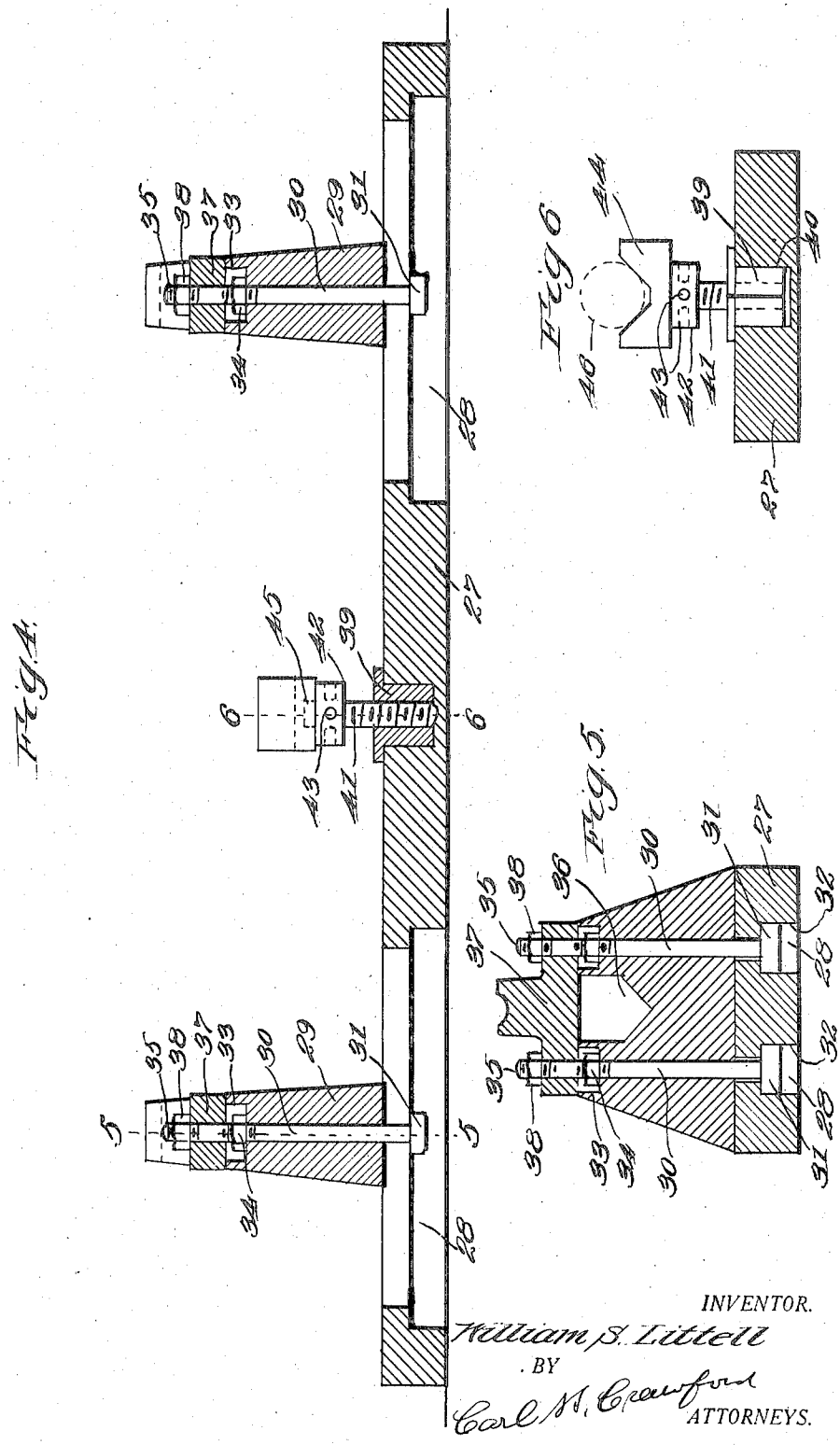
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UNITED STATES PATENT OFFICE.

WILLIAM S. LITTELL, OF SPOKANE, WASHINGTON.

CRANK OR CAM SHAFT ALINEMENT-INDICATOR AND STRAIGHTENER.

1,308,501. Specification of Letters Patent. Patented July 1, 1919.

Application filed March 19, 1919. Serial No. 283,655.

To all whom it may concern:

Be it known that I, WILLIAM S. LITTELL, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented new and useful Improvements in Crank or Cam Shaft Alinement-Indicators and Straighteners, of which the following is a specification.

The object of this invention is to provide a device for facilitating the detection of dis-alinement in a crank or cam shaft and correcting the same.

One of the objects of this invention is to provide, in a unitary structure, bearing blocks for peripheral engagement with the end journals of a crank or cam shaft to hold the same for rotation about a fixed axis so that the dis-alining detecting means may be readily applied to the central journal or journals of the shaft. My invention also includes means adapted for application, preferably, subjacent to the central journal or journals for stressing or straightening the shaft into alinement.

A further feature of my invention is to provide the bearing blocks with convertible means readily adjustable for either engaging the larger journals of a crank shaft or the smaller journals of a cam shaft whereby either type of shaft may be readily fitted and applied to my device.

My invention also includes blocks which are, or one at least is, adjustable, whereby shafts of different lengths may be accommodated. In this connection, this feature of my invention includes, in connection with my novel convertible caps, an improved means for anchoring the block or blocks in its or their adjusted positions, this same means also functioning to hold the convertible caps in either of their positions of utility.

My invention has other objects and features which will be more fully described in connection with the accompanying drawings and which will be more particularly pointed out in and by the appended claims.

In the drawings:—

Figure 1 is a perspective view of one form of my invention in which the bearing blocks are integral with the base of the structure, this form illustrating the manner in which a crank shaft is disposed in position to be straightened.

Fig. 2 is a vertical sectional view substantially on line 2—2 of Fig. 1.

Fig. 3 is an end view showing the manner in which one of the caps is inverted to hold a cam shaft.

Fig. 4 is a longitudinal vertical sectional view of that form of the structure wherein the blocks are adjustable on the base.

Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Fig. 6 is a sectional view on line 6—6 of Fig. 4.

Like characters of reference designate similar parts throughout the different figures of the drawings.

In Figs. 1 to 3 I have shown my device designed for use in connection with crank shafts and cam shafts of a Ford or like small car, and this form will first be described. As illustrated, 1 designates a base from the ends of which project upright bearing blocks 2, the blocks being integral with the base. Midway between the blocks 2, the base 1 is provided with a fulcrum block 3 which is suitably grooved at 4 to receive a prying instrument such as a cylindrical rod 5. In each bearing block 2 there is a recess 6, the walls of which are parallel, and which are spaced apart sufficiently to receive the relatively large diameter journal of the crank shaft. The bottom walls 7 converge to an apex 8 and the journal 9 seats on said converging walls 7. Each block 2 is provided with a cap 10, threaded studs 11 extending through the caps as shown in Fig. 3. Nuts 12 serve to hold the caps in position. One wall 13 of each cap is flat and when the cap is in the adjustment shown in Fig. 1, the parts are so proportioned that the flat wall 13 will engage the top of the journal 9 and hold the latter down against the converging walls 7. This insures correct positioning of the journal 9 in the blocks 2. The blocks 2 are spaced apart so that the flanges 14 will engage the inner faces of the blocks 2 and hold the crank shaft against endwise displacement. As illustrated, the crank shaft has the usual offset crank journals 15, 16, 17 and 18, and is provided with a centrally disposed bearing journal 19 which is intended to be in accurate alined relation with the end journals 9. However, some crank shafts are initially out of true alinement when manufactured, and sometimes a crank shaft will get

out of alinement after long use. The correction of dis-alinement has heretofore involved a great deal of cost and much uncertainty. An alinement indicator 20 of any well-known type, is adjustably mounted at 21 on an upright rod 22, and its indicating foot 23 is adapted for engagement with an upper peripheral portion of the central bearing journal 19. Thus as the shaft is slowly revolved, the instrument 20 will indicate at what point the shaft is out of alinement. The rod 5 can then be employed to strain or stress the shaft back into alinement. The entire operation involves only a short amount of time and correction can be made with the utmost accuracy.

The device of my invention has a convertible feature which enables it to be used either in correcting a crank shaft or a cam shaft, and I will now describe this feature in detail with reference to Figs. 1 and 3.

It will be seen that the cap 10 has a projecting portion 24, designed to extend into the recesses in the blocks 2, as shown in Fig. 3. The projection 24 has a recess 25 adapted to engage the relatively small journal 26, of a cam shaft. It will thus be seen that when a cam shaft is to be straightened, the caps 10 will be inverted from the position shown in Fig. 1, to the position shown in Fig. 3. The parts are so proportioned that when the nuts 12 are turned home, the cam shaft journal 26 will be accurately centered in the block 2. Thus it will be seen that the parts are so arranged that mere inversion of the caps 10 will accurately function with two characters of shafts. The operation of correcting or straightening a cam shaft will be in all respects similar to that described in connection with the crank shaft.

The device of my invention is adapted for use in connection with all types and sizes of crank and cam shafts, and for the larger and longer types, the form shown in Figs. 4 to 6 is particularly advantageous.

As illustrated, the base 27 is provided with two sets of T-shaped grooves 28 extending longitudinally of the base in opposing disposition with respect to the longitudinal center thereof. Blocks 29 have flat lower faces adapted to rest upon said base and each block has a pair of bolts 30. The heads 31 of said bolts snugly seat against the shoulders of the slots 28 and are held against rotation by the walls 32 thereof. Said bolts extend upwardly through the blocks and the latter are provided with sockets 33 which depend from their upper faces. Nuts 34 are threaded on said bolts 30 and when they are turned home, they will lock the blocks 29 firmly in their adjusted positions on the base 27. The upper ends 35, of said bolts, are therefore entirely free when the blocks 29 are anchored. Each block 29 has a recess 36, in all respects similar to the recess described in connection with the form shown in Fig. 3, both as regards configuration and operation, therefore it will not be necessary to describe this in detail, again, in connection with this figure.

Each block 29 has a cap 37 which likewise is in all respects similar to cap 10. The novel feature of this form however resides in the fact that the caps 37 may be adjusted into either positions of inversion without in any way affecting the anchorage of blocks 29. Thus if it is desired to invert cap 37 from the position shown in Fig. 5, for a crank shaft, to the position shown in Fig. 3, for a cam shaft, it will merely be necessary to loosen nuts 38 and re-apply them after the cap 37 has been inverted in the desired manner, the bolt 30 functioning in the dual capacity as holding means for both the blocks and the caps.

In place of the integral fulcrum block 3, and the rod 5, this form of my invention is provided with jackscrew means for engagement with the central bearing journal of the crank shaft to stress or strain the latter, or a cam shaft, into alined condition.

As illustrated, a polygonal nut 39 is seated in a suitable socket 40, in the base 27, to fit non-rotatively therein. The threaded bore of the nut 39 is adapted to receive jackscrew 41, the upper end of which is provided with a head 42. The head 42 is equipped with a series of holes 43 into which a rod may be inserted to turn the jack screw. A V-shaped shaft-engaging cap 44 is rotatively socketed on the upper end 45, of the jack-screw, and is adapted for direct engagement with the central bearing journal of a crank or cam shaft 46, as shown in Fig. 6. Thus as the head 42 is turned in the proper direction, the shaft will be stressed into alined relation. The same indicating means shown in Fig. 1, will be employed in this form of the invention.

It is believed that the operation of both forms will be clear from the foregoing description, without recapitulation, and while I have herein shown and described specific forms of my invention, I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:

1. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having end blocks for rotatively holding the end journals of the shaft, alinement indicating means for peripherally engaging the central journal of the shaft to indicate dis-alinement as the shaft is rotated, and means for engagement with said central journal to stress or straighten the shaft into an alined condition.

2. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having end blocks for rota-

tively holding the end journals of the shaft, alinement indicating means for peripherally engaging the central journal of the shaft to indicate dis-alinement as the shaft is rotated, and means adjustably mounted on said base for engagement with the central journal to stress or straighten the shaft into an alined condition.

3. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having upright end blocks for rotatively holding the end journals of the shaft, alinement indicating means mounted on said base for peripherally engaging the central journal of the shaft at an upper peripheral portion thereof to indicate dis-alinement as the shaft is rotated, and mechanism sub-jacent the central journal to stress and straighten the shaft into alinement.

4. As a means of detecting dis-alinement in a crank or cam shaft, a base having end bearing blocks peripherally engaging the end journals of the shaft to rotatively hold the same, and alinement indicating means mounted on said base for peripherally engaging the central journal of the shaft to indicate dis-alinement as the shaft is rotated.

5. As a means of detecting dis-alinement in a crank or cam shaft, a base having end bearing blocks provided with converging recesses for peripherally engaging and supporting the relatively large end journals of a crank shaft, caps for holding the crank shaft journals in position in said recesses, said caps having relatively small recesses for engagement with a cam shaft and being adapted to be inverted to hold a cam shaft against said converging recesses, and means for engagement with the central journal of the shaft to indicate dis-alinement.

6. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having end blocks for rotatively holding the end journals of the shaft, one of said blocks being adjustable on said base for accommodating shafts of different lengths, means for engaging the central journal to indicate dis-alinement, and means for applying stress to the central journal to restore the shaft to alinement.

7. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having means for subjacently engaging the central journal of the shaft to straighten the same, means for engagement with the central journal to detect dis-alinement, and end bearing blocks for holding the end journals of the shaft, said blocks being adjustable on said base to accommodate shafts of different lengths.

8. As a means of detecting dis-alinement in a crank or cam shaft and straightening the same, a base having means for sub-jacently engaging the central journal of the shaft to straighten the same, means for engagement with the central journal to detect dis-alinement, end bearing blocks having converging recesses for receiving either the relatively large end journals of crank shafts or the relatively small end journals of cam shafts, caps having flat bottoms for seating on the tops of said blocks and engaging the journals of the crank shafts and the tops of said caps having projecting bearings whereby the caps may be inverted to extend said projecting bearings into said recesses for holding the relatively smaller journals of cam shafts, said base being slotted to permit of adjustment of said blocks, bolts extending through said slots and blocks and the blocks having sockets below the planes of their top faces, nuts seated in said sockets and engaging the said bolts to hold the blocks in adjusted positions irrespective of the position of said caps, and nuts engaging said caps and said bolts whereby the caps may be used in either capacity and tightened without affecting anchorage of said blocks.

In testimony that I claim the foregoing as my own, I hereby affix my signature.

WILLIAM S. LITTELL.