

No. 647,012.

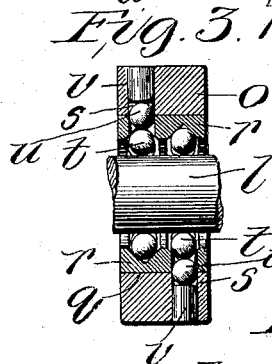
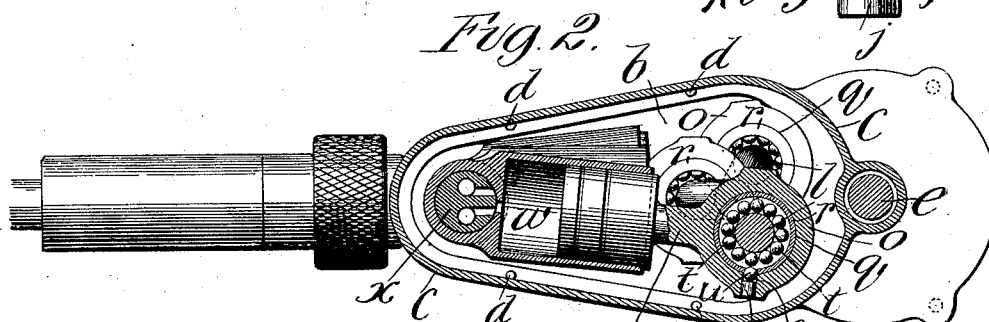
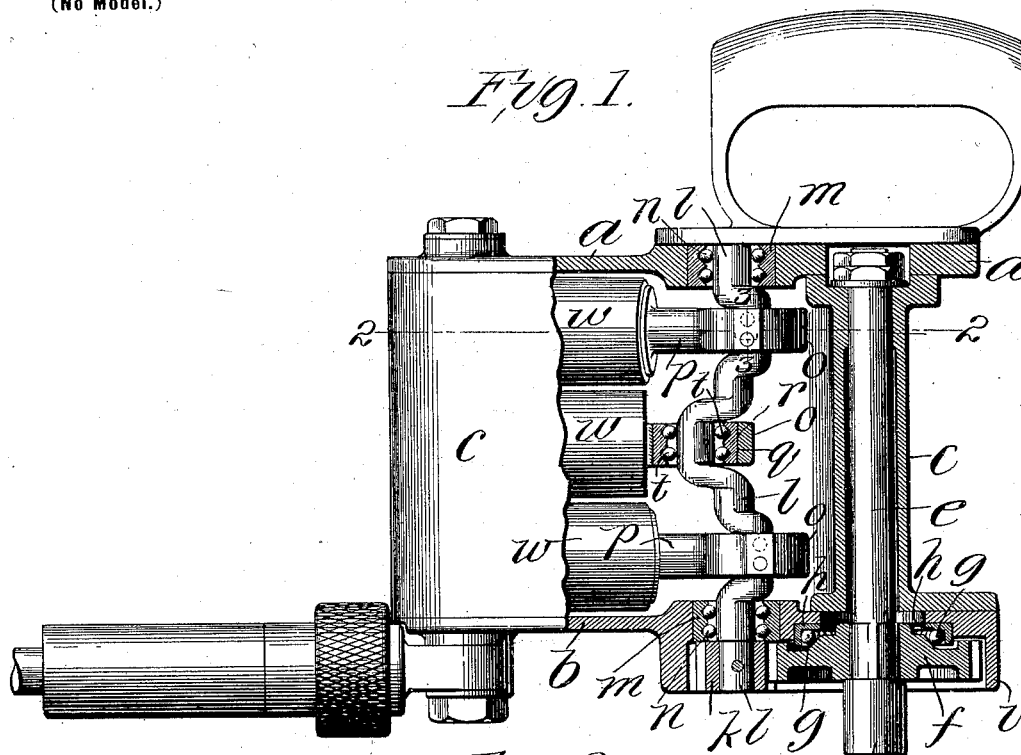
Patented Apr. 10, 1900.

E. C. MEISSNER.

BALL BEARING.

(Application filed Sept. 30, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 647,012, dated April 10, 1900.

Application filed September 30, 1899. Serial No. 732,195. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. MEISSNER, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Ball-Bearings, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view, partly in section, showing my improved ball-bearings in position in a pneumatic drill. Fig. 2 is a sectional view on line 2 2, Fig. 1; and Fig. 3 is a sectional view on line 3 3, Fig. 1.

This invention relates to a new and useful improvement in ball-bearings designed for use in connection with the crank-shaft of a pneumatic drill—such, for instance, as that illustrated in application filed by me May 15, 1899, Serial No. 716,925, which drill is illustrated in the accompanying drawings.

The object of my invention is to provide a ball-bearing for a multiple-throw crank-shaft which is made in one piece, which ball-bearings are formed in part by integral eyes on the ends of the piston-rods.

The invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, *a* indicates the top plate, and *b* the bottom plate, of a suitable casing or housing, between which is arranged the body portion *c* of said housing, to which body portion the top and bottom plates are secured by means of screws or other fastening devices *d*. The forward end of casing *c* is provided with a cored opening, in which is rotatably mounted a shaft *e*, which I will term the "driven" shaft. On the lower end of this shaft is arranged a gear-wheel *f*, said wheel being provided with a conical inner face, against which rest balls *g*, seated in a race *h*. The ball-race *h* is preferably arranged in the bottom plate of the casing, which is suitably formed to receive the same, said bottom plate also having a projecting flange *i*, surrounding the gear-wheel *f* and its meshing pinion.

The lower end of shaft *e* has a clutch, socket, or other suitable device *j* mounted upon it for receiving a bit or drill. (Not shown.) The object and purpose of the ball-bearing for the gear *f* is to provide antifriction devices to take up the end thrust of the shaft *e*, which, as shown, is shouldered against said gear and prevented from independent rotary motion thereon by means of a key, as is usual. The upper end of shaft *e* is threaded and provided with a washer and jam-nuts for the purpose of preventing forward displacement of said shaft.

k indicates a pinion in mesh with the gear *f*, said pinion being pinned to the lower end of a crank-shaft *l*. *m* indicates ball-races introduced into the top and bottom plates *a* and *b*, respectively, said races providing suitable tracks for balls *n*, thus forming ball-bearings for the crank-shaft. Crank-shaft *l* is shown in the drawings as what is known as a "three-throw" crank-shaft; but it is obvious that the number of throws thereof will be determined by the number of pistons cooperating therewith. In the construction shown the cranks in shaft *l* being three in number are arranged at one hundred and twenty degrees relative to each other, and on these cranks are mounted the outer ends of the pistons, which, as shown in Figs. 1 and 2, consist each of a shank *p* and a head *q*, arranged on the outer end of the shank and provided with an eye *q*. This eye *q* receives the ball-race *r*, which in assembling the parts, is slipped over the crank-shaft in the proper position and the eye of the piston introduced thereon, after which said head and ball-race are drilled, as at *s*, for the introduction of the balls *t*. After the ball-race is full one extra ball *u* is introduced to fill the opening *s*, and a plug *v* is inserted in the opening *s* to close the same and hold said extra ball in position. As there are two sets of balls in each ball-race, I prefer to form the openings *s*, leading thereinto, in opposite sides of the eye; but they can be arranged on the same side, if desired.

The purpose of introducing the extra ball *u* in the opening *s* is to form a bearing for the race-balls *t* and to prevent said balls *t* from contacting with the inner edges of the opening

s, in which event the free movement of said balls *t* would be to a certain extent interfered with. The extra ball *u* also acts as a key to lock the ball-race against rotary and lateral movement in its eye or the eye on said ball-race, thus dispensing with any other means of fastenings between these parts.

w indicates the oscillating cylinders, which are formed with eyes or bearings in their rear ends, which bearings are in alinement and strung on a hollow spindle *x*, suitably secured between the top and bottom plates *a* and *b* of the casing. Spindle *x* is formed with suitable inlet and exhaust passages and communicating ports for the admission and exhaust of motive fluid behind the several pistons, and as this forms no part of my present invention I will not describe the same here.

I am aware that minor changes in the arrangement, construction, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. The combination with a crank-shaft having a crank portion, of a separate integral ring ball-race having an opening of sufficient diameter to permit of its being slipped over the crank-shaft onto the said crank portion, an integral part having an eye in which said ball-race is embraced, and balls introduced between said race and crank-shaft, substantially as described.

2. The combination with a crank-shaft having a crank portion, of a separate integral ring ball-race having an opening of sufficient diameter to permit of its being slipped over the crank-shaft onto said crank portion, an integral part having an eye in which said race is embraced, balls between said crank-shaft and race, said part and race having registering openings for the introduction of the balls, and means for holding said race in said eye, substantially as described.

3. The combination of an integral part having an eye, a separate integral ring ball-race in said eye, a crank-shaft passing through said ball-race, balls between said crank-shaft and ball-race, said part and ball-race having reg-

istering openings for the introduction of the balls, an extra ball which is inserted in said registering openings and which locks the ball-race in position in the eye, and a plug in the opening in the part having the eye for retaining said extra ball in position, substantially as described.

4. The combination of an integral part having an eye, a separate integral ring ball-race in said eye, a crank-shaft passing through said race, and balls between said crank-shaft and race, substantially as described.

5. The combination of an integral part having an eye, a separate integral ring ball-race in said eye, a crank-shaft passing through said ball-race, balls between said crank-shaft and said race, said part having a plugged opening to said ball-race, substantially as described.

6. The combination with a ball-race, of an encircling band therearound, said race and band being formed with openings leading into said ball-race, a shaft passing through said ball-race, balls in said race for engaging said shaft, an extra ball which is inserted in said opening to lock said race in position within the encircling band, and a plug which is introduced in said opening; substantially as described.

7. The combination with a shaft, of a ball-race which encircles said shaft, a plurality of balls interposed between said shaft and said ball-race, a support in which said ball-race is mounted, said ball-race and said support being formed with axial alining openings, an extra ball which is introduced into the axial alining openings in the ball-race and its support, and a plug which is introduced into the opening in said race-support for confining said extra ball therein, said plug being driven into said opening sufficiently far to cause the extra ball to remain in such position that it will coöperate with said race-balls and serve as a partial bearing therefor; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 27th day of September, 1899.

EDWARD C. MEISSNER.

Witnesses:

WM. H. SCOTT,
A. S. GRAY.