(No Model.)

C. F. UEBELACKER.

APPARATUS FOR DRESSING TUBULAR BORES.

No. 576,291. Patented Feb. 2, 1897.

Fig. 1.

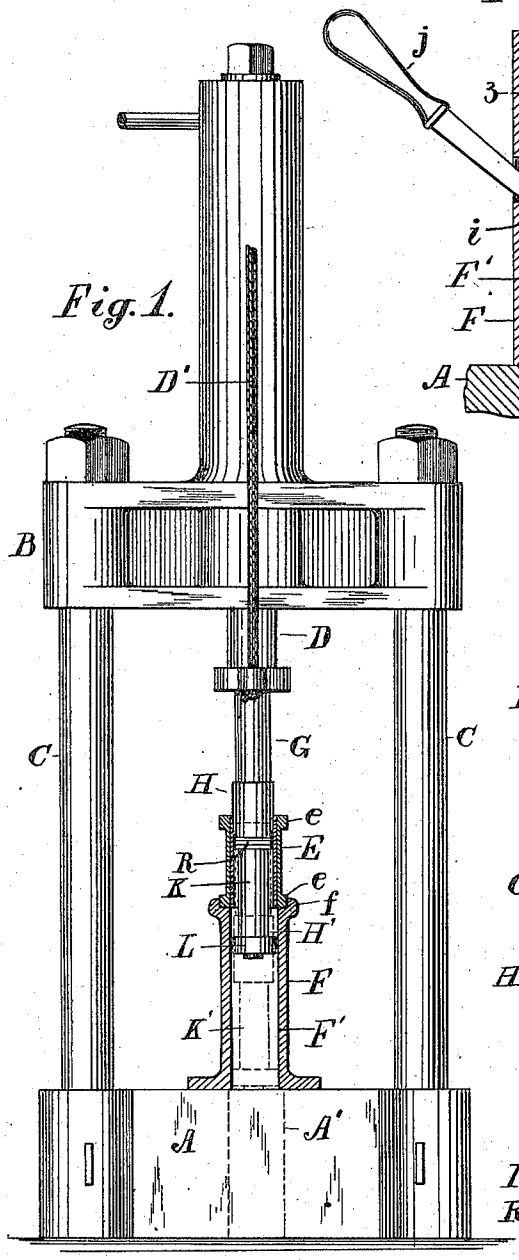


Fig. 2.

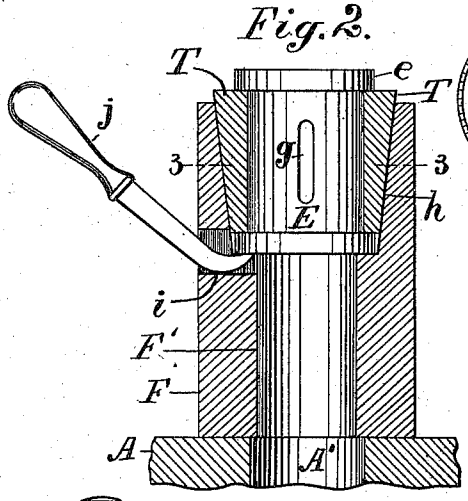


Fig. 4.

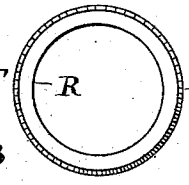


Fig. 3.

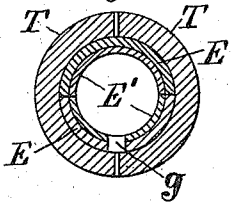


Fig. 5.

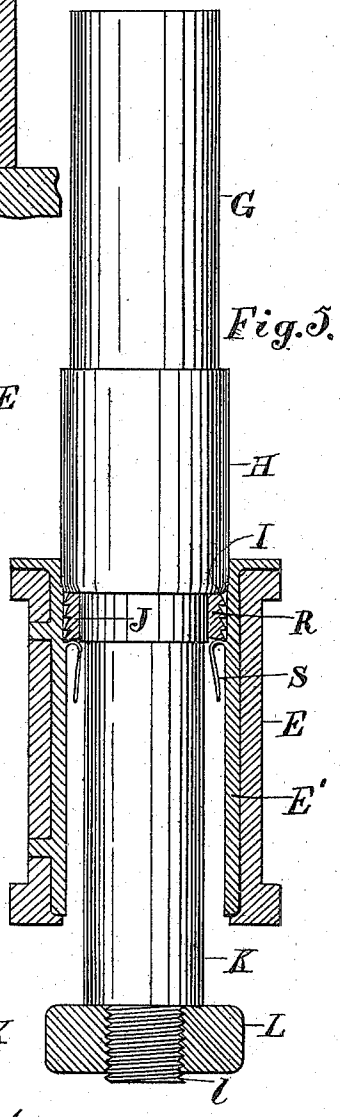
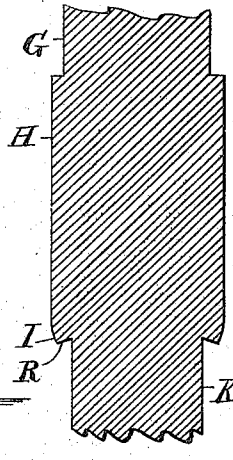


Fig. 6.



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APPARATUS FOR DRESSING TUBULAR BORES.

SPECIFICATION forming part of Letters Patent No. 576,291, dated February 2, 1897.

Application filed October 16, 1896. Serial No. 609,068. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. UEBELACKER, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Apparatus for Dressing Tubular Bores, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish a means of truing out the Babbitt lining of journal-bearings and simultaneously condensing the metal and expanding it into close contact with the shell of the bearing; and the apparatus consists partly of means for centering the bearing and the broach during the dressing operation and partly in a combined broach and drift which is used for broaching and drifting the lining at a single operation.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is an elevation of the apparatus for dressing a bearing with a solid shell. Fig. 2 is a section of the clamp for supporting a bearing with a divided shell during the dressing operation. Fig. 3 is a section of the bearing and conical clamps on line 3 3 in Fig. 2. Fig. 4 is a plan of a broach-ring made separately from the drift-mandrel. Fig. 5 is a view of the broach forced partly through a bearing, certain of the parts being in section at the center line where hatched and the broach formed of rings fitted upon the drift-mandrel; and Fig. 6 shows a portion of the combination-tool where the broach is formed upon the nose of the drift.

In Fig. 1, A designates the bed, B the cap, C the tie-rods, and D the ram, of a hydraulic press adapted to force the combination-tool through a bearing.

E designates a solid bearing provided with Babbitt lining, and F a hollow standard adapted to rest upon the bed A and support the bearing E during the dressing operation. The standard is bored out to form a guide F′ for the drift mandrel or stem. Bearings are represented herein with circular collars *e* at the opposite ends, the collar being centered upon the top of the standard by flange *f*.

The dressing-tool is shown in Fig. 1 with shank G, drift H, broach R, and guide-stem K. To permit the forcing of the drift entirely through the bearing, the bore of the standard F is made larger than the drift, and the front end of the guide-stem is provided with a collar L to fit such bore. In Fig. 1 the broach and a portion of the drift are shown forced by the hydraulic plunger D partially into the upper end of the journal-bearing, and Fig. 5 shows, upon an enlarged scale, the operation of the drift and broach upon the Babbitt lining. The broach is shown in this figure formed of rings R, secured upon a seat J adjacent to the rounded nose I of the drift. The rings are formed with annular beveled cutting edges, and the forcing of such edges through the Babbitt lining E′ trims off a shaving S and smooths and finishes the lining to a certain size. The drift is made from three to five thousandths of an inch larger than the broach, and as it follows directly behind the broach it serves to crowd the Babbitt lining firmly outward against the shell E of the bearing, and thus smooths and condenses the metal, while it forces it into the closest possible contact with the shell. Such expansion of the lining prevents all jar and vibration when the bearing is in use, while the consolidation of the metal increases its durability under wear. The drift also performs another function in finishing a series of bearings positively to a given standard size, as it has a wearing-surface many times greater than that of the broach, and is thus less liable to wear or to departure from the given standard.

In Fig. 5 the broach is shown formed of a ring having four beveled cutting edges, the ring being fitted closely to the seat J by forcing it upon the same, the guide-stem K being a little smaller than the seat to permit the movement of the ring freely over such stem. The broach may be made integral with the drift, but as the broach is much more liable to wear than the drift it is preferable to make it separate, that it may be renewed when worn.

An integral drift and broach is shown in Fig. 6, with the rounded or contracted nose of the drift formed with a sharp undercut corner to form a cutting edge, which thus broaches the bearing in advance of the drift. The broach may be made in several rings, so

that the front ring, which is more liable to wear than the others, may be renewed separately. Where the broach is made in one or more rings to slip over the guide-stem K, the collar L is necessarily made removable and secured upon the end of the stem by screw-thread *l*, as shown in Fig. 5, but where the broach is made integral with the stem or drift such collar may also be made integral for use with split bearings. Where the bearing is divided longitudinally in halves, as is common where the shaft is to be lifted laterally from its bearings, the two halves may be sustained in a suitable clamp during the broaching and drifting operation, the drift especially tending to force the halves strongly apart. Self-acting conical clamps for such purpose are shown in Figs. 2 and 3 for supporting such bearings during the dressing operation, and may also be used with solid shell-bearings which are weakened by a large oil-aperture, as shown at *g* in Fig. 2. Such a solid bearing is shown in Fig. 2, while Fig. 3 shows the shell divided longitudinally. The clamps are bored to fit the body of the shell, and their exterior surface is made conical, and the top of the standard is formed with conical socket *h* to fit the same. When the clamps are applied to the shell and dropped into the socket *h*, they are firmly sustained during the dressing operation and prevented from yielding laterally. To release the clamp and bearing from the socket *h*, a slot *i* is formed in the standard, near the base of the socket, to insert a prying-tool *j* to lift the clamp from the socket. The conical form of the clamps and socket *h* serves to crowd the clamp close to the shell when the broach forces the same directly within the socket. The annular flange *f* upon the standard F and the conical sides of the socket *h* (in the standard shown in Fig. 2) serve as equivalent means for centering the bearings by embracing the circular periphery of the same, and the bearings are thus set truly concentric with the guide F′ inside the standard.

The operation of dressing the bearings with this apparatus is exceedingly simple, as the standard F is set loosely upon the bed A, and the bearing may thus be readily applied to the top of the standard, the tool inserted in the bearing, and the whole moved beneath the ram D, as represented in Fig. 1, to force the tool through the bearing, as indicated by dotted lines H′ and K′ in Fig. 1. The operation is entirely similar to the split bearing with which the standard shown in Fig. 2 is used, the bearing being dropped, with the clamps T, into the socket *h* and the combination-tool then forced through the bearing. The shavings S drop into the bore of the standard, and after the drift has passed through the bearing the bearing may be lifted from the standard and the standard raised to remove the shavings and recover the tool. The bed A is shown with a hole A′ below the ram D, which permits the tool to drop partially through the standard and thus avoids lifting the standard to any great degree in recovering the tool.

By the use of my invention the bearings can be manufactured with great uniformity of bore and at a small fraction of the expense which is required to bore the bearings with a revolving cutter. The Babbitt metal is liable to shrink loose from the shell at the close of the casting operation, and the action of the drift in expanding the metal fully compensates for such shrinkage by pressing the lining tightly against the shell, which thus obviates any vibration or chattering of the bearing and its shaft when in use.

The drift is shown herein integral with its shank G and guide-stem K, but it is obvious that it may be made separate from the shank and secured thereon as the broach is upon the seat J. In any case the drift and broach are supported by a common shank, so as to be moved simultaneously by pressure upon the end of such shank, as the broach precedes the drift in its operation. The shank is made long enough to force the drift entirely through the bearing, and although the drift may be formed without a shank and pushed through the bearing by a separate mandrel the integral shank operates much better to force the drift in a straight line, and I have therefore claimed the drift with a shank of suitable length projecting from its upper end. Whether the shank be made integral or not, the tool successively broaches and drifts the bearing in a single operation.

It is obvious that the appliances which are shown herein may be operated by placing the drift and bearing with their axes horizontal instead of vertical, as shown in the drawings.

The drift performs a special function when secured rigidly to the top of the broach, as it is held rigidly from lateral deflection by the inner wall of the bearing in passing through the lining, and thus guides the broach positively in a straight line, whereas an annular broach without such a rigidly and closely connected guide as the drift affords is liable to work sidewise in any portion of the bearing where an excessive resistance is offered upon one side or the other, as, for instance, by an excess of material to be cut upon one side or a deficiency of material upon the other side due to the oil-channels or an oil-passage extending through the lining.

The combined drift and broach are thus capable of making a perfectly-straight bore within the box, which is not so readily effected with the use of a broach alone, no matter what form of stem-guides may be used, as such guides are capable of accidental flexure, which is not possible with the drift when formed upon the same shank with the broach.

Although the apparatus is illustrated herein for dressing babbitted bearings, it is evident that it may be used for dressing the linings of cylinders for use with a movable piston. Although it is illustrated for dress-

ing a cylindrical lining, it is evident that the broach and drift may be made of polygonal or other prismatic form, as well as circular, as it does not operate by any rotary movement; and I do not therefore limit myself to the use of an annular or circular broach and drift, but have claimed the apparatus described for dressing tubular bores of any desired cross-section.

Having thus set forth the nature of the invention, what I claim herein is—

1. A drift having a reduced guide-stem projected from the nose, and a detachable broach secured upon the stem adjacent to the nose, substantially as herein set forth.

2. The combination-tool comprising a drift with broach adjacent to the nose, and a common shank projected from the upper end of the drift to force the same through the tubular bore upon which it operates, substantially as herein set forth.

3. A round-nose drift having a reduced guide-stem projected from the nose with an annular seat adjacent to the nose, and a broach secured upon said seat, as and for the purpose set forth.

4. The cylindrical drift having a broach adjacent to its nose, a reduced guide-stem projecting from the broach, and a guide-collar larger than the drift upon the end of such guide-stem, substantially as herein set forth.

5. The cylindrical drift H provided with shank G and having a reduced guide-stem projected from its nose, with a seat J adjacent to the nose, a broach secured upon said seat, and a guide-collar larger than the drift secured detachably upon the end of such guide-stem, as and for the purpose set forth.

6. The apparatus for drifting Babbitt bearings, comprising the standard F provided with means for centering the bearing upon the top of the same, and with tubular guide F′, a broach or drift provided with shank and guide-stem, and means for forcing the broach or drift through the bearing, as and for the purpose set forth.

7. The means for drifting Babbitt bearings, comprising the standard F having tapering socket *h* and tubular guide F′, the conical clamps adapted to fit the exterior of the bearing and to set within the socket *h*, the combined drift and broach provided with shank and guide-stem, and means for forcing the tool through the bearing, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHAS. F. UEBELACKER.

Witnesses:

THOMAS S. CRANE,

PATRICK CONNOR.