(No Model.) 2 Sheets—Sheet 1.

W. LORENZ.

METHOD OF MAKING RING AND PLUG GAGES.

No. 438,253. Patented Oct. 14, 1890.

Fig: 1.

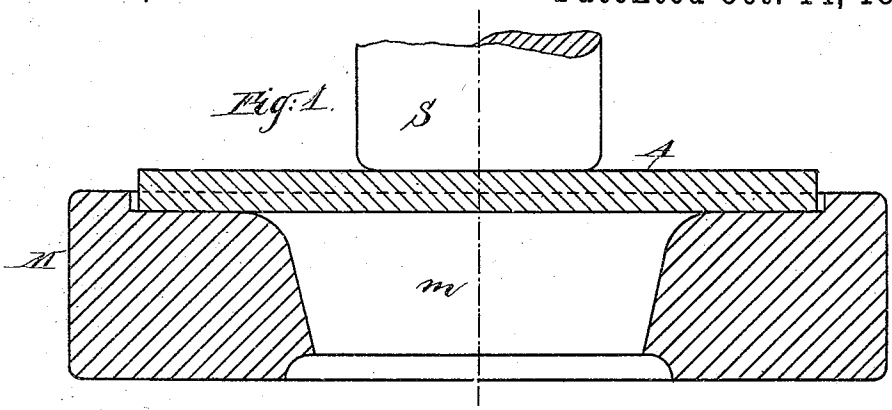


Fig: 2.

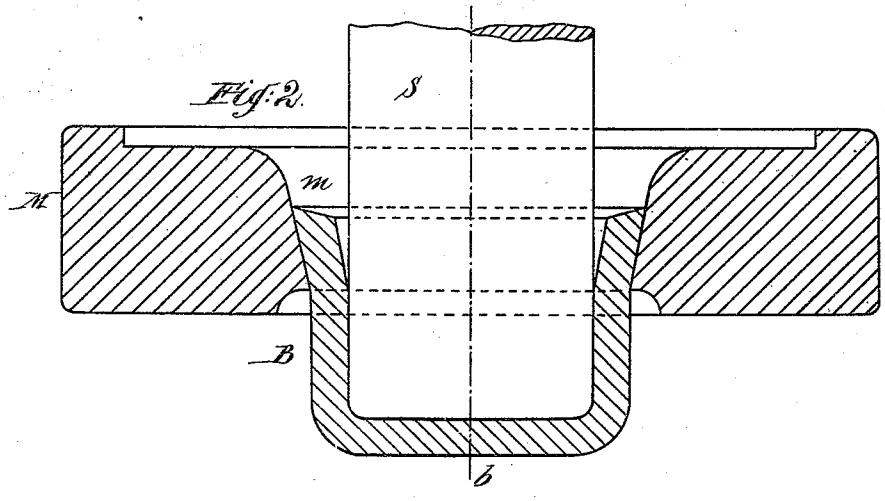


Fig: 3.

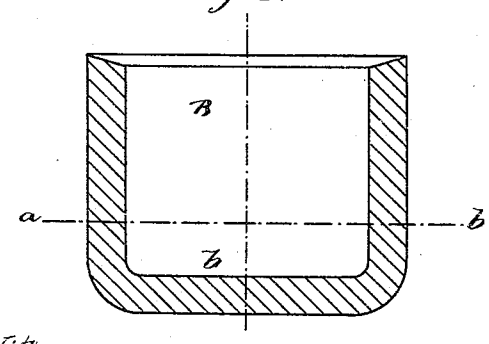
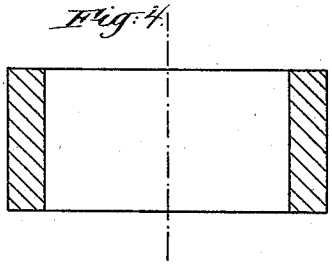


Fig: 4.



Witnesses:

Chas. F. Barter.

Charles R. Searle.

Inventor:

Wilhelm Lorenz

by his attorney

Thomas Drew Stetson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. LORENZ.

METHOD OF MAKING RING AND PLUG GAGES.

No. 438,253. Patented Oct. 14, 1890.

Fig: 5.

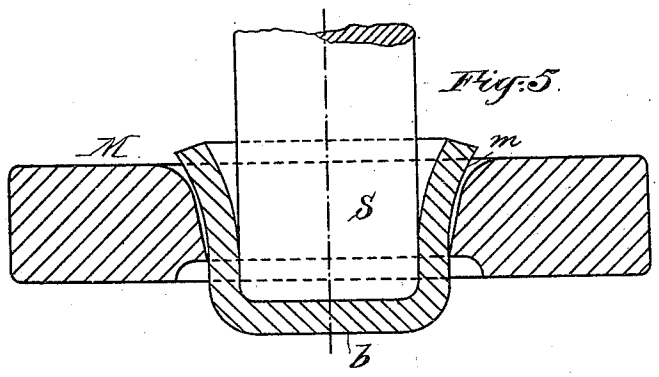


Fig: 6.

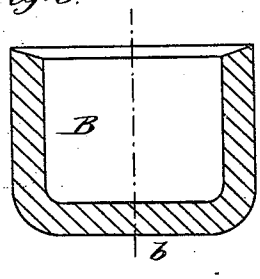


Fig: 8.

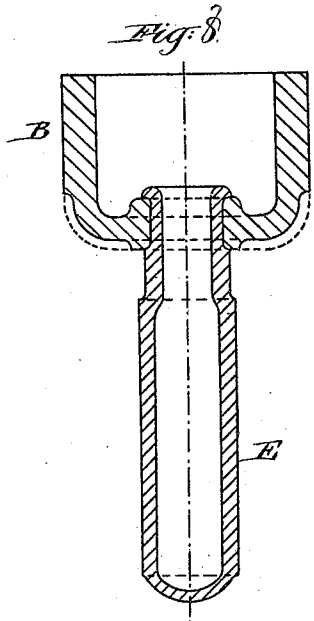


Fig: 7.

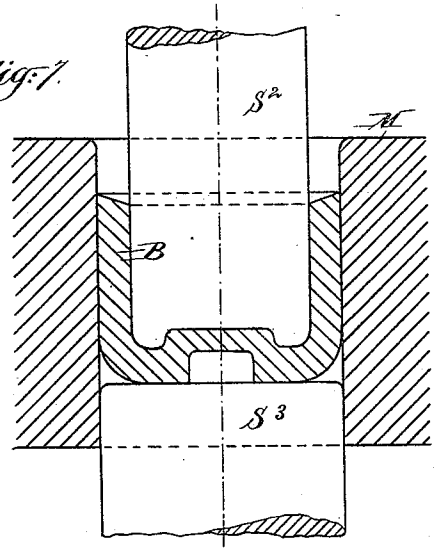
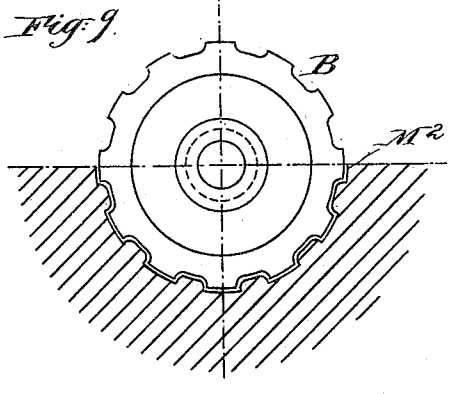


Fig: 9.



Witnesses:

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Thomas Drew Stetson

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UNITED STATES PATENT OFFICE.

WILHELM LORENZ, OF KARLSRUHE, GERMANY.

METHOD OF MAKING RING AND PLUG GAGES.

SPECIFICATION forming part of Letters Patent No. 438,253, dated October 14, 1890.

Application filed March 18, 1889. Serial No. 303,650. (No model.)

To all whom it may concern:

Be it known that I, WILHELM LORENZ, a subject of the Emperor of Germany, residing at Karlsruhe, in the Grand Duchy of Baden, German Empire, have invented certain new and useful Improvements in Making Ring and Plug Gages; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the manufacture of plug and ring gages which are used in determining the sizes of shafts, hubs, bearings, and other similar parts of machinery; and the object of my invention is to provide a method of manufacture which will produce lighter, cheaper, and more accurate and durable gages than can be produced by previously-known methods.

To the above purposes my invention consists in the peculiar and novel method of manufacture hereinafter described, and pointed out in the claim.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which similar letters of reference designate similar parts, and in which—

Figure 1 is a vertical sectional view of a die and matrix with a blank in position to be operated upon thereby. Fig. 2 illustrates in similar view the result of the descent of the die. Fig. 3 is a central longitudinal section of the plug-gage. Fig. 4 is a similar section of a ring-gage. Fig. 5 is a view similar to Fig. 2, illustrating the formation of a modified form of gage. Fig. 6 is a sectional view of the plug-gage. Fig. 7 illustrates the formation of the handle-gage. Fig. 8 represents such gage with its handle attached. Fig. 9 illustrates the fluted or notched form of gage.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

As heretofore produced, ring and plug gages have been defective, owing principally to the lack of homogeneousness of mass, whereby the various effects of expansion and contraction and also of molecular changes result in departure from the requisite true circular form. The operation of cutting from a cylindrical bar and then turning out on the lathe produces a heavy and cumbersome article which is not susceptible of delicate manipulation.

I overcome all of the above defects, and in carrying out my improved method I provide a suitable matrix M, having an opening *m* as much larger than the internal diameter of the plug or ring gage as twice the thickness of the steel blank A. I also provide a die or plunger S, which exactly corresponds in external diameter with the required internal diameter of the gage. The blank is placed over the opening of the matrix, as shown in Fig. 1, and the die is forcibly depressed so as to strike up the die into cup form, as shown. The bottom *b* of the cup B is cut off in the plane indicated by the line *a b*, and this bottom portion is again struck up into cup form in a die and matrix of smaller dimensions than the first apparatus, the forming and cutting off being continued till full sets of sizes of gages are produced. The upper parts become ring-gages and the lower parts become plug-gages, and the internal diameters of these gages exactly correspond to the required diameter of the shaft or bearing or other part to be tested. In some instances—as, for instance, in odd sizes—the internal diameter of the ring-gage may be enlarged by turning out in a lathe and a plug-gage may be reduced by turning off a little from its exterior; but for usual sizes no such operation is required, as the required diameter may be accurately produced by the die and matrix alone.

In some cases it is desirable to produce a bell-shaped gage in order to permit of the attachment of a handle, as E, and in this case two opposing dies or plungers S^2 S^3 are used in conjunction with the matrix M.

In order to enable the gages to take up dirt and other impurities, grooved matrices M^2 are employed, which form grooves *f* on the outside of the gages. The gages may be struck up either when hot or cold, and in either event are much more accurate and durable and also much lighter than gages produced in the manner heretofore employed.

I am aware that circular blanks of sheet metal have been struck up between dies into

cup-shaped blanks, which are submitted to successive operations in drawing cartridge-shells and the like; therefore I do not claim this operation by itself in carrying out my invention; but

What I claim, and desire to secure by Letters Patent, is—

The herein-described method of producing from one piece of metal a ring-gage and a plug-gage, which consists, essentially, in first striking up a circular blank of sheet metal into cup form between dies of a predetermined size and then severing the same transversely at or slightly above the bottom of such cup, so that the upper severed portion will serve as a ring-gage and the lower portion as a plug-gage of the same diameter, substantially as specified.

In testimony whereof I have hereunto set my hand at Karlsruhe, this 30th day of January, 1889, in the presence of two subscribing witnesses.

WILHELM LORENZ.

Witnesses:

FRIEDRICH LORCH,

ADOLF LEHNE.