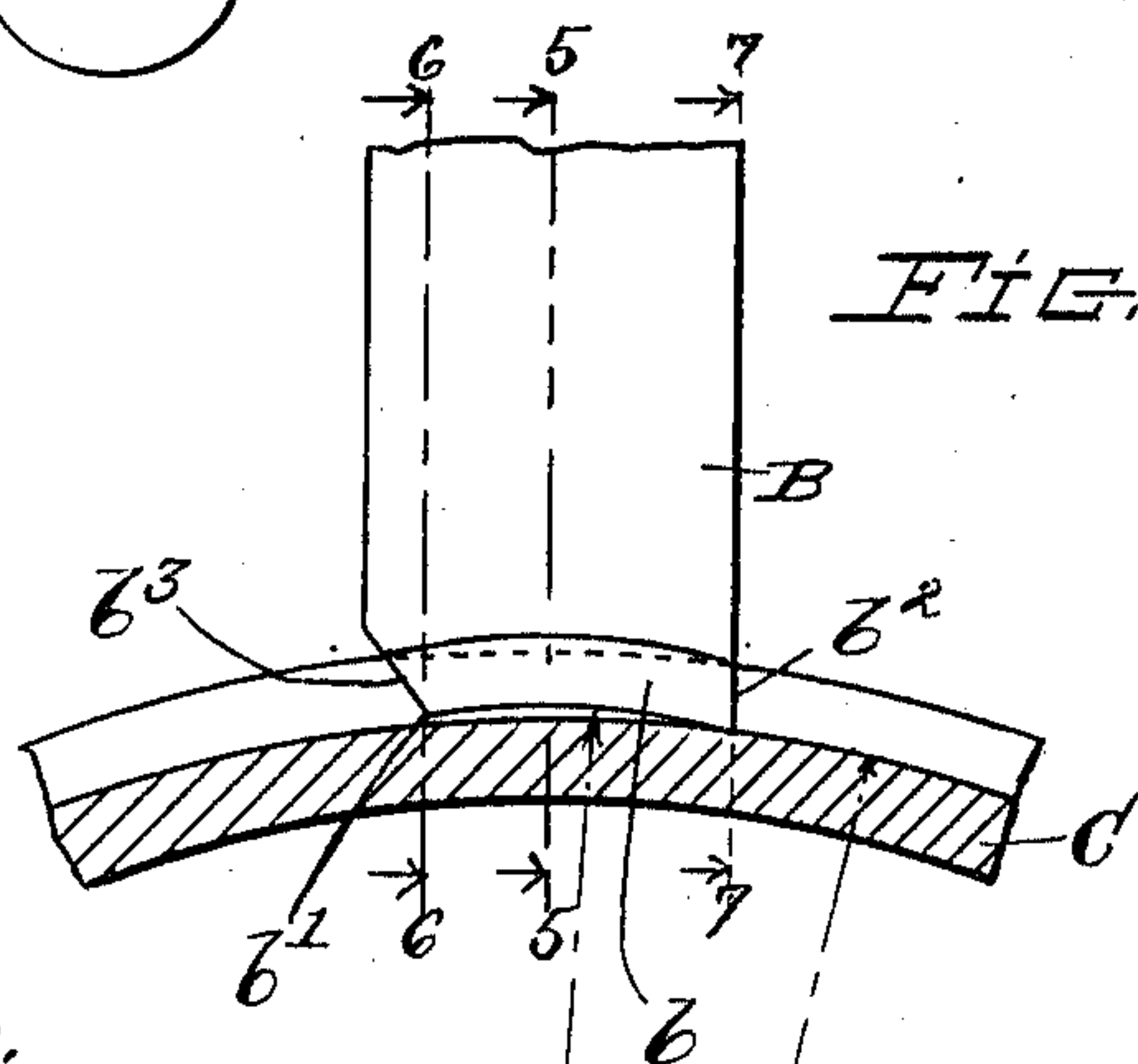


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2 SHEETS—SHEET 1.



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988,467.

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2 SHEETS—SHEET 2.

FIG. 5

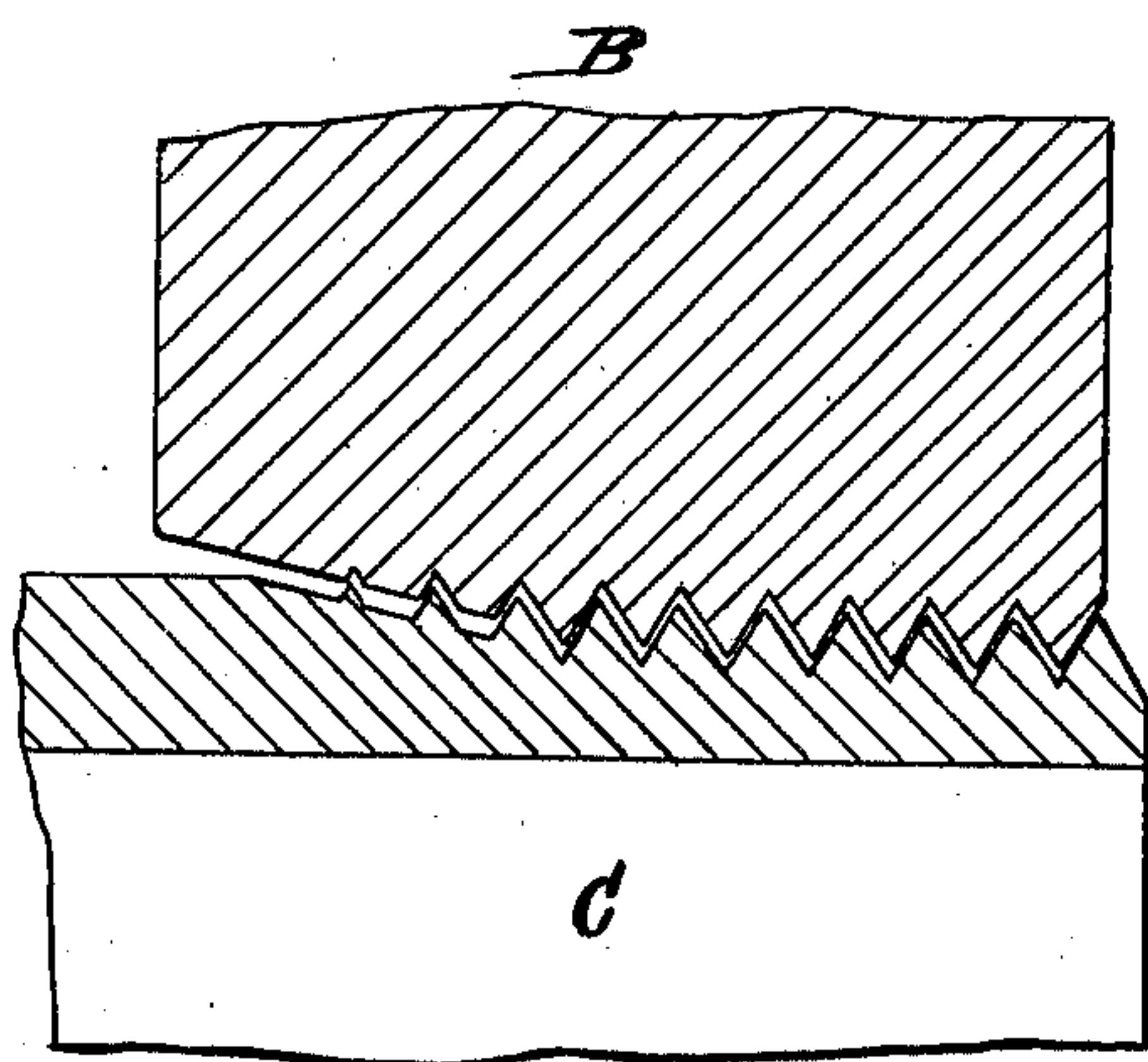


FIG. 6

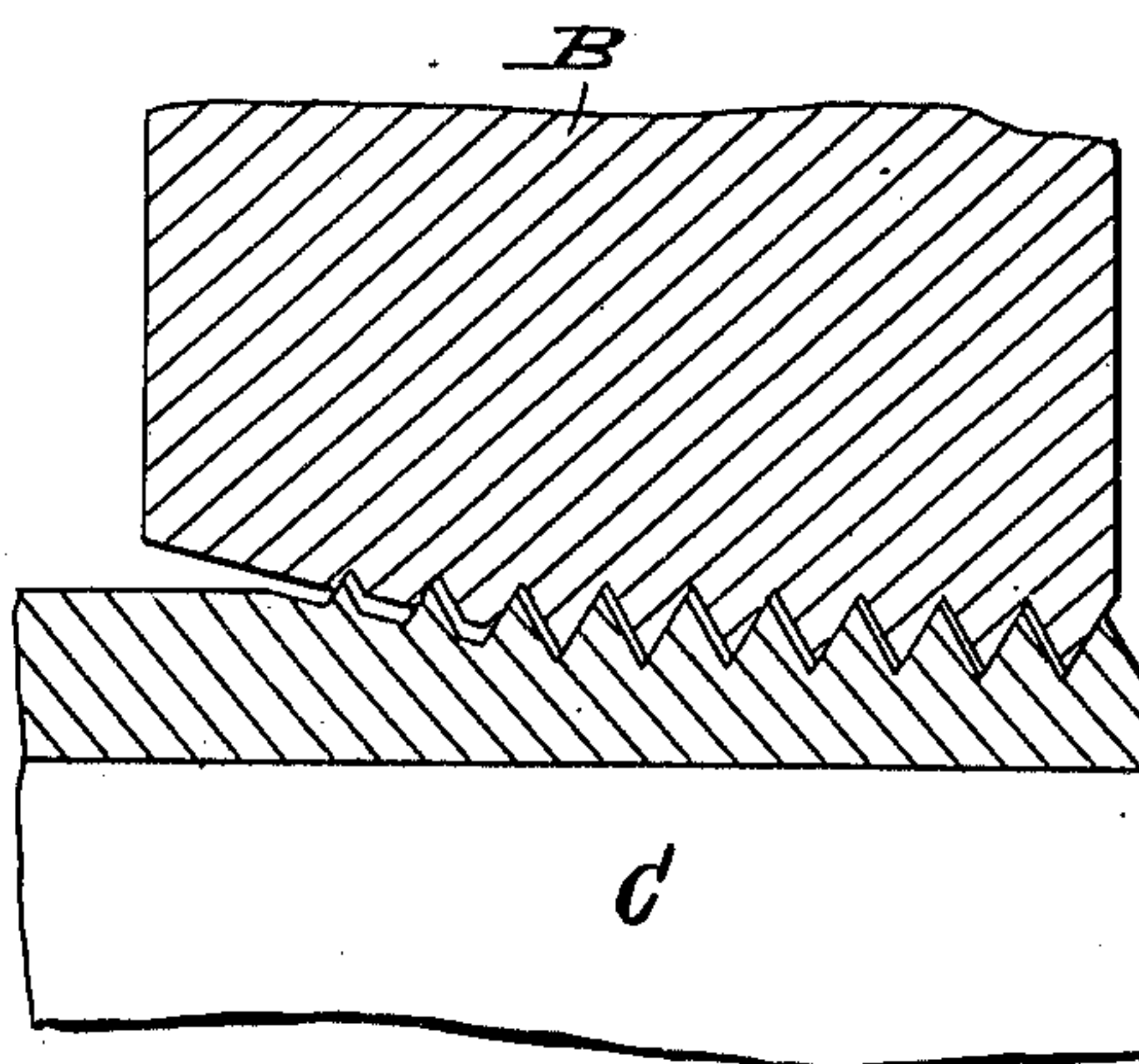


FIG. 3

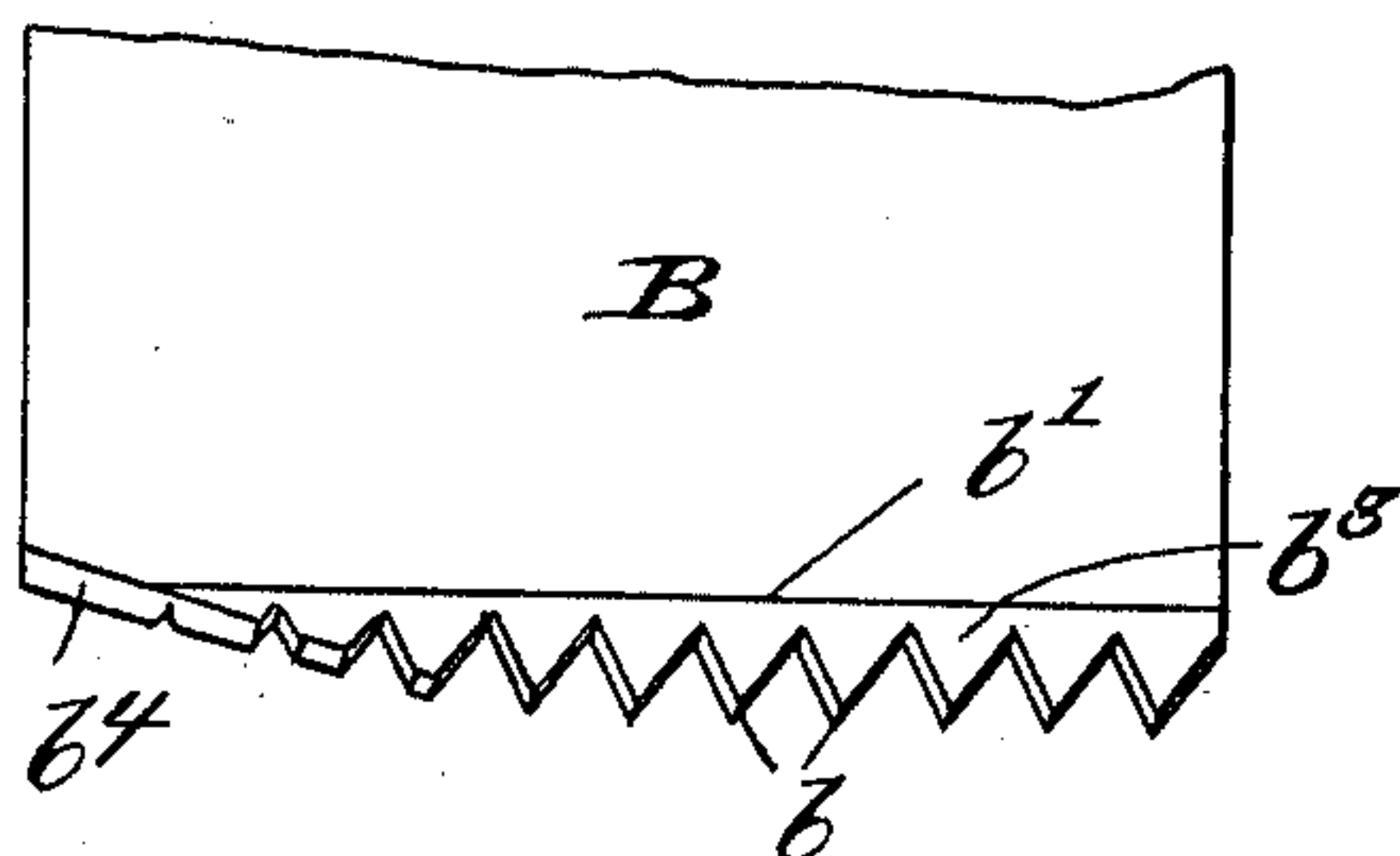


FIG. 7

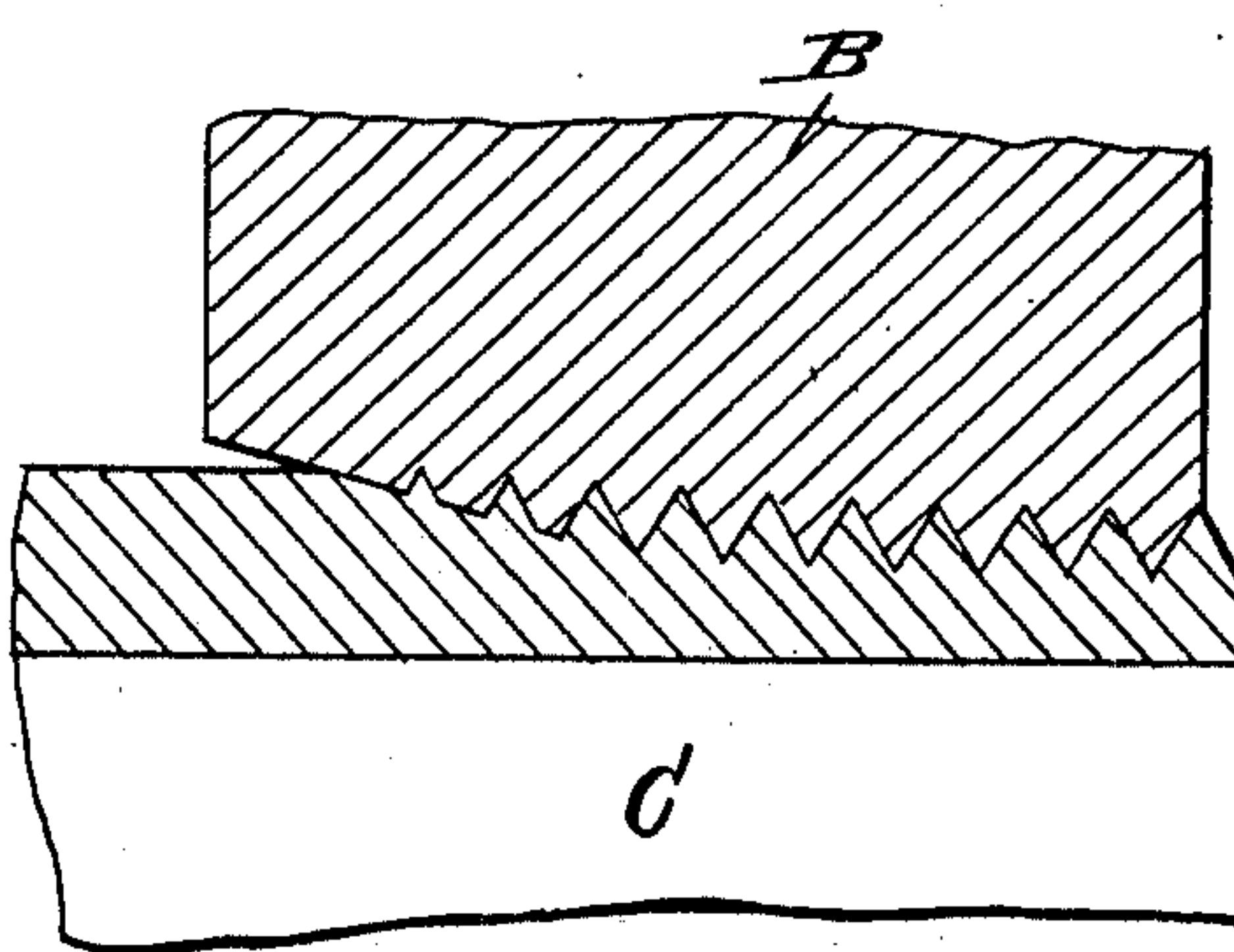
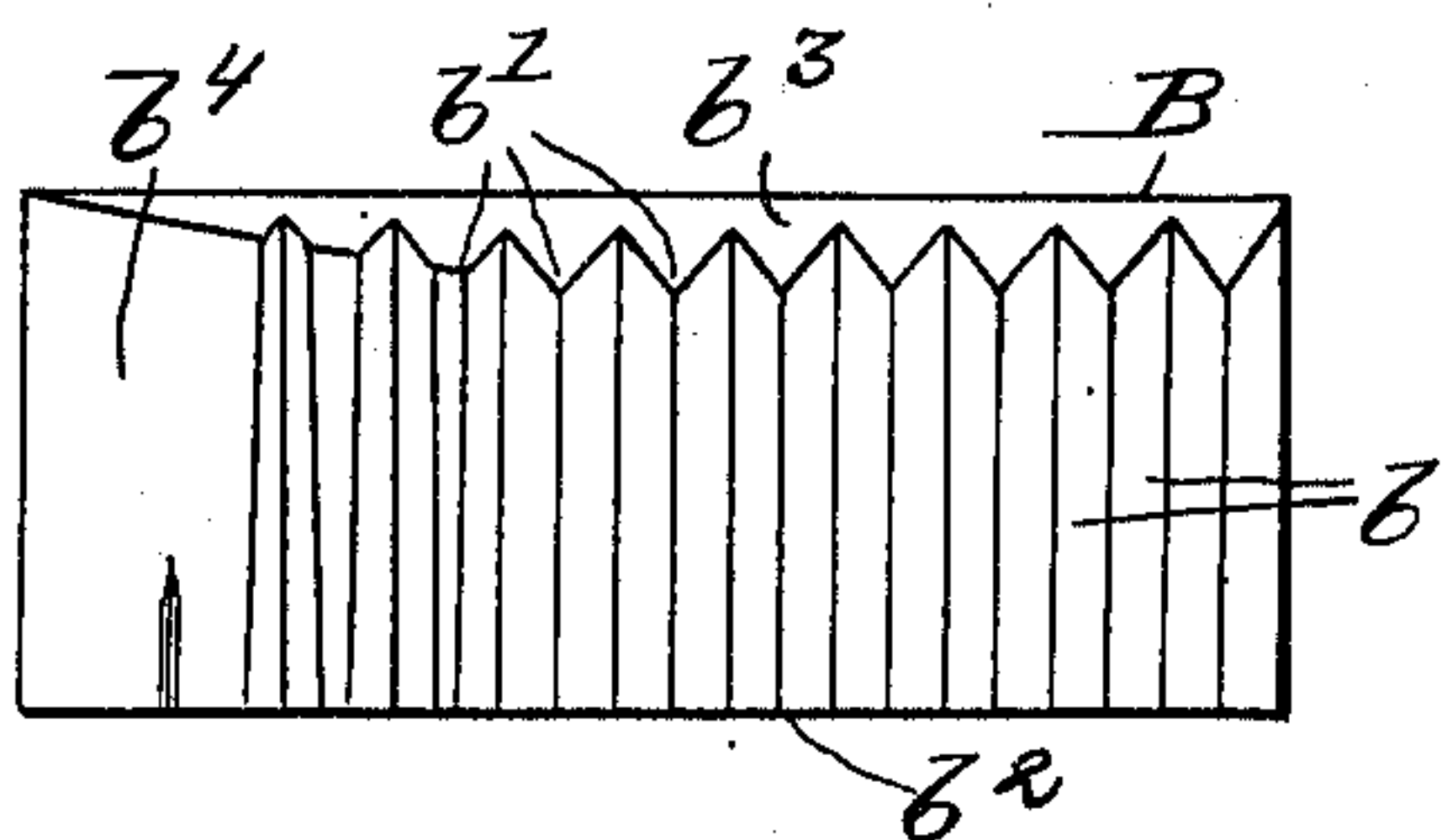


FIG. 4



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CHASER-DIES.

988,467.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed January 6, 1910. Serial No. 536,663.

To all whom it may concern:

Be it known that I, LOUIS F. HART, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Chaser-Dies, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

In devices for cutting screw threads and particularly in die stocks for cutting threads on pipe, it is desirable, in order to meet the demands of this class of work, to provide for the using of the same dies to operate upon pipe differing relatively widely in size or diameter. Thus one range of tool would be from 1 inch to 2 inch pipe, and another would be from 2½ inch to 4 inch pipe, the pitch of the threads, or the number of threads per inch, throughout each of these ranges being the same. In making a die that will operate throughout such a range of radial adjustment, various difficulties are encountered; thus the degree of inclination of threads of the same pitch varies on pipes of different sizes owing to the increased radius of such threads, but obviously the cutting threads on the die face can not thus be changed. Similarly the radius of such cutting threads can conform with the radius of but one size of work. Furthermore, when the dies in such an adjustable die stock are positioned for operation on one of the smaller sizes of pipe, said dies project for a considerable distance inside the opening in the head, and such projecting portions being unsupported, a tendency toward unsteadiness and chattering is produced; at the same time it is desirable that the "draft" of the dies be reduced, in cutting the larger sizes of pipe, as much as possible owing to the increased burden there encountered. These several difficulties, it may be remarked, are particularly emphasized in die-stocks in which no leader screw is employed and the dies thrown on their own resources in leading the tool onto the work.

The object of the present invention, is to provide a chaser die, in the design of which due consideration is given to the various foregoing requirements and difficulties, and

to the accomplishment of this object, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a front elevation of a typical die stock wherein have been incorporated chaser dies of my improved construction; Fig. 2 is a broken elevation, on a larger scale, of the narrow side of such die, showing the same in operative relation to a piece of work, as a pipe; Fig. 3 is a broken elevation of the broad side of the die viewed from the rear or "heel;" Fig. 4 is a plan view of the cutting face of the die; and Figs. 5, 6 and 7 are sectional views of the die in operative relation to a pipe, the planes of such sections being respectively indicated by the lines 5—5, 6—6, and 7—7, Fig. 2.

The typical die stock in connection with which my improved dies are illustrated in Fig. 1, is the "Duplex" die stock as it is known to the trade. Such die stock is characterized by the provision of radial slots *a* in the head A of the stock for the reception of the dies B, the latter simultaneously adjusted in such slots by means of a cam plate A' provided with eccentric slots *a'* that engage with pins on said dies, as will be readily understood. Cam plate A' is locked in adjusted position by a second plate *a*² that is threaded on the head A and adapted, upon rotation, to securely clamp the cam plate to said head, thereby at the same time retaining the dies in proper position to cut threads on work of any desired diameter, within the range of the tool. The object in having the slots radially disposed or substantially so, is that the same tool may be used for cutting either right or left handed threads by simply interchanging dies formed with corresponding cutting edges and made otherwise the same. This is obviously not practicable when the slots are otherwise than radially disposed.

The cutting threads *b* of the present improved dies, I form on an arc having a

radius approximately equal to the smallest size of work within the range of the tool, and on an axis sufficiently eccentric with respect to that of such work to cause said threads at the heel b' of the dies to clear the bottoms of the threads c being cut on the work C. At the same time the inclination of such threads b on the die face is made substantially the same as that of threads formed thereby on work of the smallest size, or if anything, this inclination is a trifle sharper. As a result, when employed in cutting threads on work of larger diameter, or on the smallest diameter also in case of the sharper inclination, such die threads bear at the rear edge of the die, against those sides of the threads on the work that face in the direction of advance of the die. In other words, while the threads along the front face b^2 of the die, at which point the cutting takes place, conform exactly to the threads being cut, as shown in Fig. 7, the same threads at the heel of the die bear against one side only of corresponding threads on the work as shown in Fig. 6. As will likewise appear from such Fig. 6, such cutting threads of the die clear the bottoms of the threads on the work, at the die's heel. Owing to the curvature of the threads of the die, moreover, such threads are substantially entirely out of contact with the threads being cut at points intermediate between such cutting face and die heel as shown in Fig. 5, which represents a substantially median plane of the die.

As result of the foregoing construction there is but little friction between the die and the work, save at the front face where the actual cutting is in progress, the wedging action at the heel of the die between the contacting faces of the threads on the die and those on the work being just enough to tighten down, or steady the die. The amount of such wedging action gaged so as to be just enough to secure the desired steadying effect without twisting the die from its proper position or distorting the pitch of the thread being cut. Adjustment of such wedging effect or pressure at the heel is secured by beveling or otherwise cutting off the thread at the heel, as shown at b^3 in Figs. 3 and 4, such bevel serving to regulate pressure at this point irrespective of the amount of clearance given such threads by the eccentric disposition of their axis with respect to the axis of the work. By thus beveling the heel, in other words, substantially a line contact is obtained for the threads at the corresponding end, which line may be made to conform more or less exactly with the threads cut on any selected larger size of work by cutting away or beveling the heel to the proper degree. The throat b^4 of the die is, of course, chamfered

as usual, so as to admit the end of the pipe or other article being threaded and thereby facilitate the starting of the tool on such work.

By means of the foregoing construction of die, I am enabled to employ the dies throughout the entire range of adjustment ordinarily found in die stocks or threading devices of the kind in hand, and have the dies cut threads with equal satisfaction on work of any size within each range; for owing to the steadying effect secured by the slight contact of the heels of the dies with the threads of the work, any tendency to chatter is eliminated, and yet no unnecessary friction produced as an alternative. In other words, such dies will cut as steadily as though conformed exactly to the thread being cut, both in the matter of inclination, radius and center of curvature, without the excessive friction that such a construction would involve.

As has been previously indicated, the foregoing results appear to the greatest practical advantage in tools or die stocks wherein the dies are thrown entirely upon their own resources and are expected to feed or lead themselves onto the work. It is immaterial whether they are forced to initially grip the work by direct pressure of the hand as in the "Duplex" die stock hereinbefore referred to, or whether other means, as in the "Buckeye" die stock shown in U. S. Letters Patent No. 925,981 issued to me June 15, 1909, be provided to effect such initial engagement.

It will, of course, be understood that the several improvements in die construction forming the present invention are not limited to use in die stocks merely, but may be employed in the various forms of tool heads used on lathes, and for thread cutting devices in general.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. The combination with a die holder having an axis about which it and the work are relatively rotatable, of chaser dies for said holder, the threads on said dies being so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves are at an inclination differing from that of such helix, whereby said threads at the heels of the dies are adapted to bear against similarly directed sides only of the threads being cut on the work, substantially as described.

2. The combination with a die holder hav-

ing an axis about which it and the work are relatively rotatable, of chaser dies for said holder, the threads on said dies being so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves are at an inclination differing from that of such helix, whereby said threads at the heels of the dies are adapted to bear against similarly directed sides only of the threads being cut on the work, such heel being cut off or beveled, substantially as described.

3. The combination with a die holder having an axis about which it and the work are relatively rotatable, of chaser dies for said holder, the threads on said dies being so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves deviate axially, and also radially outward, from such helix, whereby said threads at the heels of the dies are adapted to bear against similarly directed sides only of the threads being cut on the work and also to clear the bottoms of such latter threads, substantially as described.

4. The combination with a die holder having an axis about which it and the work are relatively rotatable, of chaser dies for said holder, the threads on said dies being so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves deviate axially, and also radially outward, from such helix, whereby said threads at the heels of the dies are adapted to bear against similarly directed sides only of the threads being cut on the work and also to clear the bottoms of such latter threads, such heel being cut off or beveled, substantially as described.

5. The combination with a die holder having an axis about which it and the work are relatively rotatable, of chaser dies for said holder, the threads on said dies being so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves are formed eccentric with respect to said axis and at an inclination differing from such helix, whereby said threads at the heels of the dies are adapted to bear against similarly directed sides only of the threads being cut on the work and also to clear the bottoms of such latter threads, substantially as described.

6. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads on an arc of a radius approximately equal to the smallest of such sizes and so arranged that their cutting edges lie in a helix co-axial with aforesaid axis while said threads themselves are at an inclination differing from that of such helix, whereby said threads at the heels of the dies are adapted to bear against similarly di-

rected sides only of the threads being cut on the work, substantially as described.

7. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads so arranged that said threads conform in inclination with the helix described by their cutting edges when the dies are adjusted for the smallest size of work, whereby such threads at the heels of the dies are adapted to bear against those sides of the threads being cut on work of larger size that face in the direction of the dies' advance.

8. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads so arranged that said threads conform in inclination with the helix described by their cutting edges when the dies are adjusted for the smallest size of work, whereby such threads at the heels of the dies are adapted to bear against those sides of the threads being cut on work of larger size that face in the direction of the dies' advance, such heels being cut off or beveled, substantially as described.

9. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads so arranged that said threads conform both in inclination and radius with the helix described by their cutting edges when the dies are adjusted for the smallest size of work, whereby such threads at the heel of the die are adapted to bear against those sides of the threads being cut on work of larger size that face in the direction of the dies' advance.

10. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads so arranged that they conform both in inclination and radius with the helix described by their cutting edges when the dies are adjusted for the smallest size of work, such threads being eccentric, however, with respect to the axis of said helix, whereby such threads at the heels of the dies are adapted to bear against those sides of the threads being cut on work of larger size that face in the direction of the dies' advance, as also to clear the bottoms of such latter threads.

11. The combination with a die holder having an axis about which it and the work are relatively rotatable; of dies adjustable therein for work of different sizes, said dies having their threads so arranged that said threads conform both in inclination and radius with the helix described by their cut-

ting edges when the dies are adjusted for
the smallest size of work, such threads being
eccentric, however, with respect to the axis
of said helix, whereby such threads at the
5 heels of the dies are adapted to bear against
those sides of the threads being cut on work
of larger size that face in the direction of
the dies' advance, as also to clear the bottoms

of such latter threads, such heels being cut
off or beveled, substantially as described. 10

Signed by me this 4th day of January,
1910.

LOUIS F. HART.

Attested by—

ANNA L. GILL,
JNO. F. OBERLIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
