

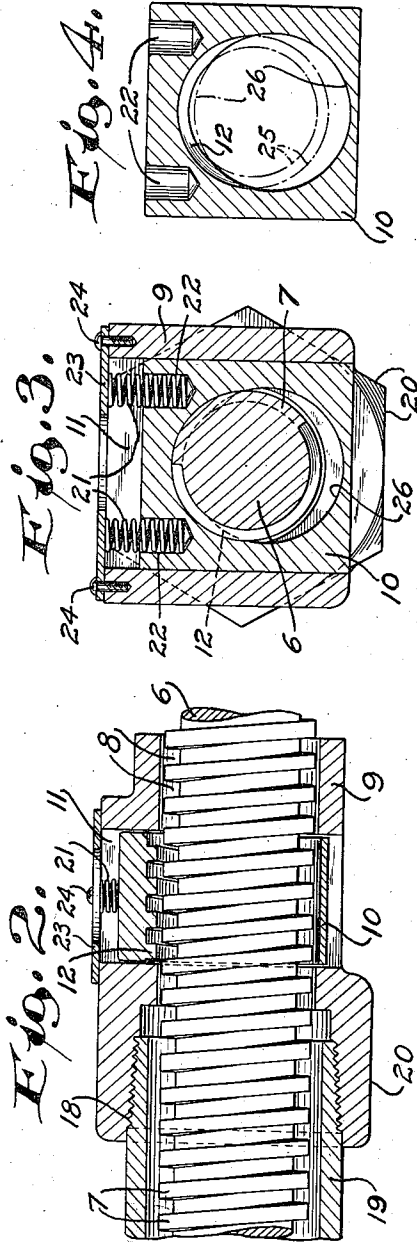
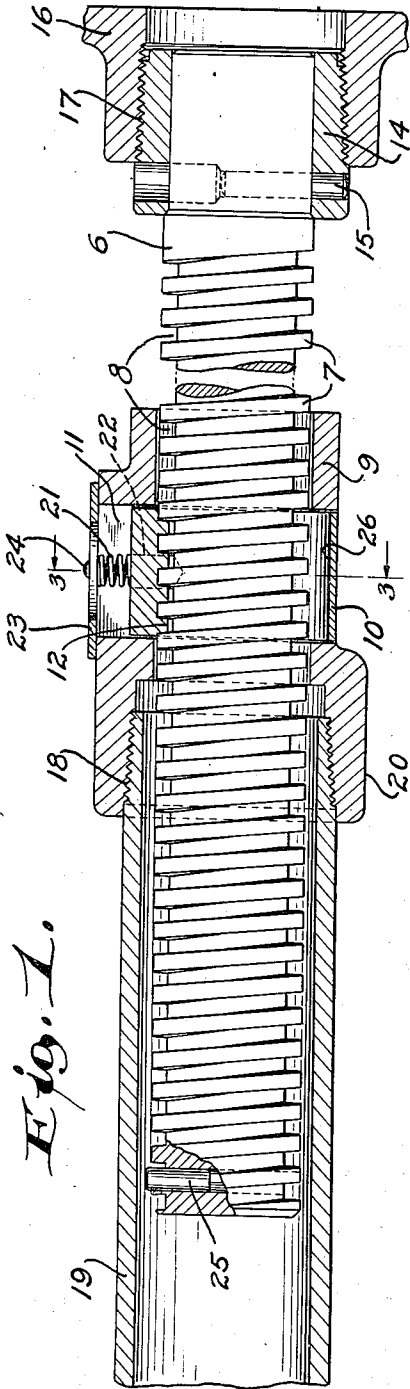
Oct. 15, 1940.

E. M. PFAUSER  
ADJUSTABLE EXTENSION

2,218,319

Filed June 3, 1939

2 Sheets-Sheet 1



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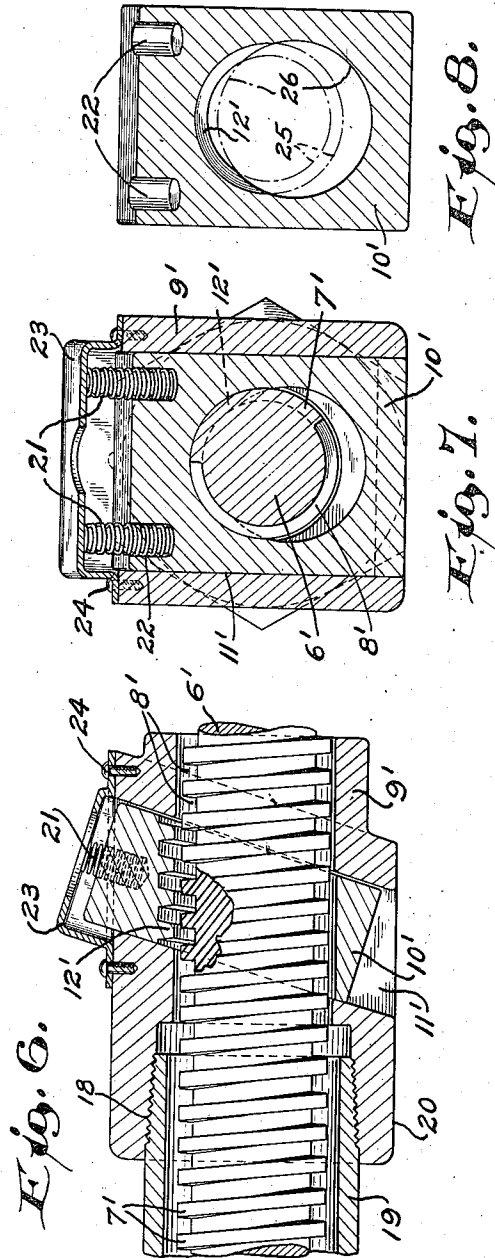
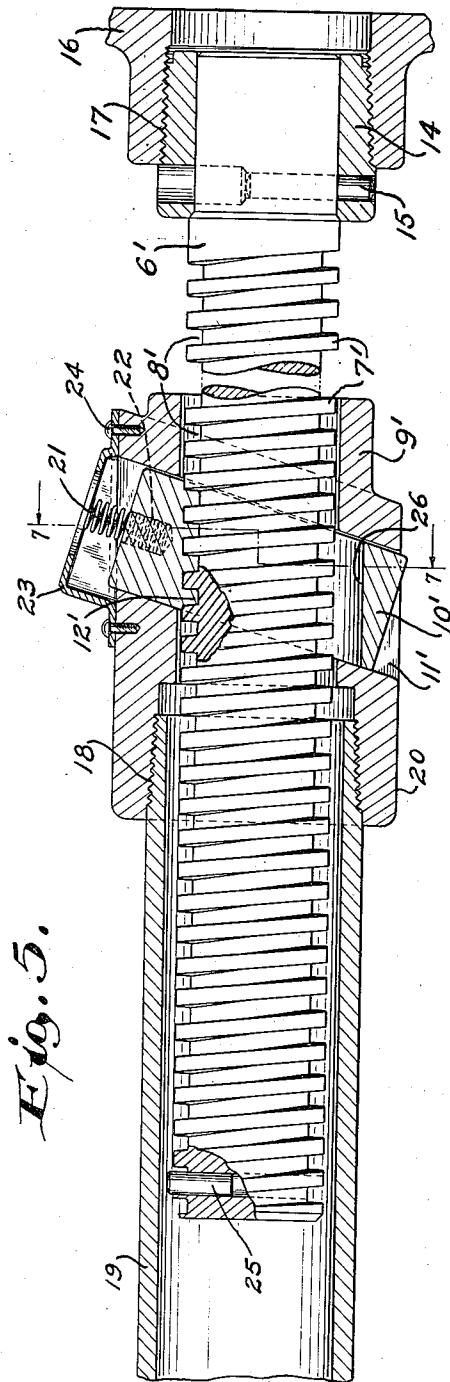
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## UNITED STATES PATENT OFFICE

2,218,319

## ADJUSTABLE EXTENSION

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Application June 3, 1939, Serial No. 277,155

14 Claims. (Cl. 254—98)

My invention relates in general to improvements in the art of transferring pressure from or to objects which may be located various distances apart, and relates more particularly to improvements in the construction and operation of quickly adjustable extensions especially adapted for insertion between a jack or ram and an object upon which work is being performed.

Generally stated, an object of the present invention is to provide an improved adjustable extension which may be quickly and conveniently elongated or shortened, and which is positively retained in adjusted condition.

When utilizing mechanical or fluid pressure jacks and rams for diverse purposes, it frequently becomes desirable to quickly vary or adjust the length of the pressure transferring and sustaining prop or connection between the jack mechanism and the object upon which the work is being performed. Many different types of these quick adjustable jack extensions have heretofore been proposed and used with some success, the prior devices have all been relatively objectionable either because of their complicated and bulky construction, or because they were ineffective in actual use. In some of the more popular jack extensions of this type, variation in length was obtained by utilizing a quickly releasable friction clamp coacting with the extension bar or spindle, and while this type of extension was relatively satisfactory when the pressure acting upon the opposite ends thereof was not too great, it would not positively resist extreme pressures and the clamp would often slip. These extensions therefore, were not only unreliable in action, but they were also dangerous.

It is therefore a more specific object of my present invention to provide a quickly adjustable pressure transferring extension for jacks or the like, which is compact and durable in construction and which is also efficient in operation and reliable in use.

Another specific object of the invention is to provide a new and useful longitudinally adjustable prop which may be readily manufactured at moderate cost, and which may also be utilized as a mechanical jack assemblage.

A further specific object of this invention is to provide an extremely sturdy and simple adjustable jack extension, which may be quickly and conveniently elongated or shortened to fit within a fixed space, wherein the relatively adjustable parts may be more slowly and accurately displaced by means of a screw thread, and in which

the parts are finally positively held in adjusted position against possible displacement.

Still another specific object of my invention is to provide a new and useful adjustable pressure sustaining prop, wherein the pressures are most effectively resisted by the prop elements and in which the adjusting notches or threads may be easily formed with thread chasers.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of several embodiments of my present invention, and of the mode of constructing and of manipulating adjustable extensions built in accordance with my improvement, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a central longitudinal section through one type of my improved adjustable extensions, showing the relatively adjustable elements positively interconnected and in condition to resist end pressure;

Fig. 2 is a similar section through a portion of the assemblage of Fig. 1, but showing the relatively adjustable elements disconnected preparatory to adjustment;

Fig. 3 is a transverse section through the assemblage of Fig. 1, taken along the line 3—3;

Fig. 4 is a transverse section through the connecting block or member alone, depicting the method of producing this member;

Fig. 5 is a central longitudinal section through another type of the improved adjustable extension, showing the parts positioned as in Fig. 1;

Fig. 6 is a similar section through a fragment of the assemblage of Fig. 5, with the relatively adjustable parts disconnected;

Fig. 7 is a transverse section through the assemblage of Fig. 5, taken along the line 7—7; and

Fig. 8 is a transverse section through the modified connecting block of Figs. 5 to 7 inclusive.

While I have illustrated and described only two specific forms of my improved adjustable extension, which are especially adapted for cooperation with screw threaded pressure applying or work engaging members, it is not the intent to thereby unnecessarily restrict the scope or use of the invention.

Referring to the drawings, the improved adjustable extension specifically shown in Figs. 1 to 4 inclusive, comprises in general an elongated inner element or spindle 6 having external screw threads 7 providing a series of transverse notches

8 along the major portion of the length thereof; an outer element or housing 9 having an internal bore embracing but freely movable along and around the crests of the threads 7 of the spindle 6; and a connecting member or block 10 laterally slidably confined within a pocket 11 in the housing 9 and having partial internal threads 12 forming transverse lateral projections which are adapted to interlock with the notches 8 formed by the spindle threads 7.

The spindle 6 may be of any suitable length and may also be either solid or hollow depending upon its diameter, and one end of the spindle 6 may be provided with a detachable externally threaded head or sleeve 14 which may be firmly but removably attached to the spindle end by a drift pin 15. A work engaging member 16 of any desired type, may be detachably secured to the external threads 17 of the spindle 6 as shown in Fig. 1, but it should be apparent that the sleeve 14 may be omitted and that the work engaging member may be applied directly to the spindle end.

The housing 9 which is adjustable along the spindle 6, is of durable construction, and has one end socketed and provided with internal screw threads 18 for reception of the threaded end of a tubular member or pipe 19 of any suitable length. Ordinarily, the opposite end of the pipe 19 is also threaded for coaction with the end of one of the movable elements of either a hydraulic or a mechanical jack, or the opposite threaded pipe end may be attached to another work engaging member 16 when the device is employed merely as a shore or prop. The exterior of the socketed end 20 of the housing 9 may be formed polygonal, as for instance hexagonal as shown in Fig. 3, in order to facilitate application of a wrench, but this formation is not essential.

The interconnecting block 10 which is slidably confined within the housing pocket 11 as shown in Fig. 3, is of rectangular shape, and is normally urged toward the spindle 6 so as to cause the block projections or threads 12 to enter the spindle notches 8 as in Fig. 1, by means of a pair of helical compression springs 21 coacting with recesses 22 in the block 10 and reacting against a closure plate 23 secured to the housing 9 over the pocket 11 by means of drive screws 24. The end of the threaded spindle 6 remote from the sleeve 14 may be provided with a stop pin 25 which is engageable with the corresponding side of the block 10 in order to prevent accidental complete separation of the housing 9 and spindle 6 during relative quick adjustment of these elements.

During manufacture of the blocks 10, and in order to insure sufficient strength and desired accuracy in the formation thereof, these blocks are preferably produced from solid metal blocks having the desired size and shape. Each block is preferably initially bored and internally threaded as indicated by the dot-and-dash circles 25 in Figs. 4 and 8, after which the block may be set in a jig and finally bored off-center along the circle 26. The diameter of the final bore is somewhat larger than the larger diameter of the spindle threads 7, thereby leaving only the fragmentary or partial threads 12 within the block 10. The construction permits the block 10 in the final assemblage to be shifted within the pocket 11 so as to clear the spindle threads 7 as in Fig. 2, for adjustment purposes, and also provides a series of approximately half threads 12 for interlocking purposes as in Fig. 1,

and the recesses 22 may be formed either before or after the blocks 10 are bored.

When my improved adjustable extension has been properly constructed and assembled, a work engaging member 16 of any desired type, may be applied to the threaded sleeve 14, and a pipe 19 of any desired length may be applied to the internal threads 18. If the device is to be utilized in conjunction with a hydraulic ram or a jack, the end of the pipe 19 remote from the housing 9 may be connected to one of the relatively movable elements of the ram or jack. The overall length of the jack and extension may then be quickly adjusted to initially roughly fit the work, by merely pressing the block 10 against the springs 21 until the thread projections 12 are disengaged from the notches 8 of the spindle thread 7 as in Fig. 2, and by thereafter sliding the block 10 and housing 9 as a unit along the spindle 6 in either direction until the work engaging faces of the jack and of the member 16 are in approximately the desired position. The block 10 may then be released to permit the springs 21 to return the same to interlocking position as shown in Fig. 1, and more accurate final adjustment of the length of the assemblage may then be secured by relatively rotating the housing 9 and spindle 6 to cause the block 10 to revolve about the spindle threads 7. When the desired length of the assemblage has been thus finally obtained, pressure may be applied to the end of the pipe 19 in order to perform the work, and this pressure will be positively transmitted through the housing 9, block 10, spindle 6, sleeve 14, and member 16 to the pressure receiving object, without danger of slippage between the extension elements.

Since the block 10 of the assemblage shown in Figs. 1 to 4 inclusive cannot be readily finished internally with a screw thread chaser, due to the use of square threads, it may be desirable to form the screw and block as shown in the modified assemblage of Figs. 5 to 8 inclusive. This modified assemblage comprises a spindle 6' having external screw threads 7' of the acme type having included angles of approximately 29° and providing a series of transverse tapered notches 8' along the major portion of its length; a housing 9' embracing but movable freely along and about the crests of the threads 7'; and a block 10' slidably confined in an inclined pocket 11' in the housing 9' and having partial internal threads 12' forming transverse tapered projections adapted to interlock with the notches 8' formed on the spindle 6'. In constructing the modified assemblage, the inclination of the pocket 11' relative to a plane perpendicular to the spindle axis, should preferably be one-half of the included thread angle, so that when pressure is applied to the ends of the prop, this pressure will be transmitted from the spindle 6' to the block 10' and from the latter to the housing 9' without forcing the block away from the spindle. For example, if the included angle of the threads 7' is twenty-nine degrees, the angle of inclination of the pocket 11' should be fourteen and one-half degrees. In other respects, the construction and operation of the modified assemblage is substantially like that of Figs. 1 to 4 inclusive, but the modified structure is susceptible of being more readily constructed with the aid of a thread chaser for forming the block threads 12'.

From the foregoing detailed description, it will be apparent that my present invention provides an exceedingly simple, durable and compact adjustable extension which may be utilized either

as a pressure transferring member alone, or as a jack, in order to positively transmit pressure from one place to another without danger of slippage in the extension itself. The thread projections of the interconnecting block may, in each case, be readily and accurately formed, and serves to positively interconnect the housing and spindle when the springs 12 are effective. This block may, however, be quickly and conveniently released from the spindle so as to permit relative adjustment of the spindle and housing, and by virtue of the fact that the projections 12, 12' are actual portions of true screw threads, the housing may also be rotated about the spindle for purposes of finer adjustment. The modified thread projections 12' may be readily formed with a thread chaser, and will effectively transmit pressure without slippage. As previously indicated, the improved assemblage may be utilized either as a jack for creating and applying pressure, or as an extension for a ram or jack, or as a shore or prop. The assemblage can be accurately machined at relatively low cost, so as to insure most efficient operation thereof, and has actually proven highly successful in commercial use. As heretofore indicated, the work engaging member 16 may be of any desired type, and the intermediate pipes 19 may be of any desired length.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. An adjustable extension comprising, an elongated element having notches extending in series therealong, a housing element embracing said elongated element and being movable therealong, and a member having an opening through which said elongated element is freely axially movable, said member being slidable within said housing element laterally of said elongated element and having a series of projections at one side of said opening interlockable with said notches to positively connect said elements.

2. An adjustable extension comprising, an elongated element having a screw thread forming notches extending in series therealong, a housing element embracing said elongated element and being rotatable thereabout and movable therealong, and a member having a bore through which said elongated element is freely axially shiftable, said member being slidable within said housing element laterally of said elongated element and having a series of projections at one side of said bore interlockable with said notches and rotatable about said screw thread to positively connect said elements.

3. An adjustable extension comprising, an elongated element having notches extending in series therealong, a housing element embracing said elongated element and being movable therealong, a member completely surrounding said elongated element and having an opening through which said element is freely axially movable, said member being slidable within said housing element laterally of said elongated element and having a series of projections at one side of said opening interlockable with said notches to positively connect said elements, and resilient means for constantly urging said member toward interlocking position.

4. An adjustable extension comprising, an elongated element having a screw thread forming notches extending in series therealong, a housing element embracing said elongated element and being rotatable thereabout and movable therealong, a member completely surrounding said elongated element and having an opening through which said element is freely axially shiftable, said member being slidable within said housing element laterally of said elongated element and having a series of projections at one side of said bore interlockable with said notches and rotatable about said screw thread to positively connect said elements, and spring means for constantly urging said member toward interlocking position.

5. An adjustable extension comprising, an elongated spindle having an external screw thread, a housing embracing said spindle and having a pocket therein, and a block slidably confined within said pocket and having a bore provided with partial threads at one side only of said bore and engageable with said spindle threads to interlock said spindle and housing, said bore being large enough to permit said block to be slid away from said spindle sufficiently to interrupt the interlock and to permit relative sliding of said housing and spindle.

6. An adjustable extension comprising, an elongated spindle having an external screw thread, a housing embracing said spindle and having a pocket therein, a block slidably confined within said pocket and having a bore provided with partial threads at one side only of said bore engageable with said spindle threads to interlock said spindle and housing, said block completely surrounding said spindle and said bore being of sufficient diameter to permit said block to be slid away from said spindle sufficiently to interrupt the interlock and to permit relative sliding of said housing and spindle, and a spring for constantly urging said block toward interlocking position.

7. An adjustable extension comprising, an elongated externally threaded spindle having screw threads at one end for interchangeable attachment of work engaging members, a housing embracing said spindle and having screw threads adapted for interchangeable reception of pressure applying pipes of different lengths, and a block completely surrounding said spindle and being slidably confined within said housing, said block having a bore and projections at one side only of said bore engageable with the screw threads on said spindle for locking said housing in adjusted positions.

8. An adjustable extension comprising, an elongated element having a series of transverse tapered notches along a side thereof, a housing element movable longitudinally of said elongated element, and a connecting member slidable relative to said housing element and laterally of said elongated element at an oblique angle, said member having tapered projections interlockable with said notches.

9. An adjustable extension comprising, an elongated element having a series of transverse tapered notches along a side thereof, a housing element movable longitudinally of said elongated element and a connecting member slidable relative to said housing element and laterally of said elongated element at an oblique angle, said member having tapered projections interlockable with said notches and the angle of sliding of said member being approximately one-half of the in-

cluded angle of the taper of said notches and of said projections.

- 5 10. An adjustable extension comprising, an elongated element having V-shaped screw threads forming tapered notches extending in series therealong, a housing element embracing said elongated element and being rotatable thereabout and movable therealong, and a member slidable within said housing element laterally of said elongated element and at an oblique angle relative to the longitudinal axis of said elongated element, said housing member having tapered projections interlockable with said notches and rotatable about said threads.
- 15 11. An adjustable extension comprising, an elongated element having V-shaped screw threads forming tapered notches extending in series therealong, a housing element embracing said elongated element and being rotatable thereabout and movable therealong, and a member slidable within said housing element laterally of said elongated element and at an oblique angle relative to the longitudinal axis of said elongated element, said slidable member having tapered projections interlockable with said notches and rotatable about said threads and the angle of sliding of said member relative to said elongated element being approximately one-half of the included angle of said threads.
- 20 12. An adjustable extension comprising, an elongated element having screw threads forming tapered notches extending in series therealong,

a housing element embracing said elongated element and being revolvable thereabout and movable therealong, and a member having a bore through which said elongated element extends and being slidable within said housing element laterally of said elongated element and approximately parallel to the planes of corresponding sides of said notches.

13. An adjustable extension comprising, an elongated element having a series of tapered notches at one side thereof, a housing element movable along said elongated element, and a member slidable within said housing element laterally of said elongated element and at an oblique angle relative to the longitudinal axis of the latter, said member having tapered projections cooperable with said notches and being movable approximately parallel to the planes of the corresponding pressure resisting sides of said notches.

14. An adjustable extension comprising, an elongated screw threaded element, a housing element movable along said elongated element, and a member having a bore through which said elongated element extends and which is provided with local projections cooperable with corresponding portions of the successive screw threads of said elongated element, said member being slidable in said housing element laterally of said threaded element and in a plane approximately parallel to corresponding sides of the successive threads.

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