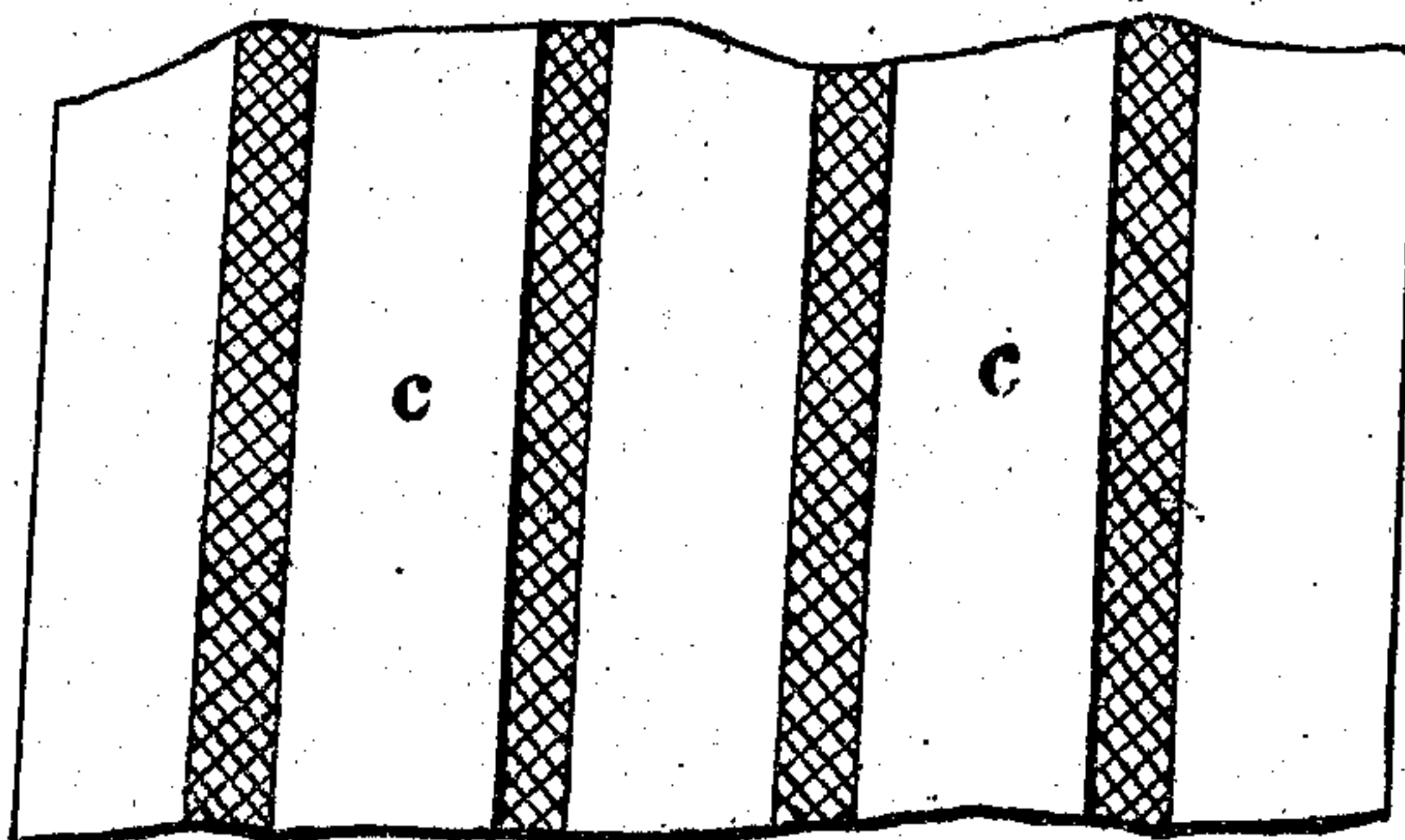
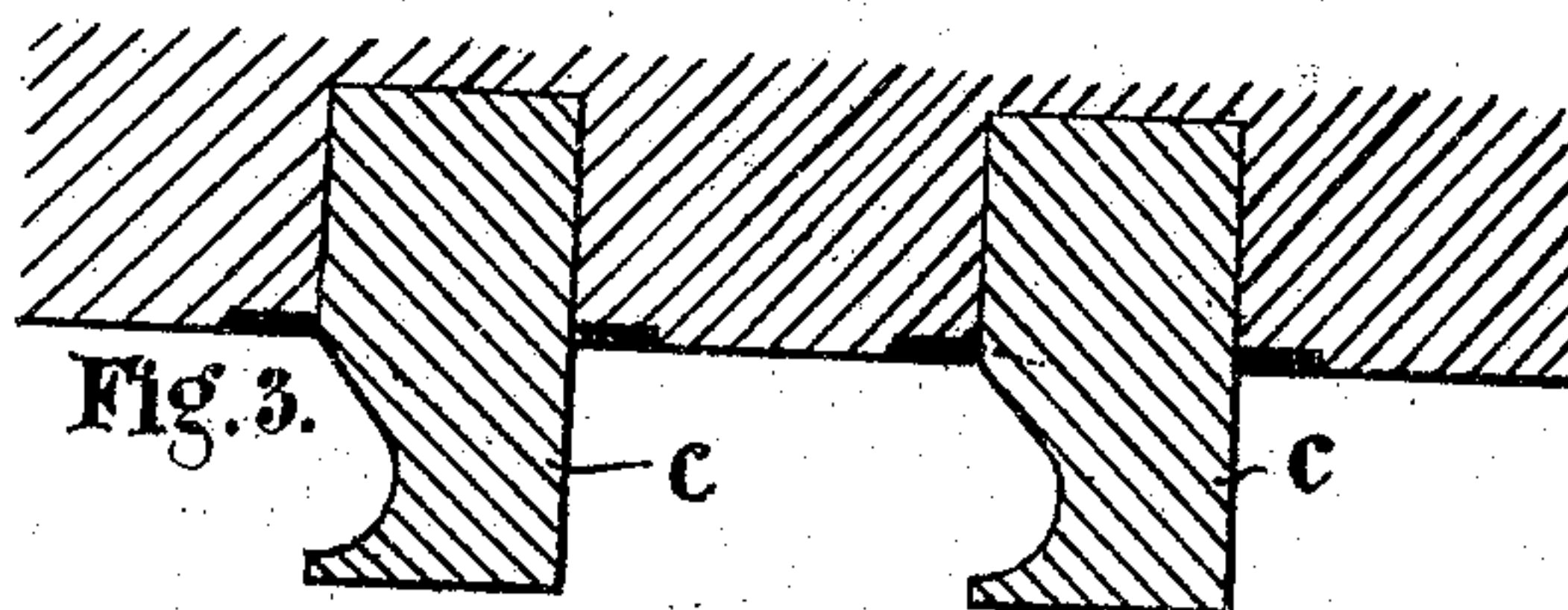
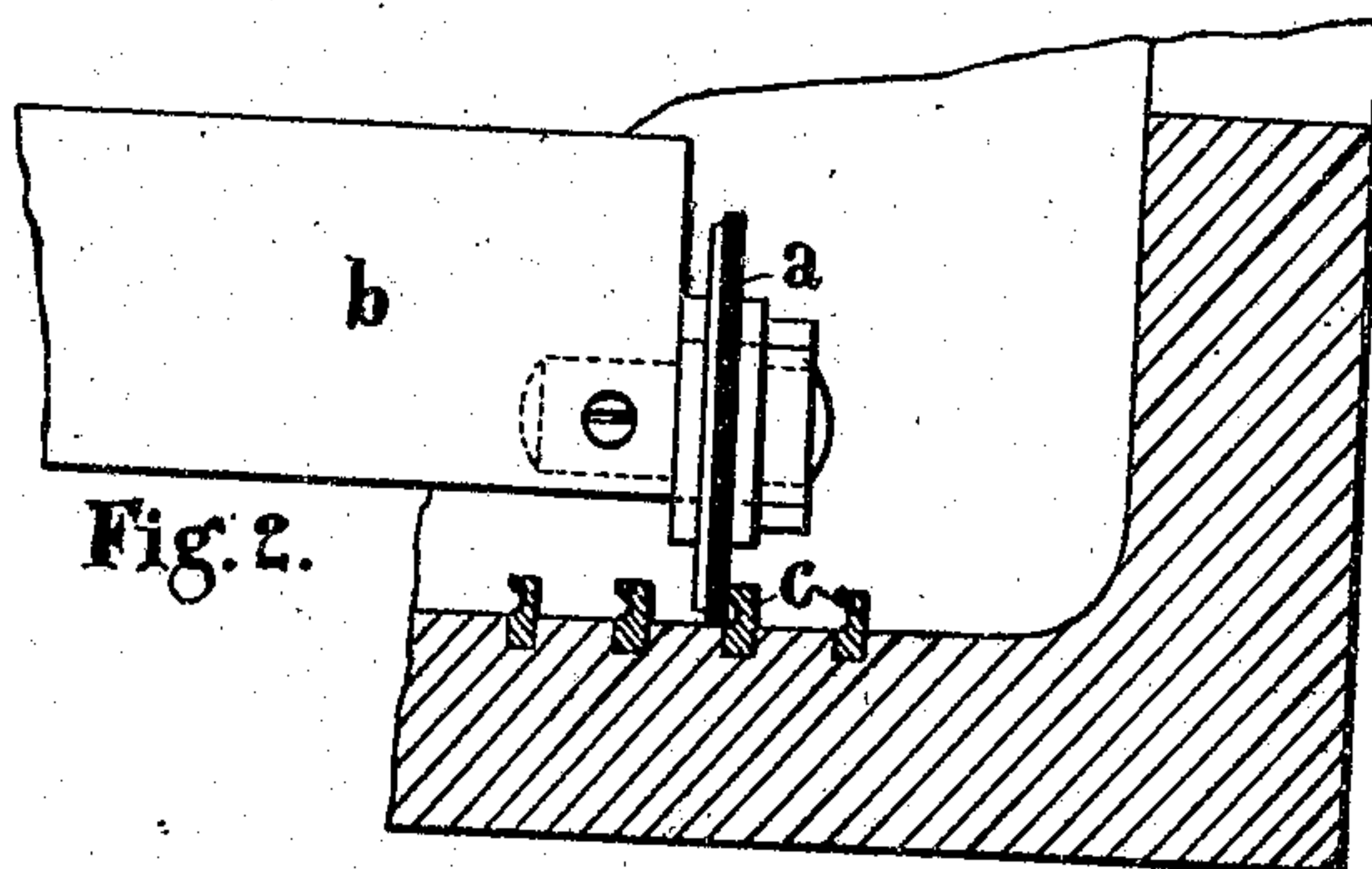
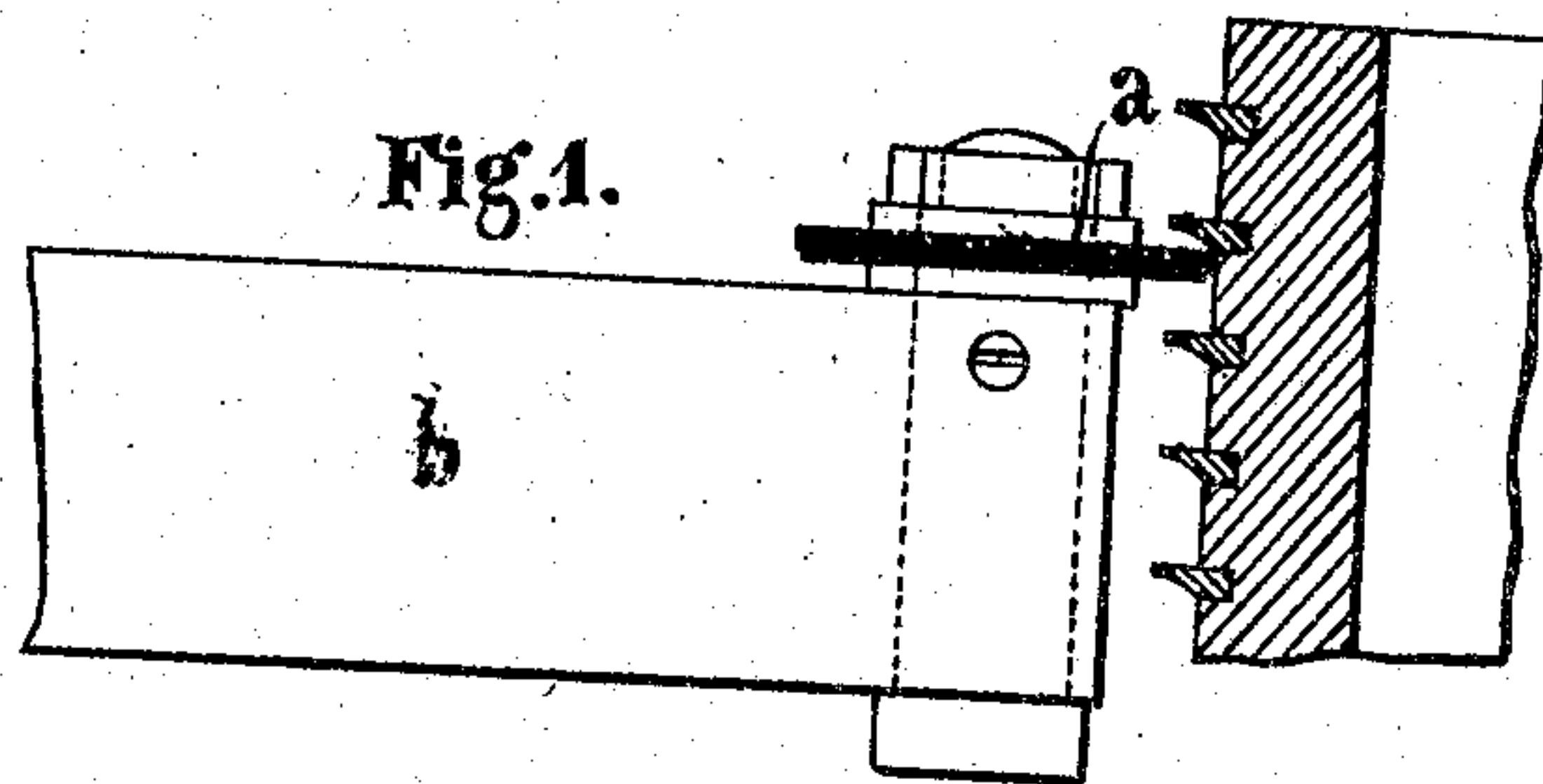


C. A. PARSONS & E. C. CARNT.  
METHOD OF SECURING METAL STRIPS IN GROOVES.  
APPLICATION FILED JAN. 6, 1908.

930,413.

Patented Aug. 10, 1909.



Attest:

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# UNITED STATES PATENT OFFICE.

CHARLES ALGERNON PARSONS, OF NEWCASTLE-UPON-TYNE, AND EDWIN CHARLES CARNT, OF EAST COWES, ISLE OF WIGHT, ENGLAND; SAID CARNT ASSIGNOR TO SAID PARSONS.

## METHOD OF SECURING METAL STRIPS IN GROOVES.

No. 930,413.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed January 6, 1908. Serial No. 409,557.

To all whom it may concern:

Be it known that we, CHARLES ALGERNON PARSONS, C. B., a subject of the King of Great Britain and Ireland, and residing at Heaton Works, Newcastle-upon-Tyne, in the county of Northumberland, and EDWIN CHARLES CARNT, a subject of the King of Great Britain and Ireland, and residing at East Cowes, Isle of Wight, England, have invented certain new and useful Improvements in Methods of Securing Metal Strips in Grooves, of which the following is a specification.

This invention relates to the securing of packing or blade strips in turbines and rotary compressors. The ordinary method of securing such strips in their grooves, is to calk the strip itself or a separate packing piece in the groove or to calk the edges of the metal of the groove in which they are placed.

The object of the present invention is to secure the strips in the groove by rolling in such a manner that creeping of the strip in relation to the holding member even during the rolling process is prevented.

The invention consists in securing blade or packing strips in grooves, especially grooves around a cylindrical surface, by rolling the material of the strip or of a separate packing piece or of the groove instead of using an ordinary calking tool in such a manner that the edges of the strip shall provide a serrated grip against the walls of the groove in the carrying member.

A convenient form of apparatus is illustrated in the accompanying drawings for carrying this invention into practical effect.

Figure 1 represents one form of the apparatus *e. g.* at the end of a radius arm carried on a boring bar; Fig. 2 illustrates another method of applying the apparatus, *e. g.* when the tool is supported in the rest of the lathe; Figs. 3 and 4 represent one form of strip after it has been fixed in position by nurling.

According to Figs. 1 and 2, we use a roller,

*a*, milled or grooved as shown which, in the case of rolling a strip or the like in the grooves on the rotating member of the turbine, is carried on a slide rest of a lathe or similar support as shown in Fig. 2. When however, the rolling is to be effected on the cylinder or casing of the turbine or the like, the nurling tool is carried on an arm such as *b*, (Fig. 1) attached to the boring bar and in both cases the nurling tool is pressed against the packing or other strips or part it is desired to calk in any convenient way, as for instance, in the last mentioned case by a screw operating a wedge with an inclined slot.

In the enlarged views Figs. 3 and 4, the strips, *c, c*, are shown as held in by nurling the casing or other part in which the strips are fixed but if desired the strip itself may be knurled.

By this invention an exceedingly cheap and quick method of securing blade and packing strips is obtained. Further by nurling the strips in accordance with this invention, we avoid straining or bending of the turbine spindle or casing. Some further advantages of this method are that packing or blade strip is pressed transversely in the groove so as to cause it to fill the groove without materially stretching the strip longitudinally, and that when the milled roller is used it makes a serrated locking joint between the strip and groove which effectually prevents end movement or creep, which may be caused by varying temperatures.

Although we have only illustrated our invention applied to packing strips, it will be readily understood that it may be used for effecting the fixing of all kinds of strips used in turbines, such as the calking strips or the blade carrying strips, and the nurling may be done on the strip or on the casing as shown or on both.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In turbines, compressors or the like, a

process for securing strips in grooves formed in metal bodies comprising the insertion of a strip in a groove and producing on the edges of the strip adjacent to the groove a serrated surface simultaneously with the compression of the strip into the groove.

2. In turbines, compressors or the like, a process for securing strips in grooves formed in metal bodies consisting in inserting the strip in the groove and rolling the strip or metal adjacent to the edge of the groove or both with a knurled roller.

In testimony whereof, we affix our signatures in presence of two witnesses.

CHARLES ALGERNON PARSONS.

EDWIN CHARLES CARNT.

Witnesses to the signature of the said Charles Algernon Parsons:

HENRY GRAHAM DAKYNS, Jr.,

FREDERICK GORDON HAY.

Witnesses to the signature of the said Edwin Charles Carnt:

ERNEST GARDNER,

JAS. HUNT.