

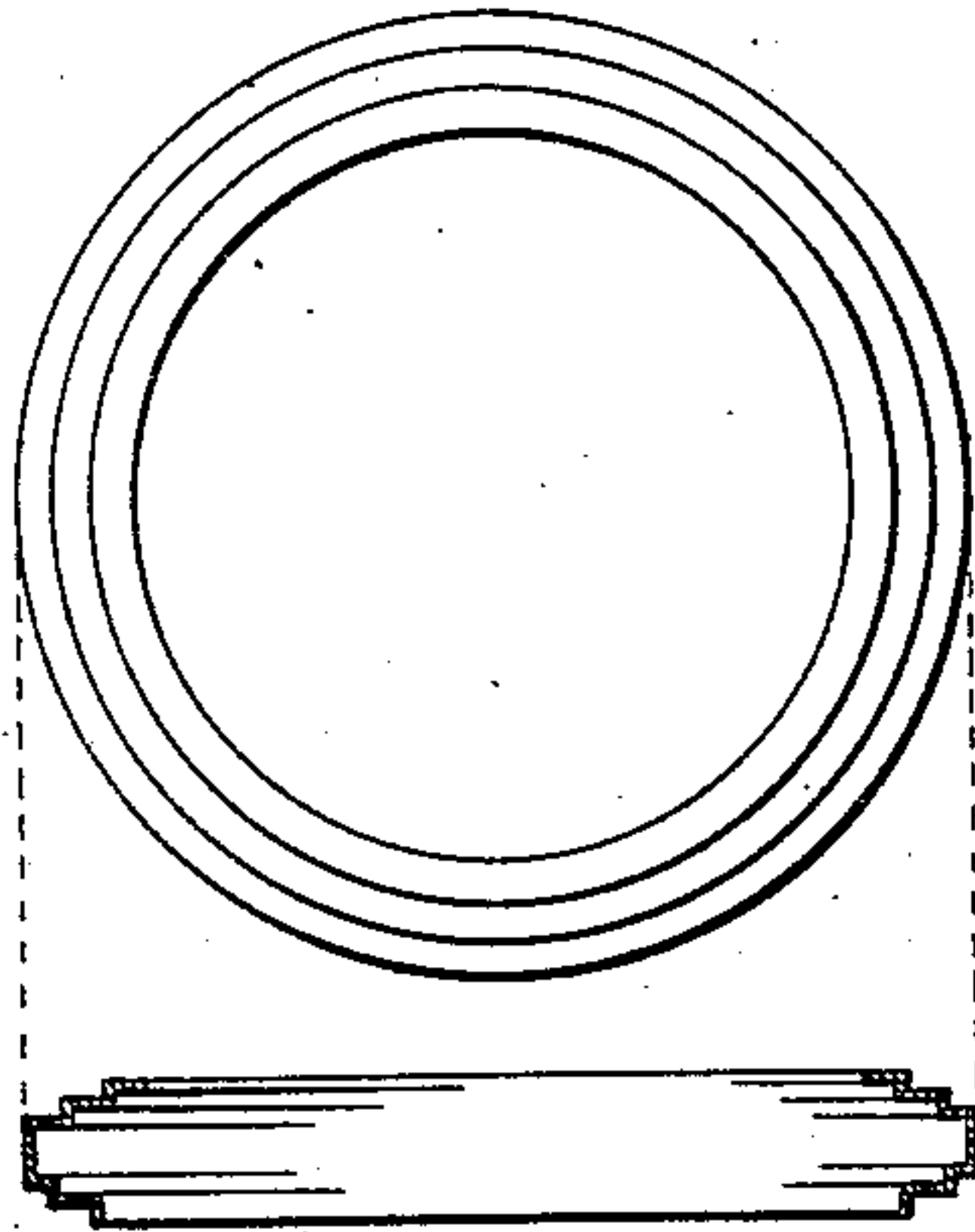
(Model.)

C. H. FIELD.  
Manufacture of Watch-Cases.

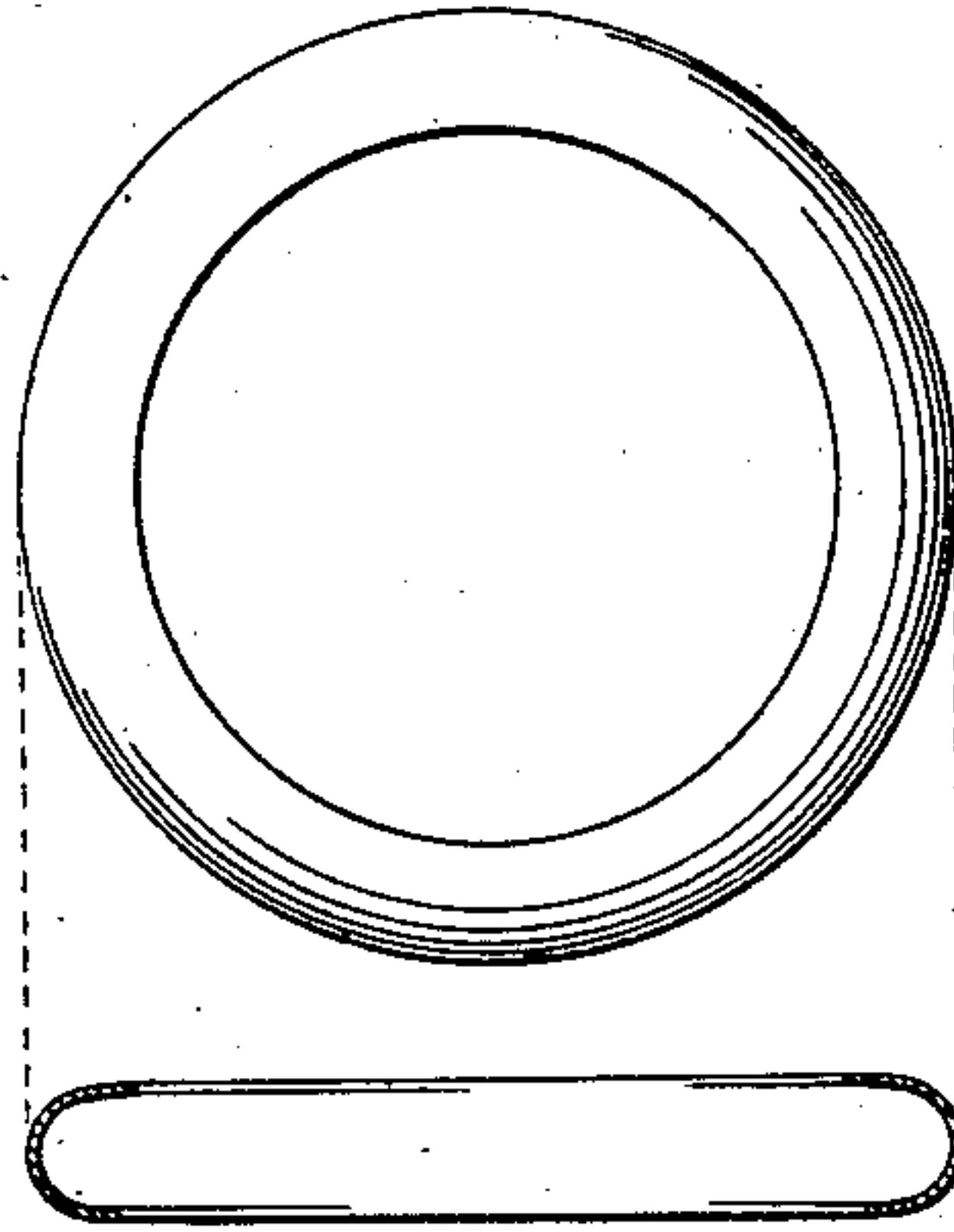
No. 227,231.

Patented May 4, 1880.

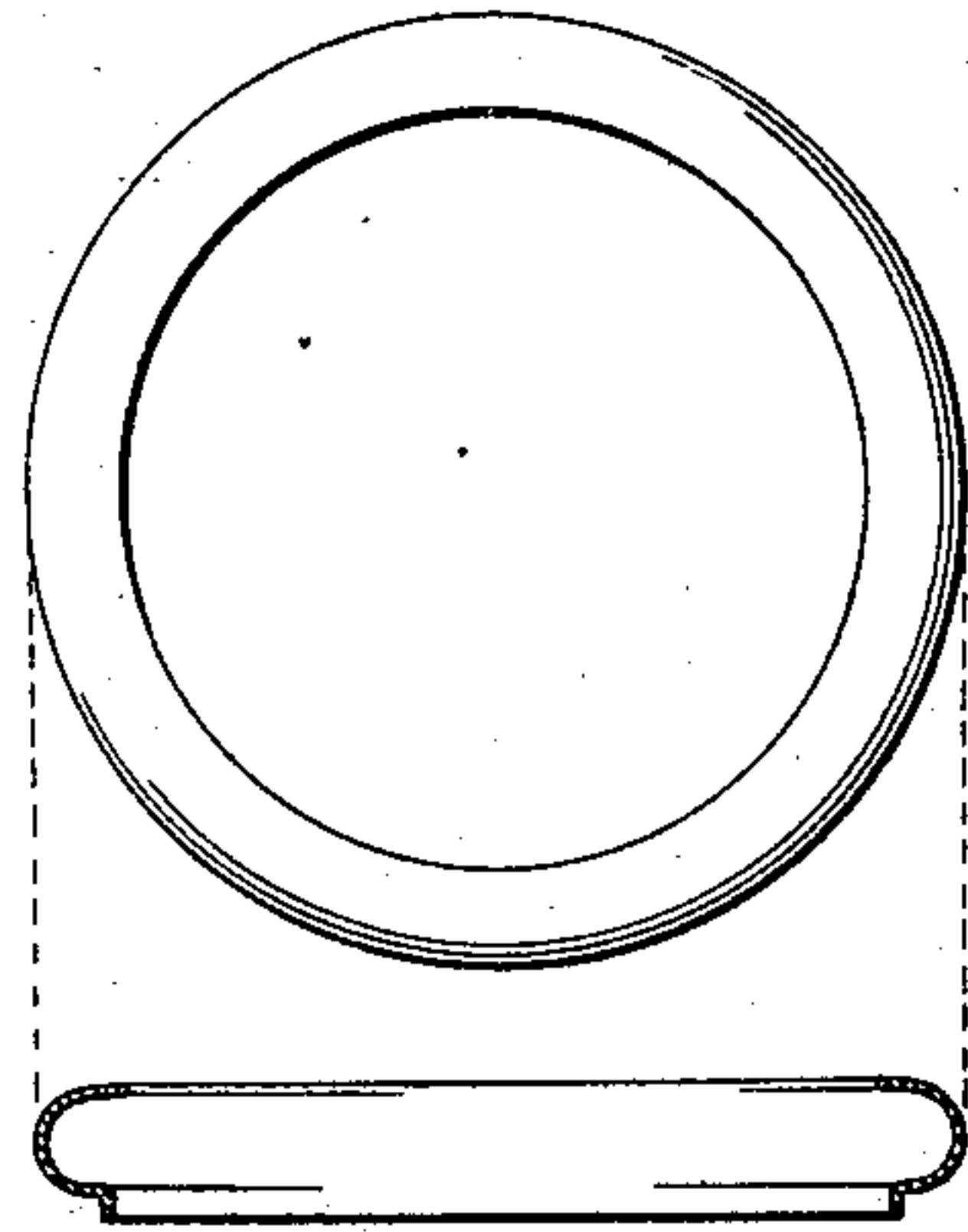
*Fig. 1.*



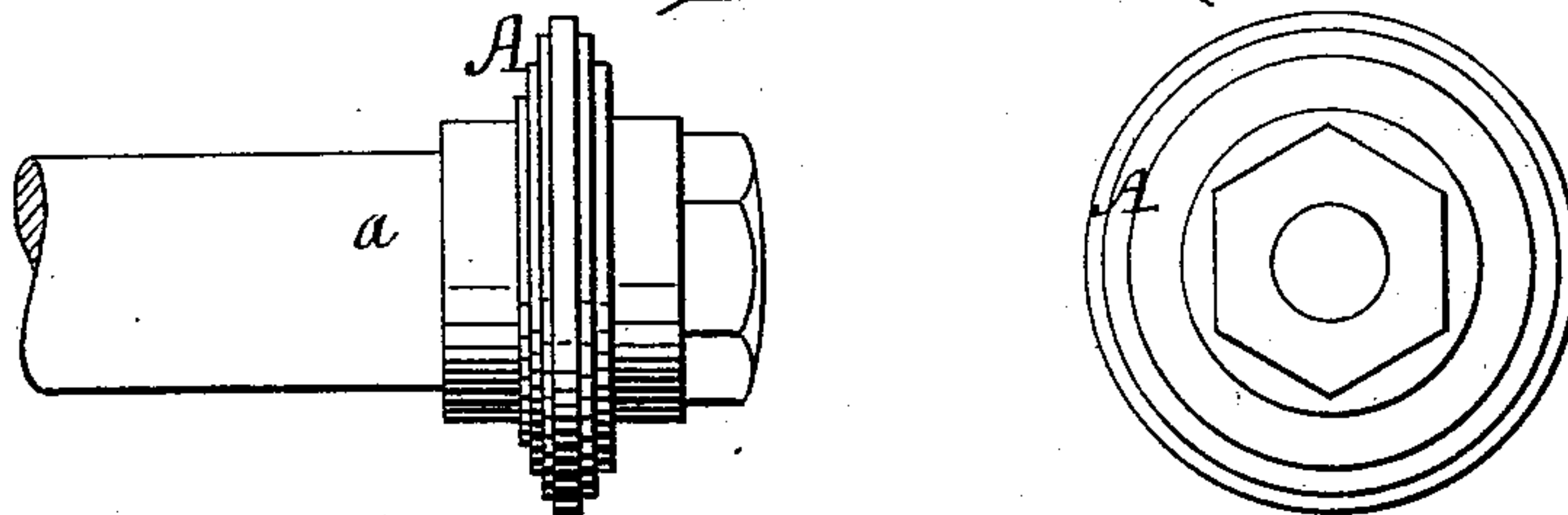
*Fig. 2.*



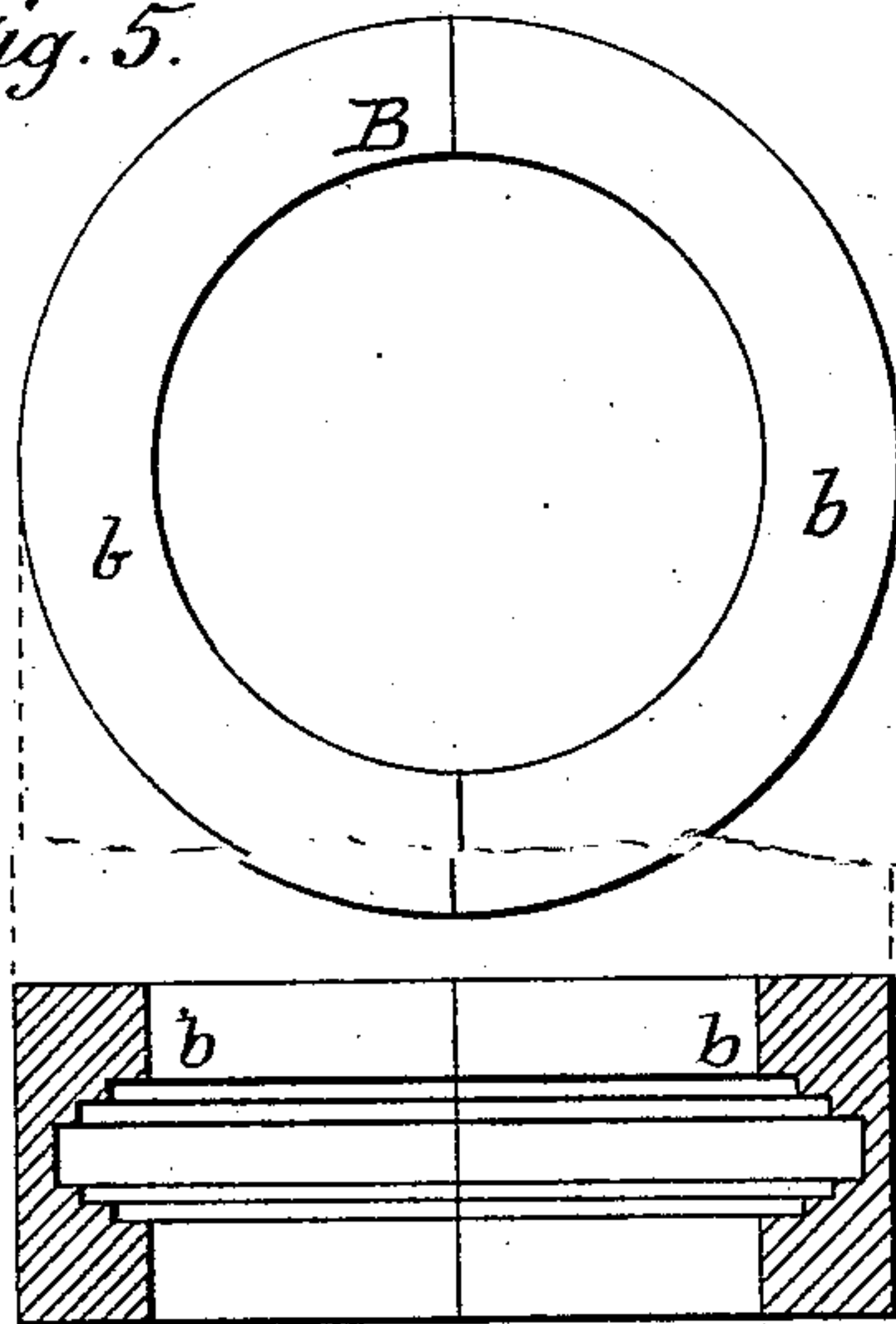
*Fig. 3.*



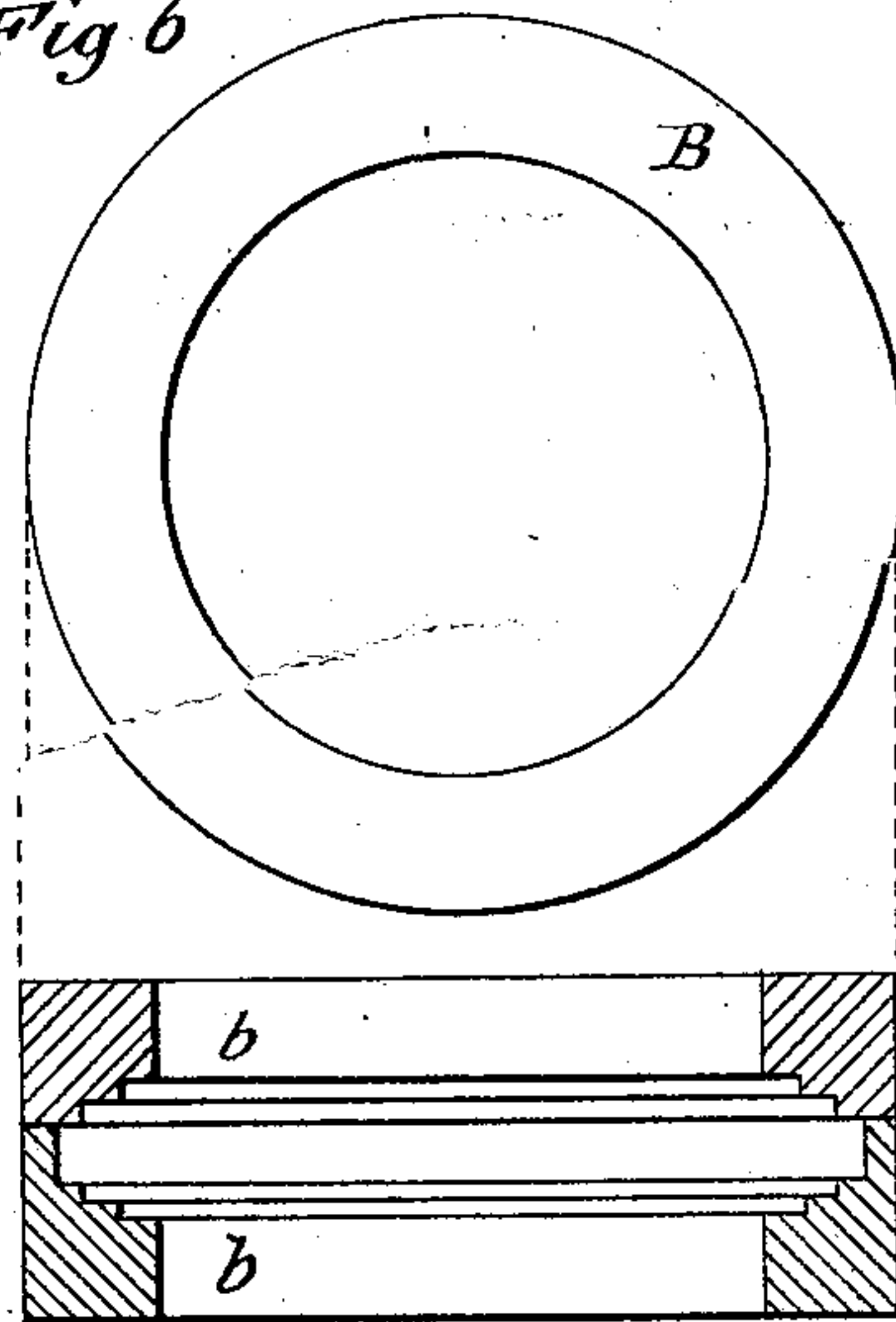
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

CHARLES H. FIELD, OF BROOKLYN, NEW YORK.

## MANUFACTURE OF WATCH-CASES.

SPECIFICATION forming part of Letters Patent No. 227,231, dated May 4, 1880.

Application filed March 14, 1879.

*To all whom it may concern:*

Be it known that I, CHARLES H. FIELD, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain  
5 new and useful Improvements in the Manufacture of Watch-Cases and in Tools Used Therein; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of  
10 the same, is a true, clear, and complete description of the several features of my invention.

My present improvements relate particularly to the manufacture of the centers of watch  
15 or locket cases from sheet metal, and they involve what I understand to be a novel mode of operation in the art of making watch-case centers of the class referred to, as well as novel tools.

20 The main feature of my invention consists in the formation of a sheet-metal watch-case center by internal rolling pressure applied to the metal while it is externally confined against undue circumferential expansion.

25 Heretofore sheet-metal watch-case centers have been formed by external rolling pressure. The differences in results accruing from the old method and those accruing from the method which I have invented are these: With my  
30 method case-centers are produced with absolute uniformity, because the rolling pressure is applied internally to produce the required and largely-varied sectional contour of the "center," and the device within which it is  
35 externally confined secures it against any possible variation in its peripheral dimension. With the old method the center-blank, mounted on a revolving bed-die of the desired contour, received external pressure, which caused  
40 the metal to elongate more or less in the line of the periphery, and, being unconfined externally, this elongation varied according to the particular condition of the metal in each case, resulting in more or less variation in the peripheral dimension of watch-case centers  
45 formed in the same manner and with the same tools. The rolling pressure referred to involves necessarily more or less abrasive action upon the surface of the metal to which the pressure is directly applied. In working upon solid  
50 gold stock this abrasive effect is not particu-

larly objectionable; but it is obvious that such effects should be scrupulously avoided in working gold-plated stock, else the base metal would be more or less liable to be uncovered, 55 and so detract from the value of the goods. A sheet-metal watch-case center when in a finished case and in use, has an inaccessible interior, and therefore one side gold plate will afford a gold-surfaced exterior; and in the 60 manufacture of plated goods my invention is of special value, because the pressure is applied internally and against the base-metal surface, the metal being forced outward, and its gold surface made merely to conform to the 65 contour of the walls of the chamber or matrix-die within which it is confined.

In the practice of my invention I employ a sectional matrix-die which is accessible from one or both of its sides and has an interior 70 contour in cross-section reversely corresponding to the external sectional outline of the particular style or variety of case-center desired.

It is well known that watch-case centers 75 have annular flanges and shoulders more or less varied in their character and for varied uses, and that the middle portion of the center is of greater diameter than that of the annular shoulders referred to. For that reason the matrix die or chamber is made sectional to provide for the ready removal of the center therefrom after the forming operation, as well as to enable the matrix to receive the blank from which the center is formed. The 80 sectional arrangement of the matrix may be largely varied—that is to say, the parts may be divided in radial lines, so as to admit of radial displacement, or on a single diametrical line; or the matrix may be truly annular, but 90 divided into parts on a line or lines which encircle the matrix peripherically.

My invention further consists in the combination, with a sectional matrix-die having an interior contour of a watch-case center, of an 95 interior rolling-die having an exterior contour reversely corresponding to the interior contour of the matrix-die.

With these tools the operation of rolling is involved, broadly considered, and that operation has been well known and practiced in 100 connection with the art of making watch-case



centers for upward of twenty years; but, as has been before herein indicated, the rolling pressure has heretofore been applied externally and the resisting-surface located internally. The interior rolling-die in my combination has substantially the same form as the bed or supporting die used heretofore; but the device heretofore used in co-operation with said supporting-die differs materially from my matrix, and although it has a matrix contour corresponding in section substantially to mine, it is otherwise its opposite, and differs therefrom in a manner which is clearly illustrated by the obvious difference between an external and an internal gear-wheel.

The modes of operation of the old and the new combinations, as before stated, differ in that under the old operation the peripheral dimensions of the center were uncontrollable, while under the new method said dimensions are fixed and determined, and also that under the old method the exterior of the center was exposed to the brunt of the rolling operation, while in the new the interior is only exposed and the metal is hardened by condensation, because of the swaging action of the dies, which result is due to the fact that the metal is externally confined against undue circumferential expansion.

For operation my matrix-die may be mounted and controlled in various ways. It is preferably mounted in a revolving head properly located with reference to the interior die and its arbor and provided with set or adjusting screws, whereby the sections may be held in position within the head and easily released, as well as to admit of their being more closely set with relation to each other as the forming operation advances; but the manner of mounting said matrix-die constitutes no portion of my present invention, the same being reserved by me as a proper subject for future Letters Patent.

It is to be distinctly understood that I do not claim to have broadly invented the spinning of sheet metal by the application of internal rolling pressure to the metal while it is externally confined against undue circumferential expansion, because I am well aware that such operation has heretofore been practiced in the manufacture of sheet-metal tobacco-boxes and other goods of that general class for the development of beads or swells in the boxes; but I am not aware that this principle was ever applied in the manufacture of watch-case centers prior to my present invention.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figure 1 represents, in top view and section, a well-known form of watch-case center. Figs. 2 and 3 represent, respectively, each both in top view and section, blanks from which centers are formed. Fig. 4 represents, in end and edge view, my rolling-die as mounted on its arbor. Fig. 5 represents, in top view and section, my sectional matrix-die with its

sections in position, showing their division to be on a diametrical line. Fig. 6 represents, in top view and section, a matrix-die with its sections in position divided on a peripheral line.

The blanks, Figs. 2 and 3, used by me do not materially differ from those heretofore used. Their form and dimensions, as compared with the finished center desired, will, of course, be varied as experience may dictate.

The blank Fig. 2 may be made from a straight strip of stock concaved with rolls coiled spirally on an arbor, cut, adjusted at the joint, and soldered, and the blank Fig. 3 may be formed from an annular plate worked in drop-dies and with other tools, all of which are well known and long in use for producing both forms of blank.

The particular sectional contour of the working-face of the circular rolling-die A needs no description, as that will, in all cases, correspond with the particular character of case-center desired. It is mounted upon its arbor so as to rotate therewith, or it may be loosely mounted thereon, as hereinafter indicated.

The matrix-die B is accessible from one or both of its sides, and has an internal sectional contour which reversely corresponds with the external sectional contour of the case-center desired, and is constructed in sections, which admit of the ready insertion of a blank, the advance of the sections toward each other, and the ready removal of the formed center.

In Fig. 5 the sections *b* are shown to be separated on a diametrical line, while in Fig. 6 they are separated on a peripheral line, and either mode of division will afford the desired results, although, so far as my experience goes, I prefer the diametrical division, Fig. 5.

In operating with these tools, the rolling-die A being revolved on its arbor, and a blank having been placed within the matrix-die, the latter is placed so as to surround the rolling-die, and then slowly moved toward it, whereupon the rolling pressure of the internal die speedily operates to force the metal outward into perfect conjunction with every coincident portion of the matrix, and thoroughly condenses and hardens those annular shoulders on both sides of the watch-rim with which the "snaps" of the watch-case covers frictionally engage.

The matrix-die, with its sections doweled, may be held by the hand if working very thin locket-stock; but it is preferable that it be so mounted that it can revolve, although I am well aware that the matrix-die may be held stationary and the rolling-die be loose upon its arbor, and so mounted on a head-plate that its arbor will describe a circle, after the manner of a crank-pin, and be capable of automatic advancement radially on the head-plate until the rolling-die shall describe a circle equal in diameter to that of the matrix-die minus the thickness of the stock employed for making the case-center. It is, however, to be distinctly understood, as before herein stated,



that my present invention does not relate to any particular method of operating the matrix-die, nor to mechanism by which it may be operated, it being my purpose to embody these matters in future applications for Letters Patent.

It will be seen that the matrix-die has no movement with relation to the metal operated upon; that the metal is worked by a rolling pressure applied internally; that the circumferential dimensions of case-centers formed within the matrix are positively predetermined, and that the exterior surface of the center is not exposed to any abrasive action.

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

1. The improvement in the art of forming

watch-case centers from sheet metal, substantially as hereinbefore described, which consists in swaging and condensing the metal by internal rolling pressure applied to the metal blank while it is externally confined against undue circumferential expansion, as and for the purposes specified.

2. The combination, with a sectional matrix-die having an internal contour in cross-section for forming a watch-case center, of a rolling-die having an exterior contour reversely corresponding to the internal contour of the matrix-die, substantially as described.

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