

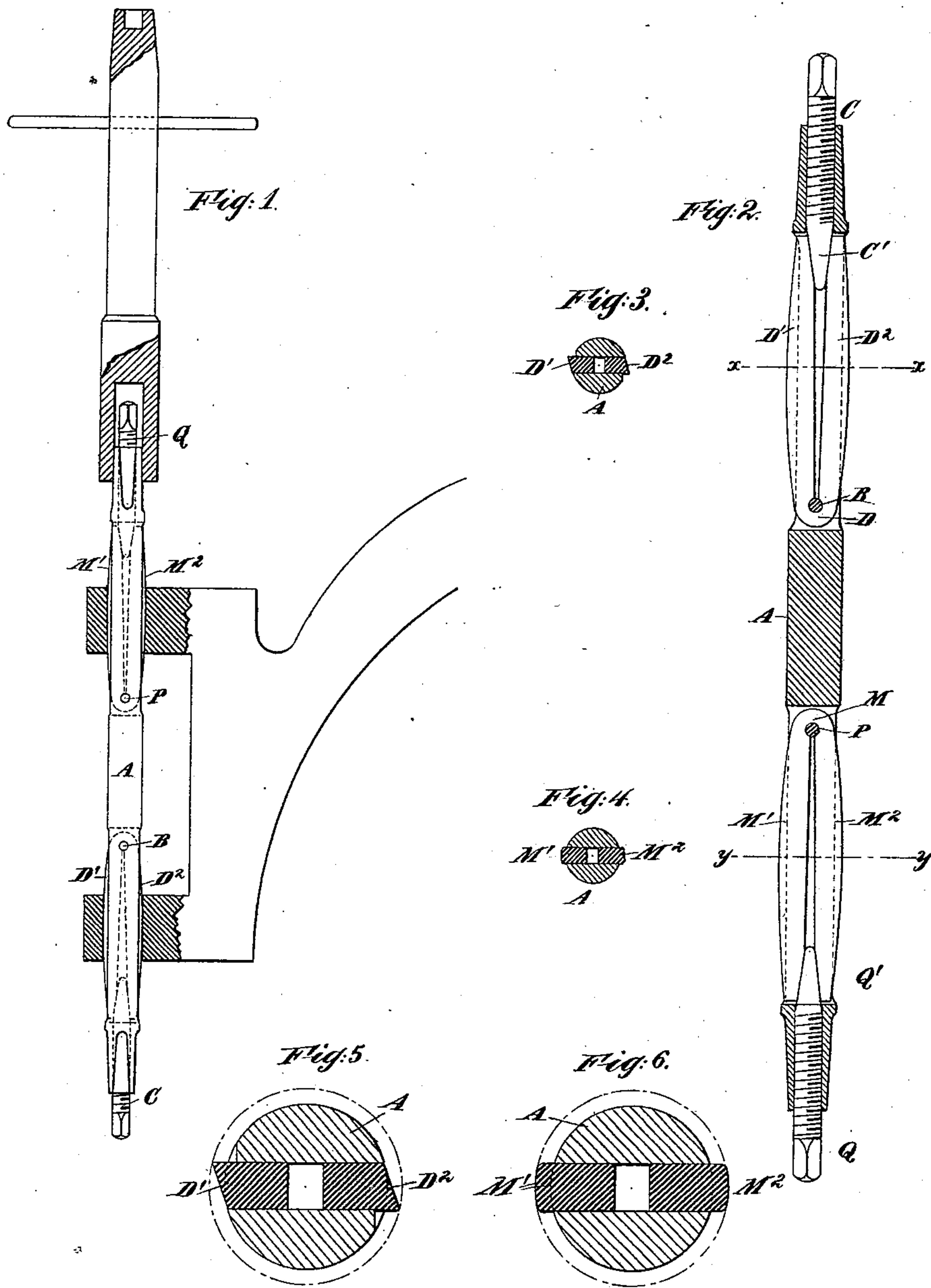
(No Model.)

J. THORNTON, Jr.

EXPANDING REAMER.

No. 282,685.

Patented Aug. 7, 1883.



WITNESSES—

Charles R. Searle,
B. E. Stafford.

INVENTOR—

John Thornton, Jr.
by his attorney
Thomas L. Stetson.

UNITED STATES PATENT OFFICE.

JOHN THORNTON, JR., OF BROOKLYN, NEW YORK.

EXPANDING REAMER.

SPECIFICATION forming part of Letters Patent No. 282,685, dated August 7, 1883.

Application filed April 14, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN THORNTON, JR., of Brooklyn, in the county of Kings, in the State of New York, have invented certain new and useful Improvements in Expanding Reamers, of which the following is a specification.

The patent to Valentine Moeslein, of Brooklyn aforesaid, dated October 3, 1882, No. 265,272, describes a portable reamer having cutters which may be expanded by a pointed screw inserted axially. The reamer produces a smoothly-finished hole. The size may be varied by properly adjusting the screw.

My invention is based on that of Moeslein, and involves an improvement in the construction of the Moeslein cutters, and also an addition of expanding bearings by which the body of the arbor is better sustained in the correct position.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is an elevation with a section of the operating-key and of a portion of a sewing-machine in which the device is being used. The remaining figures are on a larger scale. Fig. 2 is a central longitudinal section. Fig. 3 is a cross-section on the line $x x$ in Fig. 2. Fig. 4 is a cross-section on the line $y y$ in Fig. 2. Figs. 5 and 6 are cross-sections on a still larger scale. Fig. 5 corresponds to Fig. 3, and Fig. 6 to Fig. 4.

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

A is the reamer-bar; C, an axial screw, having a conical end, C' ; and $D' D^2$, two cutters resting in a central longitudinal slot formed in the reamer-bar A.

B is a transverse pin which serves as a centering means for one end of each of the cutters $D' D^2$. The other end of each cutter is adjusted outward to the required extent by turning the screw C. Instead of making the two cutting parts $D' D^2$ of two entirely separate pieces of steel, I make them both from a single piece of steel, and keep the two connected by a bent part, D. The transverse pin B holds this bent part D exactly in the center line of the arbor. It serves as a support and centering means in the same manner as the corre-

ponding part in the Moeslein invention; but instead of the two cutters turning on this pin hingewise, they simply turn thereon by virtue of the elastic yielding of the connecting part D. I have determined by experiment that it is easy to make the bent part D with sufficient metal to afford a strong and reliable support, and yet to have it sufficiently elastic to allow the two cutting-surfaces to be easily expanded to the required extent by the action of a simple tapering screw, C C'. My invention is superior to that set forth in the Moeslein patent, because it reliably holds the movable ends of the cutters $D' D^2$, pressing inward with gentle force against the conical part C' of the screw C. I have also devised means for expanding the arbor or surfaces connected therewith at another point, so as to reliably guide the arbor and keep its axis exactly in the central line of the hole which is being bored. I mount the cutters $D' D^2$ and the adjusting means therefor near one end of the arbor A. At a distance therefrom in the arbor A, I mount a pair of expanding bearing-pieces, $M' M^2$, with a corresponding connection, M, and centering means, P, at one end, and with corresponding means, Q Q', for adjusting them apart at the opposite end. Instead of making these added devices cutters, I smoothly round their outer surfaces and cause them to act simply as bearings. Their function is to guide the body of the arbor A and keep it exactly in the axial line of the hole.

One of the important uses of such a reamer is to bore the passage for what is termed the "needle-bar" in sewing-machines. It is common to form the cast-iron framing of a sewing-machine with two stout arms or bearings, through which the needle-bar performs its rapid reciprocations. The improved arbor is used for boring the hole in each arm exactly in line with the corresponding hole in the arm below or above. The expanding reamer is particularly useful in reboring and trueing these holes when they have become worn by long use.

It may be proper to explain that after the cutters have been set out, and one hole has been bored to the required size, larger than the shank or body of the reamer, a difficulty is experienced in the absence of my expanding bearing-pieces $M' M^2$ in properly holding

the reamer in line to bore the hole in the second arm. My expanding devices $M' M^2$ are important for this purpose.

I have in my experiments employed the invention mainly for repairing sewing-machines, and have put my expanding bearing-pieces $M' M^2$ at the proper distance from the expanding cutters $D' D^2$, corresponding to the distance apart of the two arms in ordinary sewing-machines; but this is not essential. The distance apart of my expanding bearings $M' M^2$ and the expanding cutters $D' D^2$ may be varied within wide limits. So, also, may the length and diameter of the arbor A and the size of the cutters and of the bearing devices.

My expanding-bearing devices $M' M^2$ may, if desired, in any case be used with cutters which are simply hinged together, as set forth in the Moeslein patent, or even with cutters which are non-expanding.

Modifications may be made in the forms and proportions. Parts of the invention may be used without the whole. The curvature of the outer edges of the cutters $D' D^2$, and also of the bearing-pieces $M' M^2$, may be made greater or less than here shown. The curvature may be considerably less. The edges may be practically straight for re boring plain cylindrical holes in sewing-machines or other work. Another important use to which my improved cutters, as also the Moeslein cutters, may be applied with the edges much curved is the making of holes larger inside than at the orifice. Such holes may be used in retaining spring-catches for spool-holders, and in a great variety of uses. To produce them by the aid of my arbor a plain cylindrical hole is first bored, then my arbor inserted and expanded while running. The cutters being made with the curvature shown, or a still greater curvature, a corresponding increase in the diameter of the hole is made at a depth

below the surface of the casting. When the hole is completed my pointed screw $C C'$ is withdrawn, allowing the cutter to be afterward easily closed together, and the arbor, with its cutters, withdrawn. I propose in some cases to introduce in each of the two slots similar pieces, each of which has its two nearly-parallel arms adapted to serve as cutters, and each of which has such arms connected in a single piece by a connecting-eye. In such case one set of arms should be adapted to cut by turning the arbor in one direction, and the other set of arms should be ground the other way and adapted to cut by turning the arbor in the opposite direction. Then, by turning the arbor in either direction one only will cut, and the other will simply serve as a guide for centering the arbor-bar, it being incapable of cutting under those conditions because of its being turned backward relatively to its cutting-edges.

I claim as my invention—

1. In an expanding reamer, the cutter composed of the parts $D' D^2$, made in a single piece, adapted to serve relatively to the mortised arbor A, the pin B, and the holding and expanding screw C' , as and for the purposes set forth.

2. The expanding bearing-surfaces $M' M^2$ and pivot, as P, in combination with means, as Q, for expanding the divided end, and with the arbor A, and suitable reaming-cutters mounted at a distant portion of the arbor and arranged for joint operation, substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York, this 9th day of April, 1883, in the presence of two subscribing witnesses.

JOHN THORNTON, JR.

Witnesses:

A. H. FRANKLIN,
R. J. HEARNE.