E. SCOFIELD.

CRANK SHAFT.

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1,399,806. Patented Dec. 13, 1921.

Fig. 1.

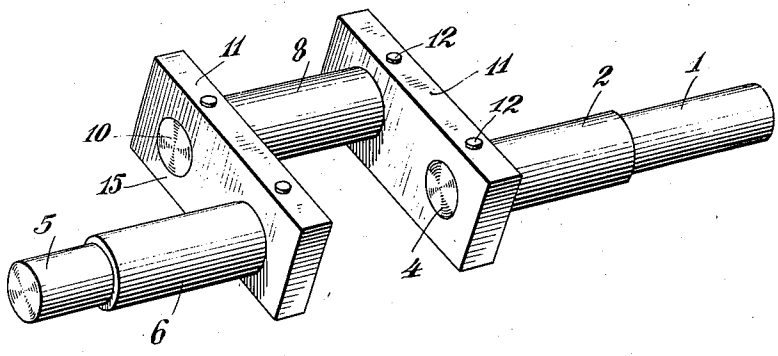
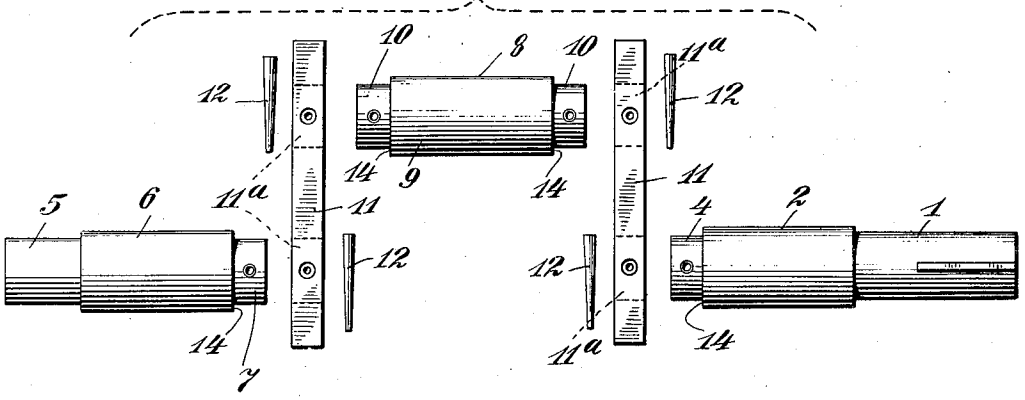


Fig. 2.



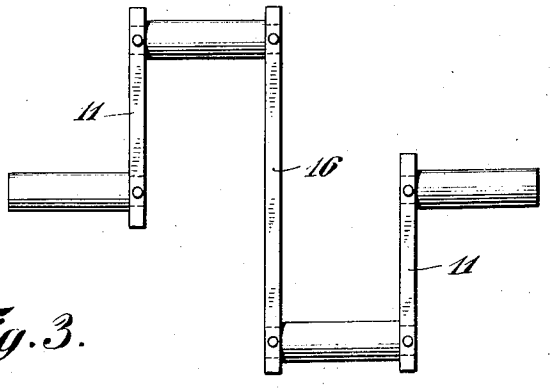


Fig. 3.

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CRANK-SHAFT.

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To all whom it may concern:

Be it known that I, EDGAR SCOFIELD, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Crank-Shafts, of which the following is a specification.

This invention relates to a new construction of machine crank shafts. The invention has for one of its general objects the provision of a crank shaft structure which may be manufactured at very low cost.

A further object is to provide a crank shaft structure by virtue of which the term of utility of the article is considerably lengthened, due to the facility for replacement of worn or broken parts.

Other and further objects of the invention will be obvious to one skilled in the art, or pointed out with particularity hereinafter.

The crank shaft which constitutes my invention is characterized by a built-up construction wherein the several journal and shaft portions, and likewise the crank arms, are formed, and to a more or less degree, finished separately from one another, then assembled in their proper relation to form the crank shaft, and certain parts subjected to such further finishing operations as may be expedient or desirable.

The nature of the improvements constituting my invention will be evident from the following detailed discription.

In the accompanying drawings, which form a part of my application, Figure 1 is a perspective view of a simple crank shaft embodying my invention as formed by my improved method;

Fig. 2 is a composite side view showing the several parts of the crank shaft in position for assembling; and

Fig. 3 is a side view of a double-throw crank shaft embodying my invention and formed by my improved method.

By reference to these drawings, in which like reference characters identify the respective parts throughout, it will be understood that 1 designates a shaft member having a journal portion 2 and a wrist portion 4. The numeral 5 designates a corresponding shaft member formed with a journal portion 6 and a wrist portion 7. The crank pin 8 is formed with the journal portion 9 and terminal wrist portions 10. These members are designed to be connected in assembled relationship by the crank arm members 11, which preferably are identically formed elements of proper dimensions, and having transverse apertures 11ª, which are adapted to receive the wrist portions of the respective shaft and crank pin members. The several parts may be secured in assembled relationship by taper pins of conventional form or other suitable securing means, such as will be effective to retain the wrist portions from turning in the crank arms, yet permit their being detached one from another when desired. Preferably the form and dimensions of the wrist portions and their associated journal portions are such as to provide shoulder portions 14 which, when the parts are assembled, abut the faces 15 of the crank arm members 11, against which faces they are tightly drawn and closely wedged by the pins 12.

Heretofore it has been customary practice to form crank shafts from forgings by machining down the various portions of the forgings to give the shaft journal, crank arm, and crank pin portions the proper dimensions and alinements. Such forgings are customarily formed with considerable excess metal in the respective portions, all of which it is necessary to machine off. This produces a great waste of metal, and necessitates slow, cumbersome, and therefore expensive operations, due to the necessity of handling the entire crank shaft in all of them. In the practice of my improved method the respective parts may be formed from commercial bar material of convenient size, whereby a minimum loss of material is entailed, and rapid and exact machining facilitated.

As the several steps in the process of manufacture, I form and finish to proper dimensions the wrist pin member; form and finish the crank arm member; form the wrist portions of the shaft members; then assemble the shaft, crank arm and wrist pin members; and finally finish the journal portions of the shaft members while said members are maintained in alinement in the assembly.

It is obvious that by the construction of the crank shaft in this fashion I eliminate the necessity for rehandling of the crank shaft, and its remounting in the various different positions and machines, for the accomplishment of the several machining op-

erations of the respective parts. Furthermore, the machining operations of the different parts may be carried on simultaneously in different machines, thus contributing to speed, uniformity, economy, and large production. The essential features of the shaft thus constructed provide for accurate interchangeability of parts, whereby substitutions may be made in the event of breakage, at low cost, and with a saving of the major portion of the crank shaft.

While the foregoing description has been directed to a simple crank shaft, it is obvious that double-throw crank shafts may be similarly constructed to embody the features of the invention hereinafter claimed. Such a crank shaft is illustrated in Fig. 3. in which the crank shaft shown has two crank pins and the composite crank arm member 16.

It is obvious that the invention delineated in the following claim may be embodied in forms other than those specifically shown and described herein for the purpose of illustration.

Having thus described my invention, what I claim is:

A crank shaft comprising shaft members formed with journal portions and wrist portions, a crank pin formed with a journal portion and wrist portions, crank arms provided with apertures in which the wrist portions of the shaft members and crank pin are seated, said shaft members being provided with shoulders disposed to abut associated faces of the crank arms, and securing means adapted to draw said shoulders against said faces, said securing means being removably seated in the crank arms and wrist portions and extending transversely of the latter to retain the parts in assembled relationship.

EDGAR SCOFIELD.