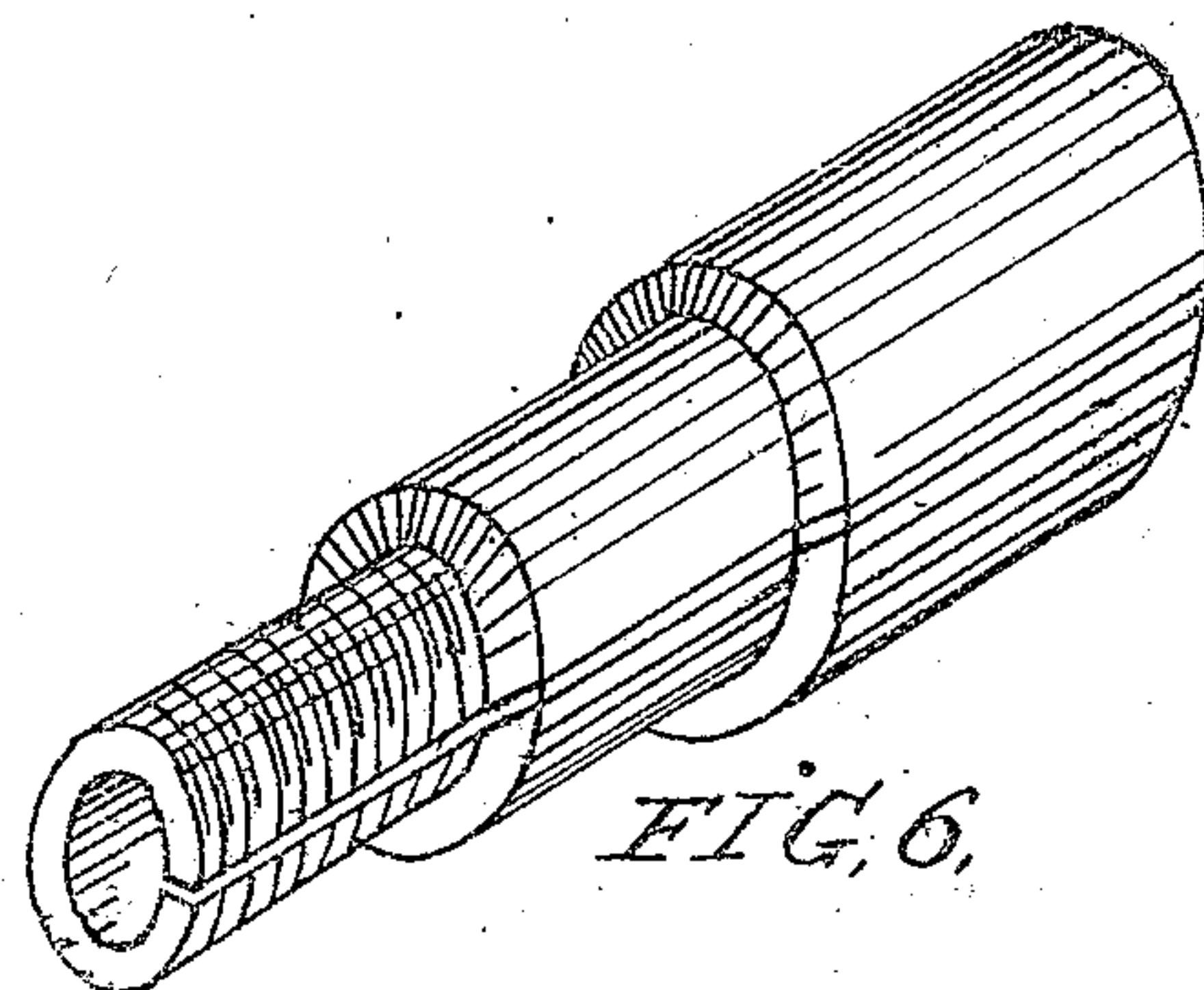
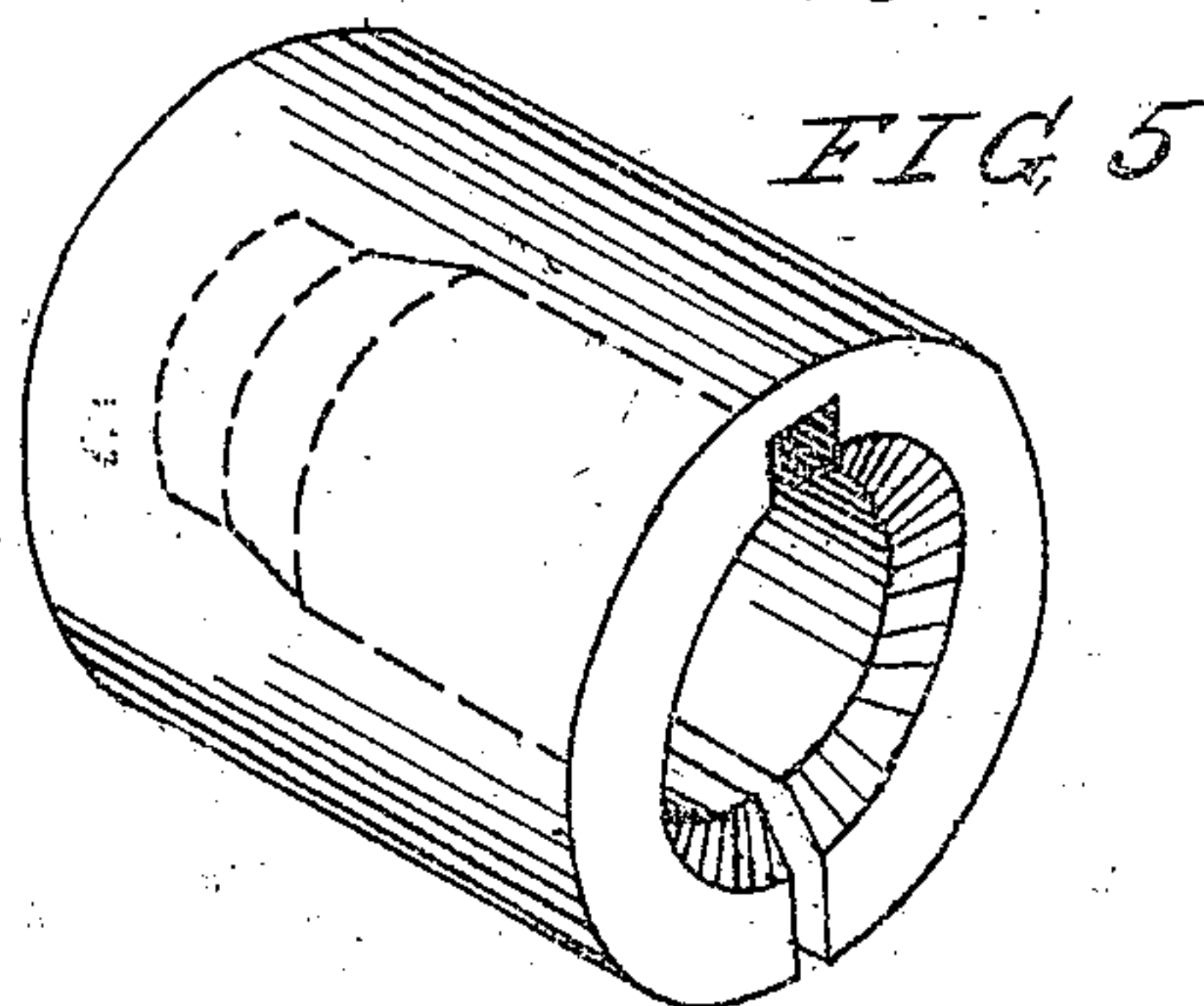
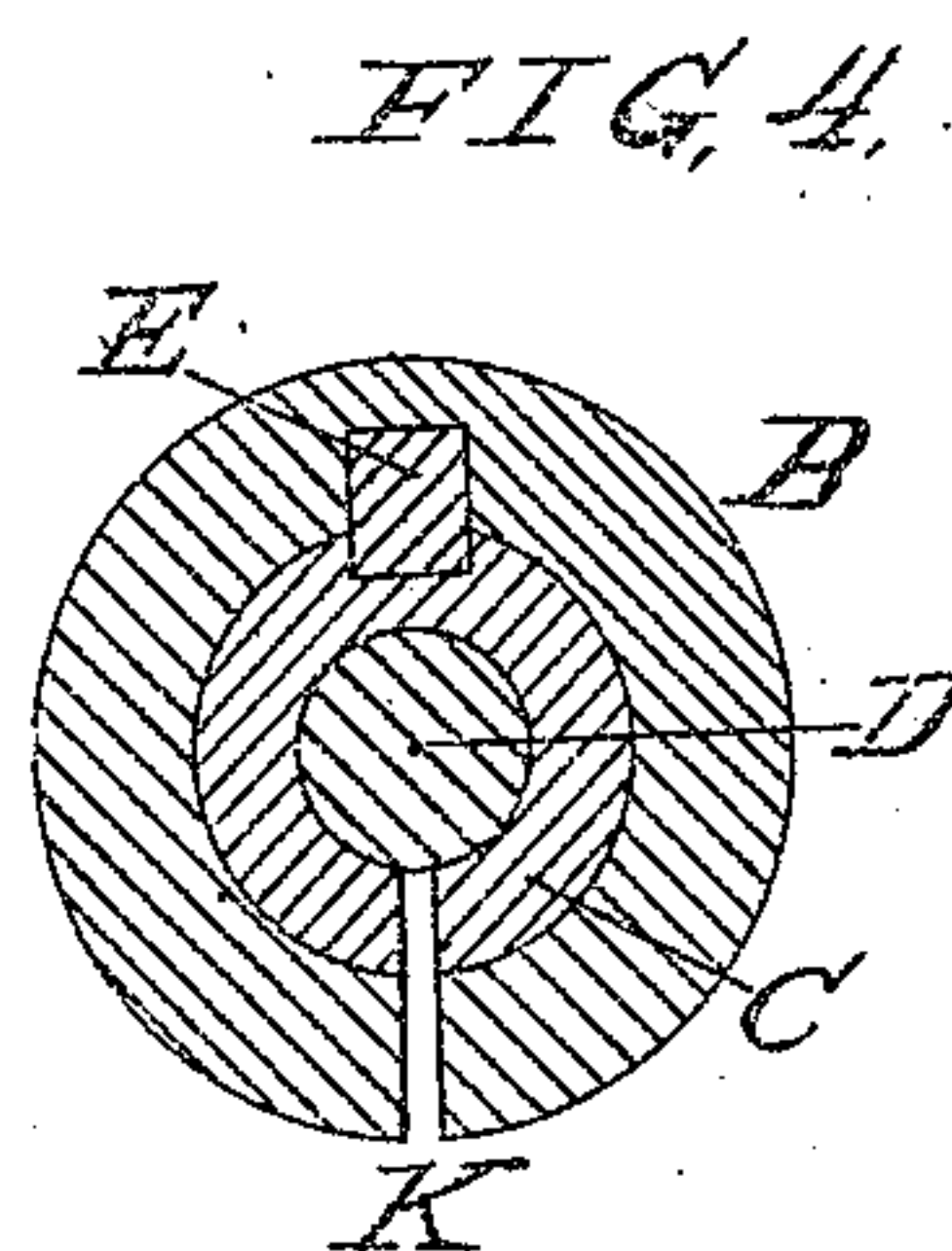
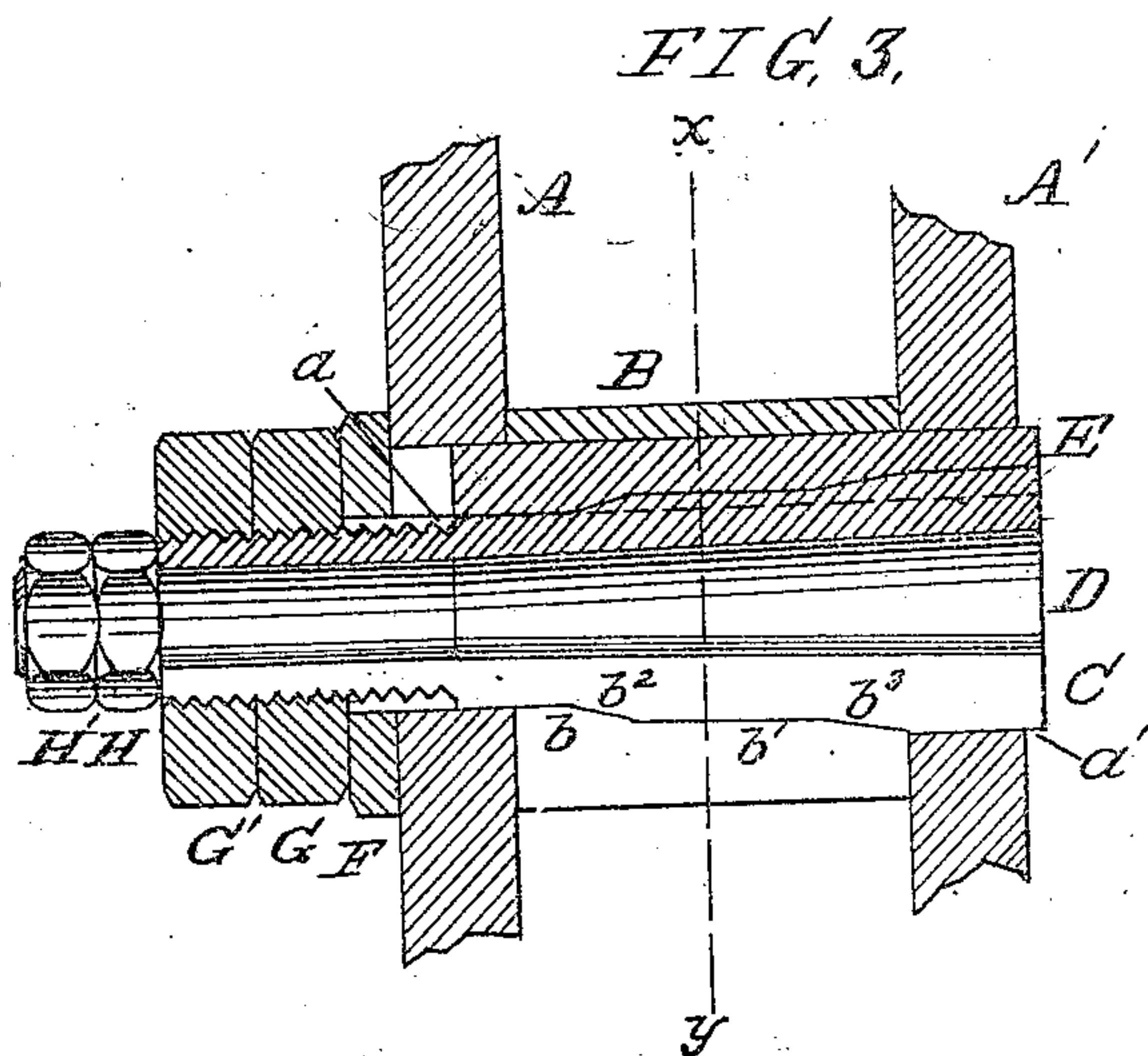
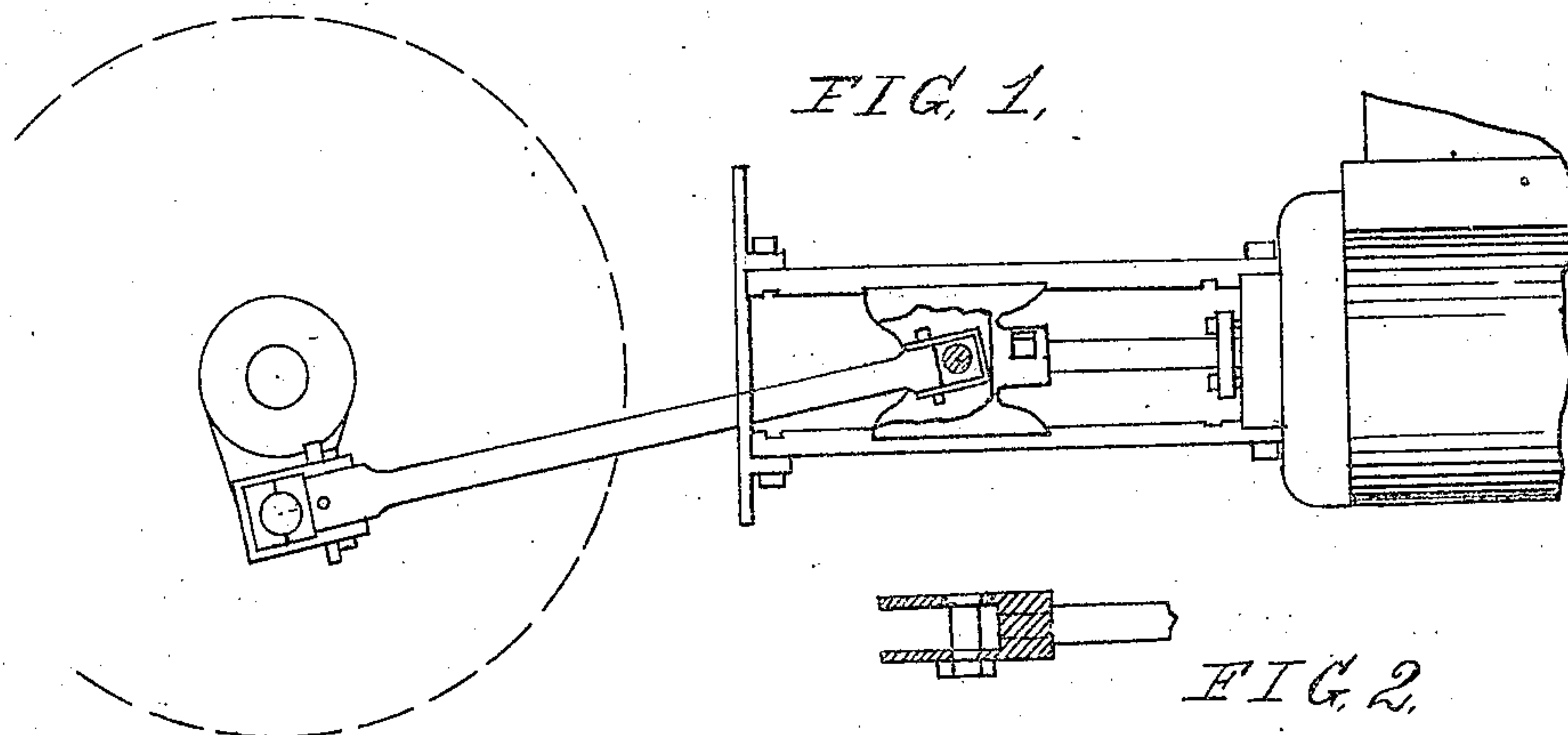


(No Model.)

H. M. MONTGOMERY.
EXPANSIBLE CONNECTING PIN.

No. 337,072.

Patented Mar. 2, 1886.



Witnesses
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HARRY M. MONTGOMERY, OF BOSTON, MASSACHUSETTS.

EXPANSIBLE CONNECTING-PIN.

SPECIFICATION forming part of Letters Patent No. 337,072, dated March 2, 1886.

Application filed November 17, 1885. Serial No. 183,146. (No model.)

To all whom it may concern:

Be it known that I, HARRY M. MONTGOMERY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Expansible Connecting-Pins; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The nature and object of my invention will be more readily understood upon consideration of some of the difficulties which it is intended to obviate.

In locomotive and stationary steam-engines it is extremely important that the correct distance from the center of the cross-head pin to the center of the crank-pin should be maintained at all times unchanged. Any alteration of this distance after the engine has been properly set up affects the position of the piston in the cylinder at each end of the stroke, and thus changes the amount of clearance, making it greater at one end of the cylinder than at the other. This not only seriously impairs the efficiency of the engine, but if the clearance was originally small, as is usually the case, such variation in the effective length of the connecting-rod involves the risk of knocking out one of the cylinder-heads.

The usual mode of construction is to make the crank-pin and the cross-head pin solid, and to provide each end of the connecting-rod with brasses, strap, and keys to enable all wear of the pins or of the brasses to be taken up. In setting up the keys for this purpose the effective length of the connecting-rod is liable to be changed—a circumstance which necessitates careful and tedious adjustment and readjustment of the brasses and keys in order to preserve the correct distance between crank-pin and cross-head pin. Furthermore, the keys in the cross-head end of the connecting-rod are usually difficult of access, being situated in the confined space between the walls of the cross-head. This renders their accurate adjustment a matter of

much time and trouble. The same difficulties are experienced in direct-acting engines wherein the connecting-rod is pivoted directly to the piston, in some kinds of pumps, and in fact may be said to exist in all cases where a connecting-rod is used to transmit motion and force.

My invention is intended to obviate these annoyances and to enable the construction of connecting-rods to be simplified.

To this end my invention consists of an expansible pin which may be used for connecting together moving parts of machinery of any kind, but is especially adapted for uniting connecting-rods or pitmen to their coacting parts. It enables expensive brasses and keys to be dispensed with, since in lieu of them the connecting-rod may have a solid end with a hole drilled through it to receive the expansible pin. When the bearing wears loose, the pin is expanded until a close fit is again obtained. As the expansion is substantially radial the effective length of the connecting-rod remains the same.

Referring now to the drawings forming a part of this specification, Figure 1 represents the usual construction of the moving parts of a steam-engine, the cross-head being broken away to show the end of the connecting-rod. Fig. 2 is a cross-sectional view of the cross-head, taken through the connecting-pin. Fig. 3 is a longitudinal sectional view of my improved expansible connecting-pin. Fig. 4 is a cross-sectional view of the same on line *xy*. Fig. 5 is a perspective view of the expansible sleeve. Fig. 6 is a similar view of the expanding-wedge.

The same letter of reference is used to designate like parts in all the figures.

A A' represent plates or lugs, which serve as supports for the connecting-pin. Through these plates are drilled holes *a a'*. Between these plates is snugly fitted the hollow pin or sleeve B, which is separate from and independent of said plates, merely abutting against them at each end without entering them. This sleeve is supported solely by the wedge C, hereinafter described, and is received within the bearing in a connecting-rod or the like. The sleeve is split from end to end on one side, as shown at K. It is cylindrical on its outer

surface and its inner surface is of such a conformation as to enable the sleeve to be expanded by suitable devices. For instance, it may taper gradually from both ends to coact with tapering plugs inserted into it. I prefer, however, the construction shown in the drawings, in which one or more cylindrical portions, $b\ b'$, alternate with one or more frusto-conical portions, $b''\ b'''$. The number of these frusto-conical portions may be varied, as desired, and their pitch or slant can be made so sharp that a moderate longitudinal movement of the wedge will effect a considerable expansion of the sleeve B.

For the purpose of expanding the sleeve B, I prefer to use a wedge, C, passing centrally through the same. At its larger end is a cylindrical portion fitting the hole a' in plate A', and at the smaller end is a similar cylindrical portion fitting the hole a . This construction enables the wedge to be moved lengthwise without destroying its fit in the holes $a\ a'$. Between these two cylindrical portions the wedge C corresponds in shape with the interior of the sleeve B. The wedge is provided with means for adjusting it longitudinally. I have shown its smaller end extending beyond the plate A, and screw-threaded nut G and lock-nut G' enable it to be suitably adjusted. A washer, F, is interposed between nut G and plate A.

I also provide means for locking the wedge C to the plates A A' when properly adjusted. A hole is drilled through its center from end to end, and it is also split lengthwise along one side, as shown. For a greater portion of its length the central hole is tapering, and fitted into it is the locking center pin, D. This center pin has suitable means for tightening it—such as the nut H and lock-nut H' screwed upon its end and bearing against the end of wedge C. The effect of tightening the nuts H H' is to expand the wedge C and cause the cylindrical portions at each end of it to become firmly fixed in the holes $a\ a'$. A spline or key, E, is driven into grooves cut in the plates A A', the sleeve B, and the wedge C to secure these parts in their relative positions, and to resist their tendency to rotate about the axis of the center pin, D, when in active service.

The operation of my device is as follows: When it is desired to expand the connecting-pin, the nuts H H' are slacked up, which loosens the center pin, D, and allows the wedge C to contract slightly, so as to rest loosely in the holes $a\ a'$. Upon turning up the nuts G G' the wedge C is moved lengthwise, expanding the sleeve B. When the required degree of expansion has been reached, the nuts H H' are tightened, causing the center pin, D, to expand the wedge C and lock it firmly in place in the plates A A'. The several parts are thus held compactly and rigidly, forming a strong solid bearing for the connecting-rod. As the sleeve B is capable of increased ex-

pansion to a considerable degree, this operation may be repeated from time to time to compensate for wear of the parts.

I do not confine myself to the exact construction and arrangement of parts shown in the drawings; but I may modify them somewhat within the scope of my invention. Thus, for instance, it may sometimes be advisable to make the sleeve B or the wedge C, or both, in more than one section. So also slots and keys may take the place of the adjusting-nuts. Only one supporting plate may be used instead of two.

I am aware that a solid conical pin has been used for the purpose of taking up the wear in connecting-rod brasses, and such I do not claim.

What I do claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a connecting-rod and its coacting part, of an expansible pin for joining them together, consisting of a separate and independent split sleeve received solely within the member which sustains the wear, and means for expanding said sleeve to compensate for the wear, substantially as and for the purpose set forth.

2. An expansible connecting-pin, consisting of the separate and independent split sleeve B, in combination with the wedge C and means for adjusting the same, said sleeve being supported solely by said wedge and capable of increased expansion from time to time, for the purpose of taking up wear, substantially as shown and described.

3. The combination, with a supporting plate, of an expansible connecting-pin consisting of an expansible sleeve, B, abutting against but not entering said plate, in combination with suitable means for expanding it, substantially as and for the purpose set forth.

4. The combination, with a supporting plate, of an expansible connecting-pin consisting of the split sleeve B, abutting against but not entering said plate, in combination with the wedge C and means for adjusting said wedge, substantially as and for the purpose set forth.

5. The combination, with a supporting plate, of an expansible sleeve, B, and an adjustable wedge, C, having one or more frusto-conical portions, $b''\ b'''$, substantially as and for the purpose set forth.

6. The combination, with a supporting plate having an opening therein, of an expansible sleeve, B, abutting against but not entering said plate, and an adjustable wedge, C, having a cylindrical end portion fitting the opening in said plate, substantially as and for the purpose set forth.

7. The combination, with a supporting plate, of an expansible sleeve, B, an adjustable wedge, C, and means for locking said wedge to the supporting plate, substantially as and for the purpose set forth.

8. The combination, with the plates A A

of the split sleeve B, the split hollow wedge C, the tapering center pin, D, and means for adjusting said wedge and said pin, substantially as and for the purpose set forth.

5 9. The combination, with plates A A', of the split sleeve B, the split hollow adjustable wedge C, the adjustable tapering center pin, D, and the key E, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

HARRY M. MONTGOMERY.

Witnesses:

R. S. MOODY,

JAS. P. MANNING.