E. A. L. ROBERTS.

Casting Cranks.

No. 209,836. Patented Nov. 12, 1878.

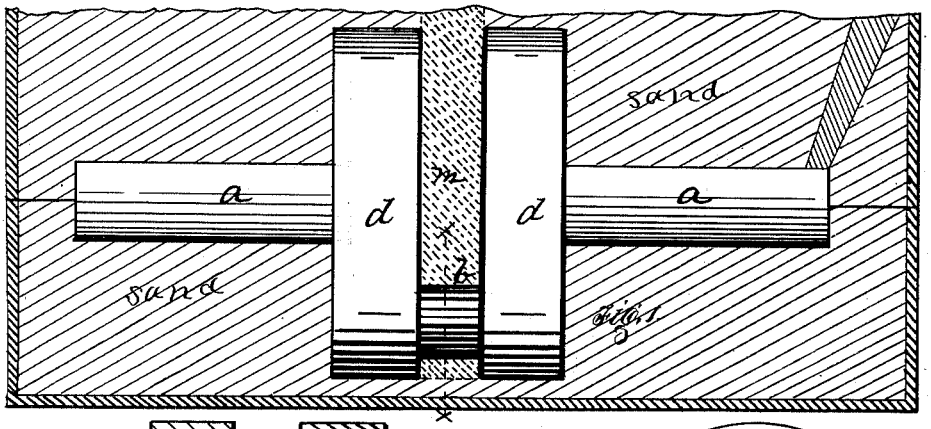

Fig. 1.

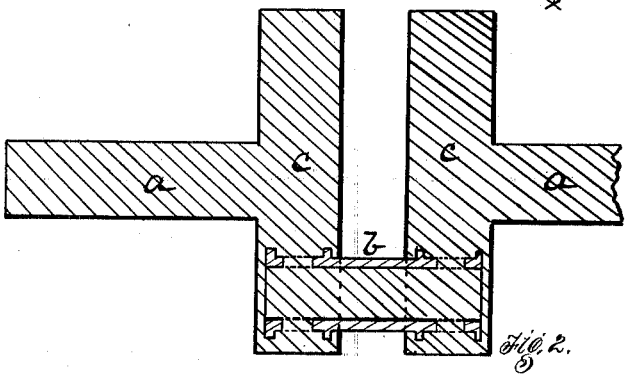

Fig. 2.

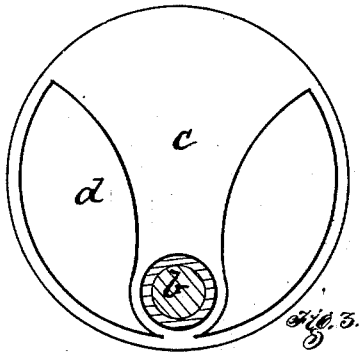

Fig. 3.

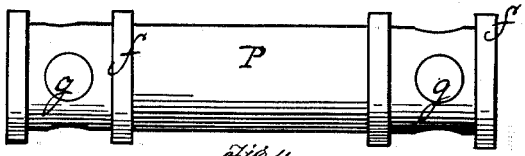

Fig. 4.

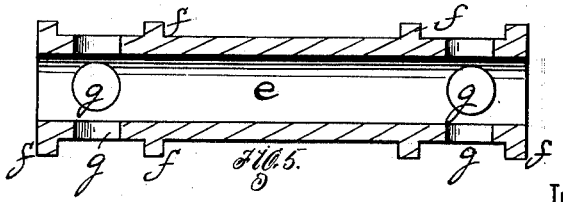

Fig. 5.

WITNESSES

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EDWARD A. L. ROBERTS, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN CASTING CRANKS.

Specification forming part of Letters Patent No. **209,836,** dated November 12, 1878; application filed October 11, 1878.

To all whom it may concern:

Be it known that I, EDWARD A. L. ROBERTS, of Titusville, in the county of Crawford and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Cranks; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is an elevation of a pattern for a crank embodying my invention, and sectional view of a flask and mold. Fig. 2 is a longitudinal central section of a cast crank. Fig. 3 is a transverse section on the line of one end of pattern and pin. Fig. 4 is an elevation of the crank-pin re-enforce. Fig. 5 is a longitudinal section of the same.

My invention relates to the manufacture of cranks for engines and all classes of machinery, especially where large and strong cranks are required.

Heretofore it has been customary to manufacture cranks either by forging, which is expensive and laborious, or by casting the same of cast-steel, which is also expensive, and uncertain in its results, owing to the difficulty of getting perfect cast-steel castings; and in such castings a solid rod has been inserted in the mold at the position of the crank-pin and incorporated with the casting; but the cast metal of the pin is not protected thereby, nor is a good wearing-surface obtained on the crank-pin.

The object of the present invention is to properly re-enforce the crank-pin, so that cheap, strong, and durable cast-iron cranks may be readily produced.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawing, *a* indicates the shaft of the pattern and casting; *b*, the crank-pin of pattern, and *c* the arms or completed crank counterbalances. The form I prefer is that shown, the counter-balances *c* being parts of two disks or wheels, *d*, which act somewhat as fly-wheels; but the form is not essential to the manner of producing, and any preferred or desired form may be chosen to meet the requirements of the case or the fancy of the constructer.

P, Figs. 4 and 5, shows one form given to the metallic re-enforce for the crank-pin, which is the essential feature of this invention. This crank-pin re-enforce should be hollow, as at *e*, and is preferably provided with flanges *f* and holes or perforations *g*, so that in casting the cast metal will become incorporated with the re-enforce.

The crank will be, by preference, cast in the position shown in Fig. 1, the space in the mold indicated by *m* being filled with a divided disk-core adapted to inclose the crank-pin re-enforce P, and support the same in its position in the mold, the communication between the two parts of the mold being through *e* of the hollow pin P.

The crank-pin P or re-enforce being in position in the mold with the core, the molten metal is preferably cast from one end of the shaft, and sufficient metal run through the mold, and, of course, through the pin, to insure a perfect union of the pin P with the casting.

When completed the pin or re-enforce will be held by the cast metal, and frequently, if not always, will be thoroughly united or fused thereto. The tube or sleeve P, inclosing the cast metal of the crank-pin, will not only strengthen the same to resist shocks or torsion, but will at the same time afford a superior bearing-surface.

The metal of which the pin P is formed is preferably steel, though brass, wrought-iron, and other suitable metals may be used. Cross-head pins and various other steel fixtures or pins can be combined with cast-iron castings in like manner.

I am aware that a skeleton-wheel has been employed to re-enforce cast-metal car-wheels, and also that a solid metal rod or re-enforce has been cast into a crank, and do not claim such subject-matter; but,

Having thus described the nature and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. An improvement in the process of manufacturing a crank-axle, consisting in plac-

ing a tubular perforated re-enforce in a mold properly constructed and casting the crank-shaft within and through it, so as to become incorporated therewith and form a bearing-surface thereon, substantially as and for the purpose specified.

2. A crank having a hollow crank-pin cast into the same, into, through, and around which pin the metal of the casting passes, substantially as and for the purpose specified.

In testimony whereof I, the said EDWARD A. L. ROBERTS, have hereunto set my hand.

EDWARD A. L. ROBERTS.

Witnesses:

F. W. RITTER, Jr.,

C. H. ROBERTS.