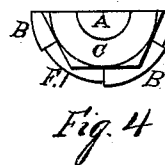
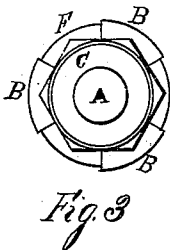
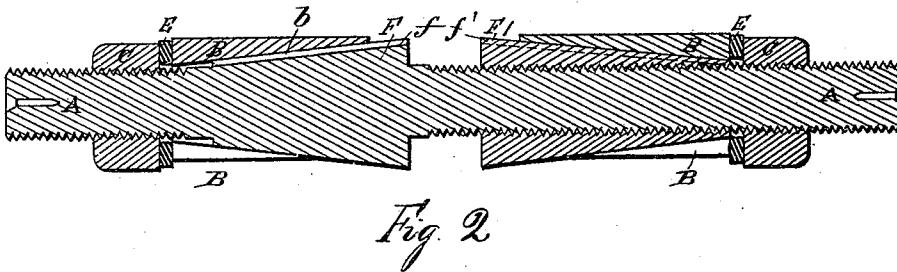
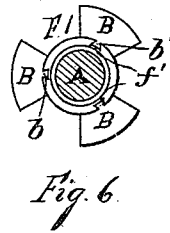
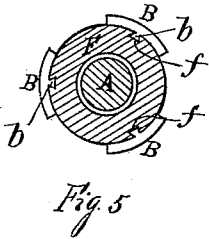
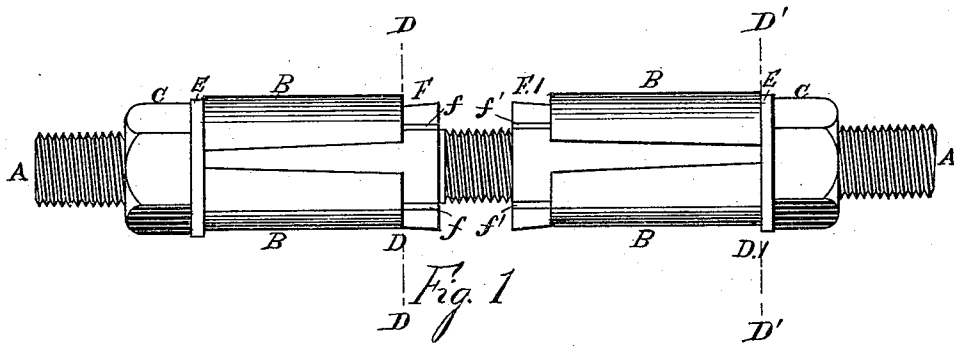


(No Model.)

J. D. O. DUBRULE.
EXPANDING MANDREL.

No. 447,667.

Patented Mar. 3, 1891.



Witnesses:

G. J. L. L. L.
L. V. L.

Inventor:

Joseph. Daniel. Oude. Dubrule

UNITED STATES PATENT OFFICE.

JOSEPH DANIEL OVIDE DUBRULE, OF MONTREAL, CANADA.

EXPANDING MANDREL.

SPECIFICATION forming part of Letters Patent No. 447,667, dated March 3, 1891.

Application filed September 2, 1890. Serial No. 363,778. (No model.) Patented in Canada October 6, 1890, No. 35,184.

To all whom it may concern:

Be it known that I, JOSEPH DANIEL OVIDE DUBRULE, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented a new and useful Improvement in Expanding Mandrels, (for which I have obtained Letters Patent in Canada No. 35,148, granted October 6, 1890;) and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to expanding mandrels generally, and has for its object to render the same extensible as to length, capable of use in conical as well as cylindrical holes, and, further, to secure an easy adjustment of the parts. The extensibility in length is secured by the combination, with a stationary expansion-head on the spindle, of a movable expansion-head working on a screwed portion of such spindle. The expansion-heads are composed of cones and wedges, the latter having the smallest connection possible with the cones and being adjustable longitudinally along the outer surfaces of the same; and if a conical hole is to be fitted, these wedges, which make up the difference between the conical shape of the cone and the cylindrical, are adapted to be so disposed as to present a small diameter at one end and a large diameter at another. As the expanding-wedges are adjustable longitudinally along the cones, I am able to use nuts on screwed portions of the spindle, which nuts, through a loose washer, bear upon the ends of the wedges and serve to adjust them along the cones, thus avoiding any necessity for hammering the spindle, which invariably spoils the centers. For full comprehension, however, of the invention, reference must be had to the annexed drawings, in which like symbols indicate corresponding parts, and wherein—

Figure 1 is an elevation of the expanding mandrel; Fig. 2, a longitudinal section through same; Fig. 3, an end view of same, as shown in Fig. 1; Fig. 4, a similar view of same, as shown in Fig. 2, and Figs. 5 and 6, transverse sections, respectively, on lines D D and D' D', Fig. 1.

A is the spindle, having cast in one with it in a position to one side of the center of its length a conical body F, tapering outward from its inner end to a screwed end portion

of the spindle. The remaining or opposite end portion of the spindle is also screw-threaded to receive a conical body F', tapering in like manner to that of F, outward toward the end of the spindle, and pierced and screw-threaded to travel along it. Each of these cones F F' has longitudinal dovetail grooves *f f'* (preferably three in number) in their outer surfaces to receive head-pins *b b'* projecting from the under sides of adjustable segments or wedges B B B. These wedges are preferably the same length as the cones and are shaped to make up the difference between the conical and cylindrical form of mandrel—*i. e.*, their interior surfaces are beveled and their exteriors parallel or horizontal. In order that these wedges shall be more easily adjusted, I make the head-pins *b b'* in size just sufficient to hold them loosely in place, and use loose washers E between their outer ends and the nuts C C, traveling on the screwed portions of the spindle, to secure a steady inward pressure.

Heretofore the connection between wedges and cones has consisted in making such wedge in dovetail form and introducing it bodily into the dovetail groove in the cone, with the result that the wedges very frequently stick in position and entail more or less trouble in adjustment.

The cone F, with its adjustable wedges, goes to form what I have before called a "stationary expansion-head," and the cone F', with its wedges, a "movable expansion-head," and it will easily be seen that no matter whether the aperture requiring fitting be long or short, conical or cylindrical, my mandrel can be adjusted to suit it and simply by the turning of the nuts C C (and the cone F in some cases) in either direction.

If a conical hole is to be fitted, it is only necessary to locate the wedges near the outer end of one of the cones and move inward those on the other cone, thus securing different diameters.

What I claim is as follows:

1. In an expanding mandrel, the combination of a spindle, a stationary expansion-head, a movable expansion-head, and means for expanding the heads, as set forth.

2. In an expanding mandrel, the combination of a screwed spindle, a stationary cone

and a movable cone, each tapering in the direction of the respective ends of such spindle, wedges adapted to be adjusted longitudinally along the surfaces of such cones, and means
5 for adjusting such wedges, as set forth.

3. In an expanding mandrel, the combination of a screwed spindle, a cone on same dovetail-grooved longitudinally, wedges having their under surfaces bearing on the exterior surface of such cone and having dovetail
10 projections located centrally in such under

surfaces and fitting such grooves, so that such wedges are adapted to be adjusted longitudinally along said cone with their said under surfaces in contact with the said exterior surface of same, and a traveler on such spindle
15 for effecting such adjustment, as set forth.

August 28, 1890.

JOSEPH DANIEL OVIDE DUBRULE.

Witnesses:

G. J. LABELLE,

J. W. SOLY.