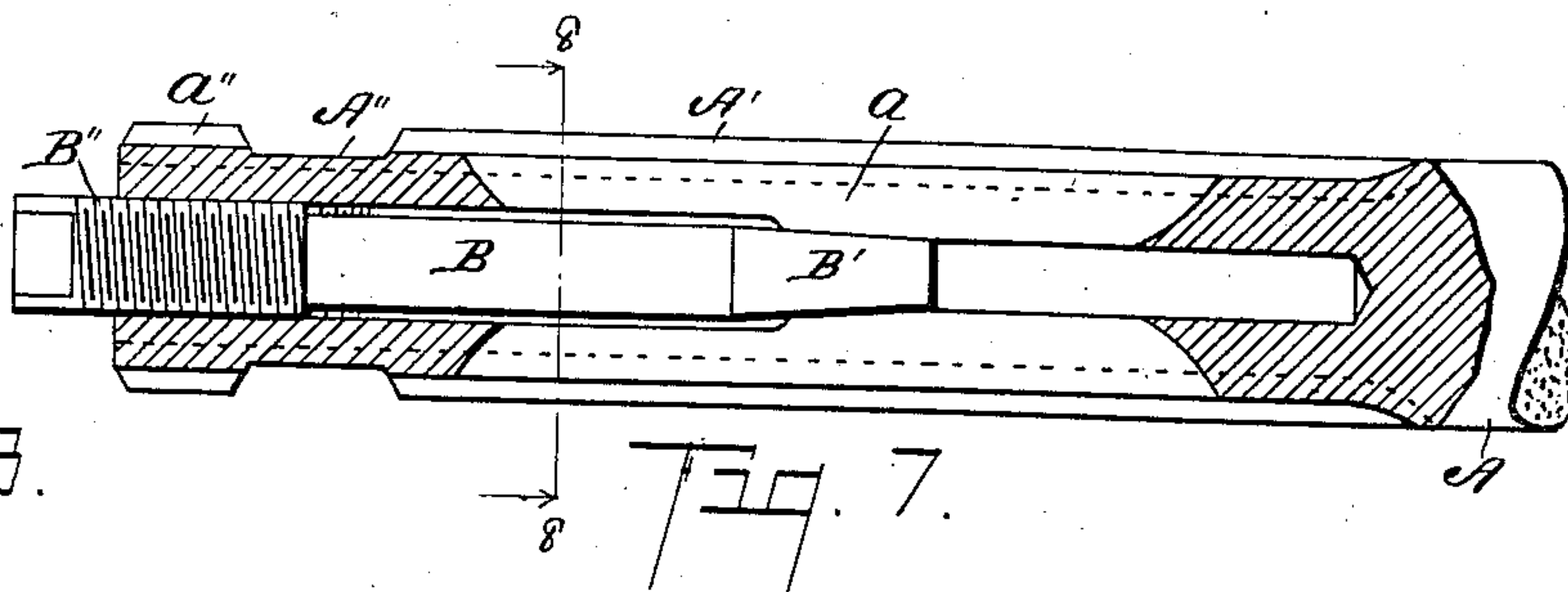
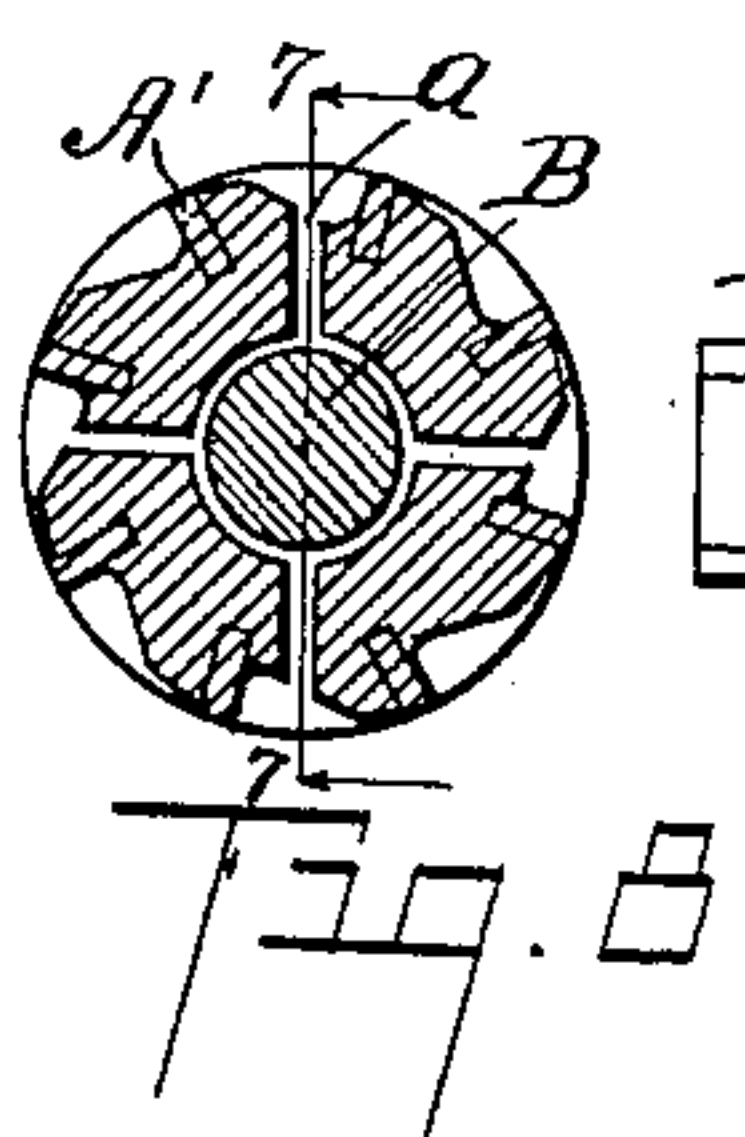
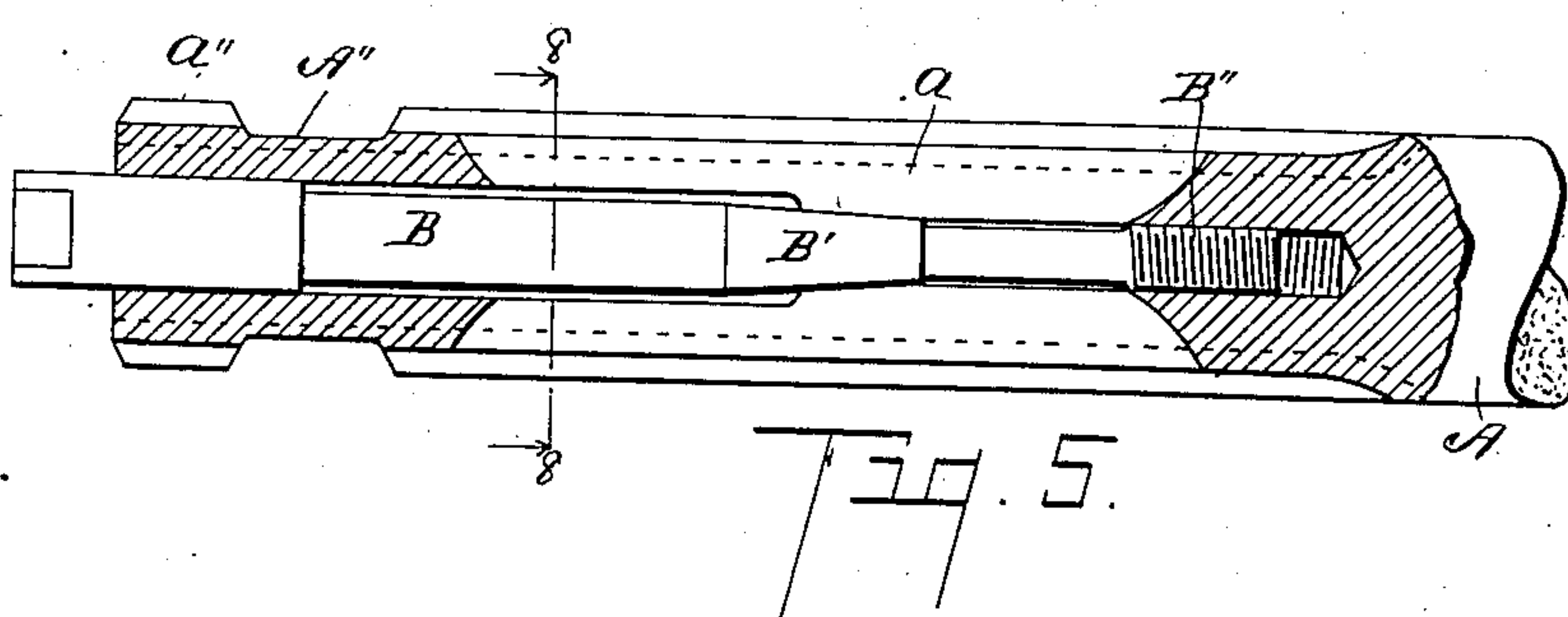
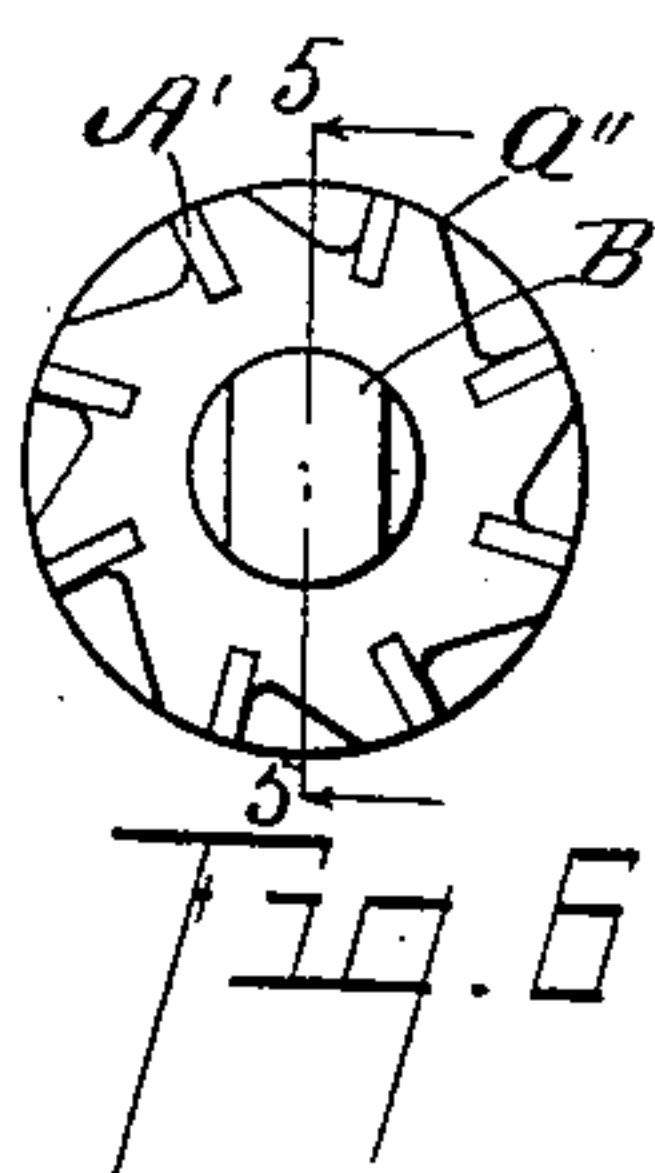
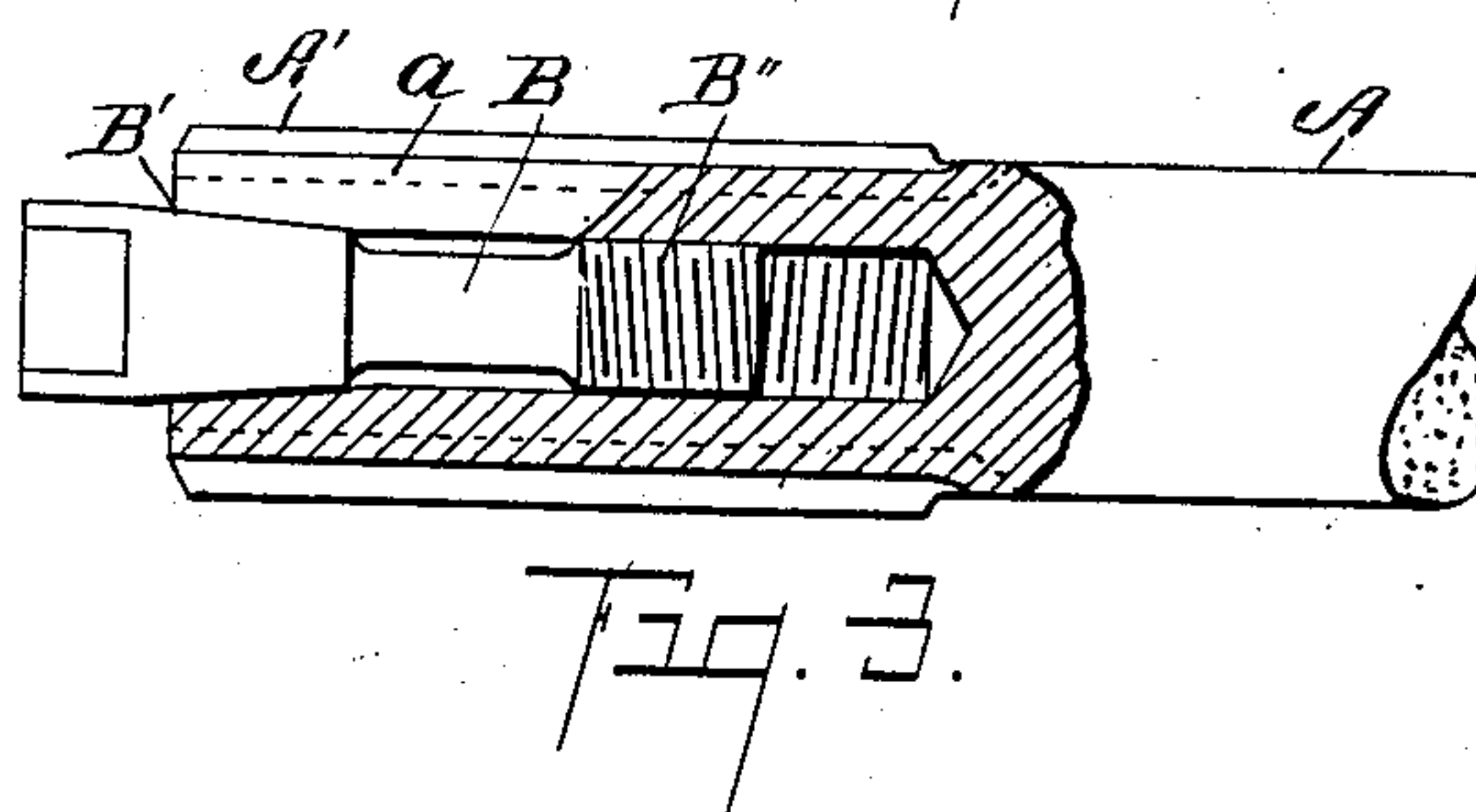
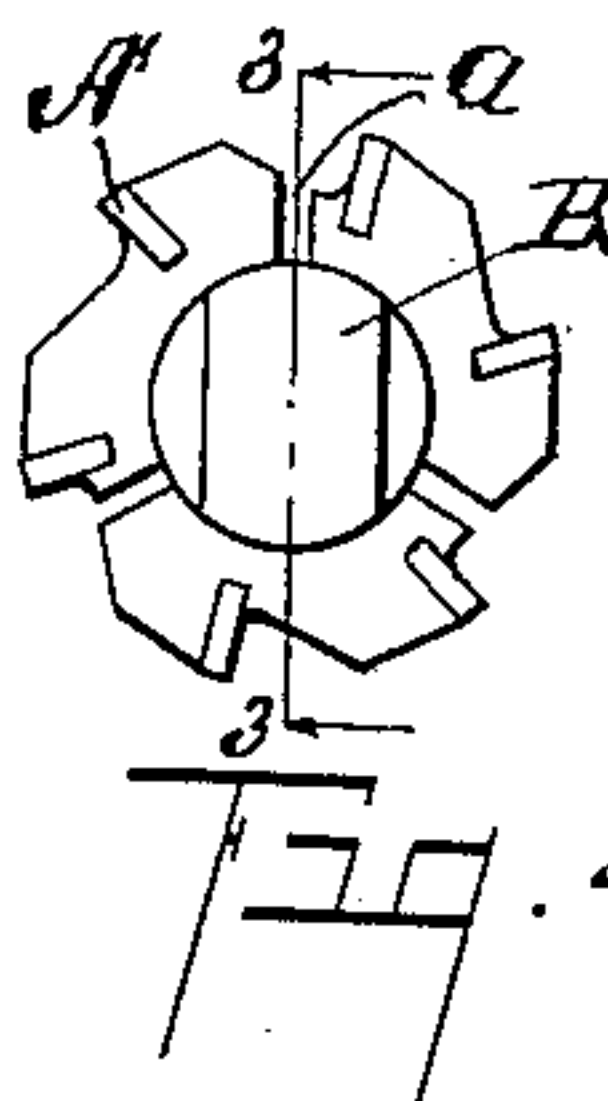
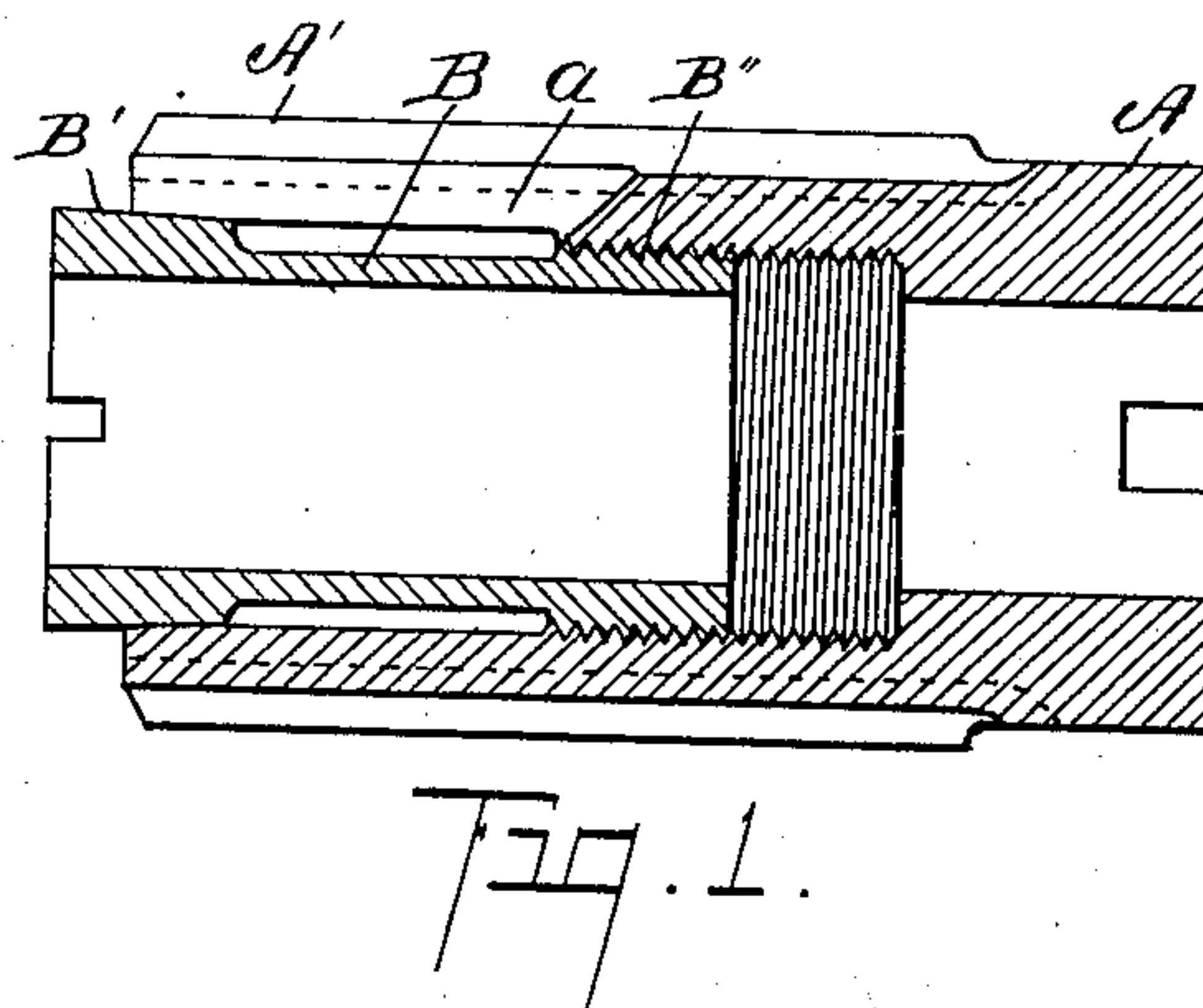
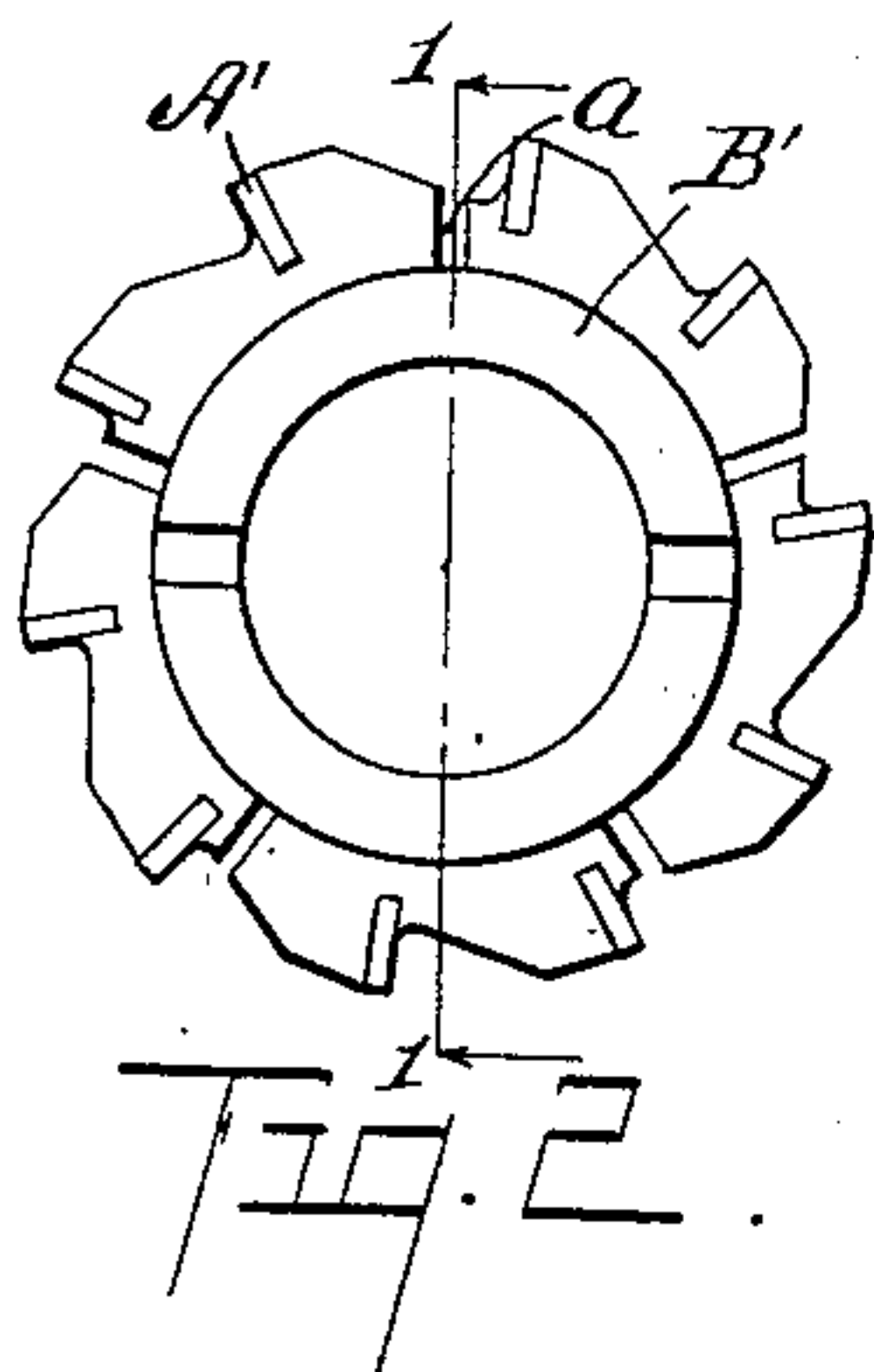


REAMEER.

945,566.

Patented Jan. 4, 1910.



Lulu F. Greenfield
A. S. K. & Co.

John C. Matthews
By Chappell & Earl
Att'ys

UNITED STATES PATENT OFFICE.

JOHN G. MATTHEWS, OF THREE RIVERS, MICHIGAN.

REAMER.

945,566.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed August 30, 1906. Serial No. 332,682.

To all whom it may concern:

Be it known that I, JOHN G. MATTHEWS, a citizen of the United States, residing at Three Rivers, county of St. Joseph, and State of Michigan, have invented certain new and useful Improvements in Reamers, of which the following is a specification.

This invention relates to improvements in expandible reamers.

10 The objects of this invention are: First, to provide an improved reamer having fixed blades of high-grade steel, which is capable of expansion so that the size of the tool may be maintained, and, at the same time, one
15 which is comparatively easy and economical to manufacture. Second, to provide an improved expandible reamer having blades of high-grade steel having as many cutting edges as would ordinarily be found in a
20 solid or non-expandible reamer. Third, to provide an improved expandible reamer having blades of high-grade steel in which the blades are fixed and supported throughout so that the tool is capable of use in any class
25 of work and capable of withstanding all the strain to which a solid or non-expandible reamer may be subjected.

Further objects, and objects relating to structural details, will definitely appear from
30 the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

35 The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which,

40 Figure 1 is a longitudinal section of a reamer embodying the features of my invention taken on a line corresponding to line 1—1 of Fig. 2. Fig. 2 is an end elevation of the structure appearing in Fig. 1, looking from the left thereof. Fig. 3 is a
45 detail longitudinal section of my improved reamer in a slightly modified form, taken on a line corresponding to line 3—3 of Fig. 4, the expanding plug being solid instead of
50 tubular, as appears in Fig. 1. Fig. 4 is an end elevation of the structure appearing in Fig. 3, looking from the left thereof. Fig. 5 is a detail longitudinal section of a further modification, taken on a line corresponding
55 to line 5—5 of Fig. 6, in which the longitudinal slots do not open at the end of the

tool, the tool being provided with a guide portion A'', this form being especially designed for hand tools. Fig. 6 is an end elevation of the structure appearing in Fig. 5, looking from the left thereof. Fig. 7 is a detail longitudinal section of a further modification, being particularly a modification of the structure shown in Fig. 5, with the threading on the expanding plug at the
60 outer instead of the inner end thereof. Fig. 8 is a cross section, taken on a line corresponding to line 8—8 of Figs. 5 and 7, showing the details of the construction and the inserted blades.
70

In the drawing, the sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar letters of reference refer to similar parts throughout the several views.
75

Referring to the drawing, the body of the reamer A is formed of soft steel, such steel or material being preferably used which can be quite easily worked and can be quite readily expanded. In the construction shown in Figs. 1 to 4 inclusive, the body is provided with longitudinal slits α opening at its cutting end. In the tool shown in Fig. 1, the body is made tubular being particularly designed for large reamers.
85

The blades A' are preferably of high-grade steel, preferably such as self-hardening or air-hardening or high-speed steel, which are brazed or soldered in their seats, a suitable hard solder being used, the process of uniting the blades to the body being preferably that described in my application for Letters Patent of the United States, filed July 22, 1904. This secures the blades to the body so that they are substantially
90 integral therewith. I thus secure a tool having cutting blades of the highest grade, which is capable of much greater adjustment than would be possible if the entire body were made of hard or high-grade
95 steel.
100

The blades are so supported by the comparatively soft body that they are not liable to injury by the adjustment thereof. Further, the tool is capable of a much
105 greater range of adjustment than would be possible in a tool constructed entirely of high-grade steel. Another very great advantage is that the cutting blades are so supported that they are not likely to be injured in use and are capable of withstanding much greater strain than the blades of
110

the ordinary expansible reamer having adjustable blades or blades held by mechanical means. The expanding plug B, in the construction shown in Fig. 1, is threaded into the same, the threaded portion B'' being preferably beyond the kerfs or slots therein and the expanding conical portion B' of the plug is at its outer end. This enables the more perfect machining of the parts and the expanding portion B' may be hardened if desired.

In the modified construction of Figs. 5 to 8 inclusive, the longitudinal slits do not open at the end of the reamers, the reamers being provided with solid portions A'' at their ends. These solid portions form guides for the reamer which are of particular advantage in hand reamers, as is well understood in the art. In this construction, the conical or tapered portion of the plug is located at a central point relative to the slots *a* so that the expansion occurs at a central point of the blades.

In the construction shown in Fig. 5, the threads B'' are at the inner end of the plug, while in the construction shown in Fig. 7, they are at the outer end.

By supporting the blades of high-grade steel on a soft body, as before stated, I secure all the advantages of the high-grade steel cutting blades. Further, the body of soft steel can be easily machined to receive the expanding plug. The comparatively thin blades are so supported that they are capable of considerable adjustment and at the same time are not liable to be injured thereby, the expansion being much greater than is possible in a tool made of a single piece of hardened steel. A further advantage is that the body can be machined after the blades are hardened, thereby avoiding a liability of distortion of the body and the cracking thereof in hardening, which are characteristics of tools made of single pieces of high-grade steel which harden clear through. Another advantage is that a tool having a solid body, such as is illustrated in my application referred to, may, after the

same has been worn below size by use, be converted into an expansible tool, it being possible to machine the body, as before stated.

In the use of the expression soft steel, I wish to be understood as contemplating any suitable steel which is relatively soft and may be machined or worked. Some so called tool steel and carbon steels for instance, although they should be hardened at the time of hardening the blades, might be softened by reheating without destroying the temper of the blades so that they can be quite easily machined.

I have illustrated and described my invention in detail in the form preferred by me, although I am aware that it is capable of considerable variation in structural details without departing from my invention.

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

1. An expansible reamer, comprising a body of soft metal having longitudinal slits therein; cutting blades of high-grade steel arranged in suitable seats in said divided portion of said body and brazed therein; and a tapered expanding plug threaded into said body to expand said reamer, as specified.

2. An expansible reamer comprising a hollow body having longitudinal slots therein dividing one end thereof into parts, a portion of the unslitted body being provided with internal screw threads; a tapered expanding plug having a threaded portion adapted to engage the threads in the said body; and a conical unthreaded portion for expanding and regulating the slitted portion of said body; and cutting blades brazed to said expanding portion of said body.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

JOHN G. MATTHEWS. [L. s.]

Witnesses:

LULU G. GREENFIELD,
OTIS A. EARL.