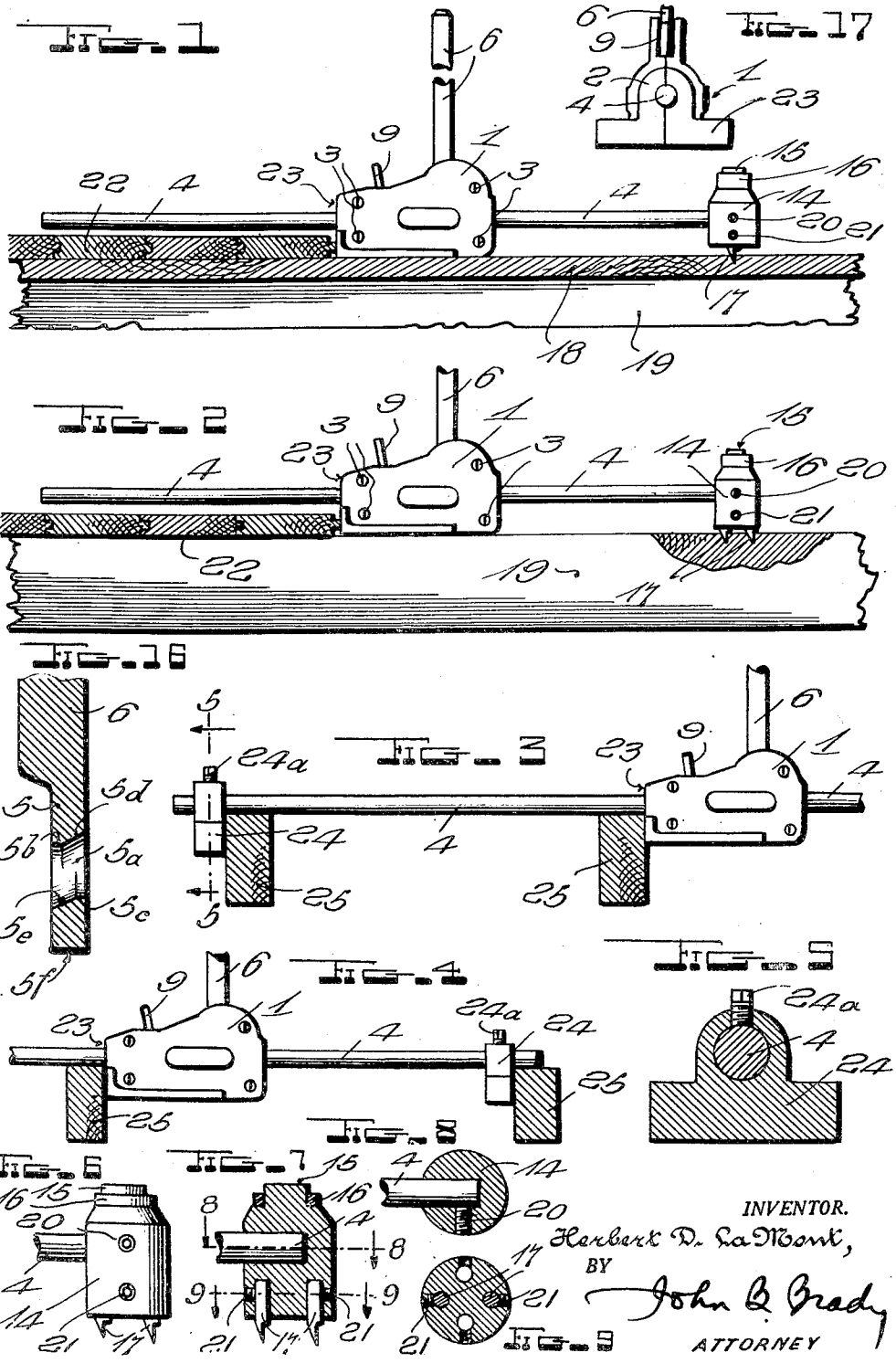
Dec. 26, 1950 H. D. LA MONT 2,535,078

EXPANSION AND CONTRACTION TOOL

Filed Sept. 10. 1947 2 Sheets-Sheet 1



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EXPANSION AND CONTRACTION TOOL

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FIG. 10

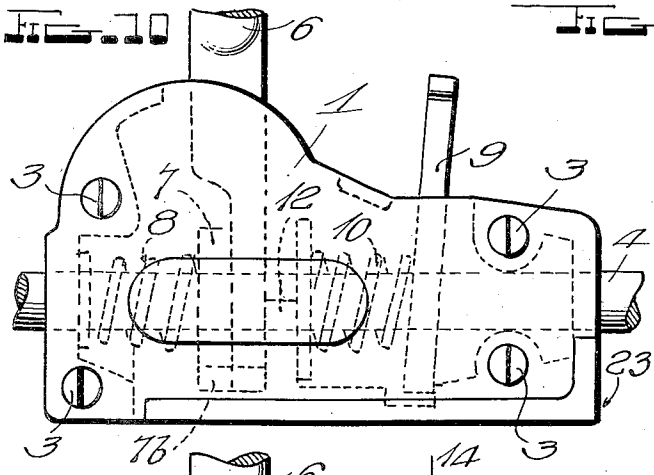


FIG. 13

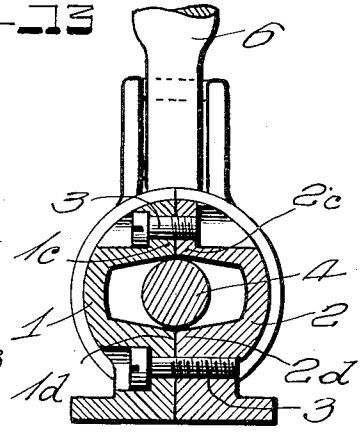


FIG. 11

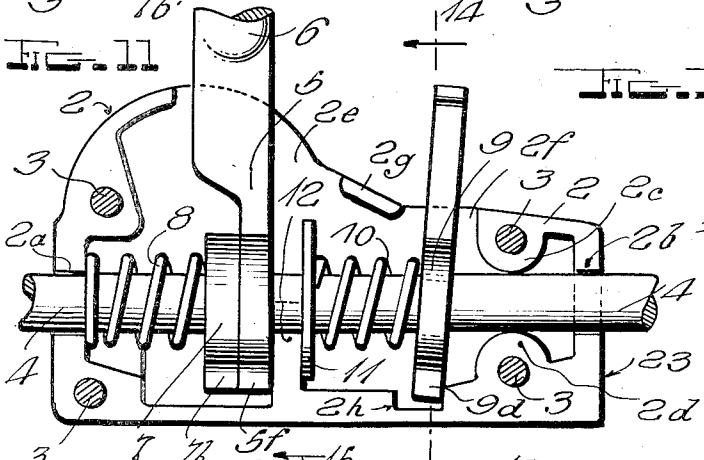


FIG. 14

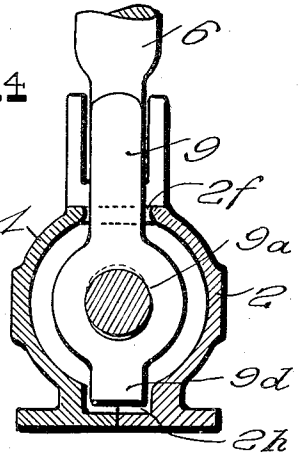


FIG. 15

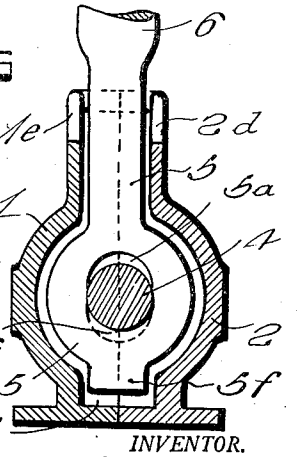
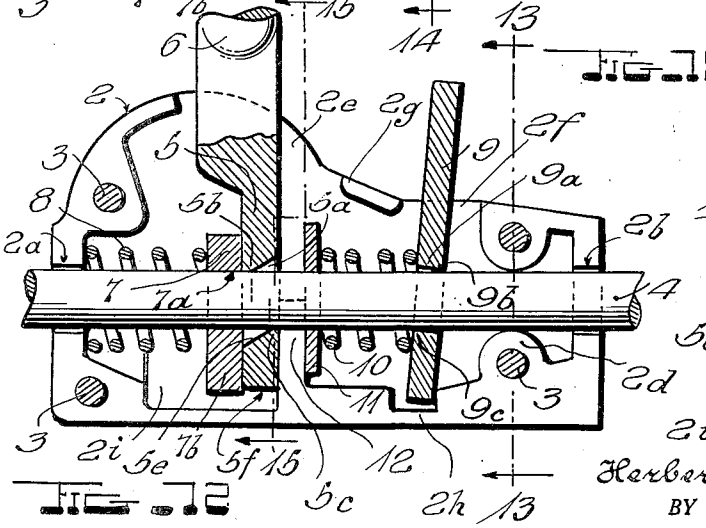


FIG. 12



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EXPANSION AND CONTRACTION TOOL

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5 Claims. (Cl. 254—106)

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My invention relates broadly to tools, and more particularly to an improved construction of expansion and contraction tool for applying expansion or contraction forces to structural members.

One of the objects of my invention is to provide the construction of expansible and contractable tool for use on structural members which is readily reversible in arrangement for selective use as an expansion or contraction force exerting device.

Another object of my invention is to provide an improved construction of tool comprising a minimum number of operating parts and including a rod member with header members removably associated therewith, one of said header members being adjustable along the rod member in imparting expansible or contractable forces substantially in alignment with the axis of the rod member.

Another object of my invention is to provide a construction of expansible and contractable tool including a rod member and a pair of header members associated therewith, in which one of the header members includes a step-by-step mechanism for adjusting the position of the said header member along the rod member, the header members being associated with the rod member in such relation that either expansion or contraction forces are exerted by the tool.

Still another object of my invention is to provide a construction of expansion and contraction tool including a rod member and header members associated therewith, in which one of the header members is provided with a substantially central fulcrum member against which an actuating lever surrounding the rod member is operative for coaction with associated mechanism in the header for moving the header in step-by-step increments with respect to the rod member.

A still further object of my invention is to provide a construction of expansion and contraction tool including a rod member with header members arranged thereon in which one of the header members includes a housing which incloses a pair of lever members and a pair of coacting spring members, all of which are arranged to enable said header to be adjusted in step-by-step increments with respect to said rod member, and gripped in the adjusted position for continuously exerting an expansion or contraction force with respect to structural members to which the tool may be applied.

Other and further objects of my invention reside in the construction of expansion and contraction tool as set forth more fully in the specification hereinafter following by reference to the accompanying drawings in which:

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Figure 1 is a side elevational view showing the tool of my invention applied in the laying of a flooring for exerting a compressive force against a tongue and groove finish flooring laid over the sub-flooring; Fig. 2 is a side elevational view of the tool applied to a joist for exerting a compressive force against flooring laid on the joist where a sub-flooring is not used; Fig. 3 illustrates the tool of my invention used for exerting a compressive force between studding, joists, etc. for pressing the studding or joists together in substantially parallel alignment; Fig. 4 is a side elevational view showing the tool of my invention used in a reverse manner for exerting an expansive force between studding or joists for separating the studding or joists; Fig. 5 is a transverse sectional view taken substantially on line 5—5 of Fig. 3; Fig. 6 is a side elevational view of the header which constitutes the anchor for the tool in the form of my invention illustrated in Figs. 1 and 2; Fig. 7 is a substantially vertical sectional view through the header of Fig. 6; Fig. 8 is a transverse sectional view taken substantially on line 8—8 of Fig. 7; Fig. 9 is a transverse sectional view taken substantially on line 9—9 of Fig. 7; Fig. 10 is a side elevational view of the adjustable header used in the tool of my invention; Fig. 11 is an elevational view of the internal operating parts of the adjustable header with one section of the housing removed; Fig. 12 is a view similar to the view shown in Fig. 11 but illustrating parts of the actuating mechanism of the adjustable header in section; Fig. 13 is a vertical sectional view taken through the adjustable header substantially on line 13—13 of Fig. 12; Fig. 14 is a vertical sectional view through the adjustable header taken substantially on line 14—14 of Fig. 11; Fig. 15 is a vertical sectional view through the adjustable header taken substantially on line 15—15 of Fig. 12; Fig. 16 is an enlarged fragmentary cross-sectional view taken through the end of operating lever 5 and showing the manner in which operating lever 5 encircles the rod member of the tool; and Fig. 17 is a front view of the force exerting front end of the adjustable header of the tool of my invention.

My invention is directed to a new and useful tool to be used among other things to press together sections of flooring, ceiling or siding lumber in construction work and to straighten structural members, by providing a new and unique method of applying pressure, as from either side of such structural members for drawing together

or pushing apart such members or for any other similar use.

The tool comprises three major parts, that is, a rod member whose length determines the distance over which extensive or contractive forces may be exerted by the tool; a head member secured to the rod member and forming an anchor or force applicator for the tool, and an adjustable header movable by step-by-step increments along the rod member for adjusting the tool in applying expansive or contractive forces. The adjustable header is constructed in unique manner by providing a substantially hollow housing through which the rod member is slidably extendable. The housing includes a substantially centrally arranged fulcrum with respect to which an operating lever which is apertured for the passage of the rod member is operative. The housing also incloses a pair of operating springs and a gripping lever which coact to maintain the adjustable head in the position on the rod member to which the head is adjusted by step-by-step movement of the operating lever. The important feature of the tool of my invention is the ready reversibility of the tool permitting wide application of the tool in positions where either expansive or contractive forces must be exerted.

Referring to the drawings in detail reference characters 1 and 2 designate the two half-sections of the housing of the adjustable header used in the tool of my invention. The housing is substantially hollow and the parts 1 and 2 are interconnected by laterally extending screw members 3. The sections of the housing each contain semi-circular recesses in opposite ends thereof which are aligned, as represented at 2*a* and 2*b* in Figs. 11 and 12, to provide passages for the slidable rod member 4. The housing sections 1 and 2 are also provided with inwardly directed guide portions represented at 1*c* and 1*d* and 2*c* and 2*d* which serve to align and guide rod member 4 through the housing.

An operating lever 5 is associated with the adjustable header and is provided with an operating lever handle 6 projecting vertically through an aperture in the housing formed by the coacting recesses 2*e* and 1*e* in the housing sections. The operating lever 5 has a flattened end portion which contains an aperture 5*a* therein. The aperture 5*a* is formed in very special manner. Diagonally opposite portions of aperture 5*a* have substantially semi-cylindrical wall portions 5*b* and 5*c*, as shown more particularly in Fig. 16, which permit rod member 4 to be gripped in aperture 5*a*. The extremity of the operating lever 5 has a tongue 5*f* thereon which projects into a recess 2*i* formed in the housings 1 and 2 and pivots about the operating lever fulcrum 12. Diagonally opposite portions of the aperture 5*a* are inclined at an angle of approximately 30° forming semi-cylindrical inclined faces 5*b* and 5*e*. When lever 5 is moved to a position in which the inclined faces 5*d* and 5*e* are substantially parallel to the rod 4, the grip exerted by faces 5*d* and 5*c* may be released and the lever restored to the initial operating position. The principal gripping function is performed by gripping lever 7 disposed immediately adjacent the operating lever 5 and having an aperture therein with walls 7*a* substantially conforming with the rod member 4 and snugly fitting around the rod member 4. The gripping lever 7 has a tongue 7*b* thereon which projects into the recess 2*i* formed between the housing sections 1 and 2 and immediately adjacent the tongue 5*f* of operating lever 5, thereby keying the gripping lever 7 against rotative displacement within the housing formed by sections 1 and 2. The operating lever 5*a* exerts a force against gripping lever 7 causing it to cant slightly and grip with rod 4 for moving the rod 4 in step-by-step increments. The structure which makes this movement possible is the arrangement of the operating lever fulcrum 12 projecting from the base of each of the housing sections 1 and 2. Each housing section includes a substantially centrally arranged projecting portion which jointly constitute the operating lever fulcrum represented at 12 and with respect to which the end of operating lever 5 pivots. The housing also incloses the compression coil spring 8 intermediate the end of the housing and the gripping lever 7, and the compression coil spring 10 intermediate the washer member 11 and the gripping lever 9. The compression coil springs 8 and 10, washer member 11, and gripping lever 9 all surround the rod member 4. The operating lever fulcrum 12 also acts as a retaining post against which the washer member 11 is seated.

The gripping member 9 is apertured to 9*a* for the passage of rod member 4 and is provided with diagonally opposite gripping portions 9*b* and 9*c* which grip rod 4 and maintain rod 4 in the position to which the rod has been displaced under the action of the rocking of operating lever 5 with respect to operating lever fulcrum 12. The gripping lever 9 extends vertically through an opening 2*f* in the housing formed by complementary recesses in the housing sections 1 and 2. The openings 2*e* and 2*f* are separated by a transversely extending closure 2*g* formed by members on housing sections 1 and 2 directed toward each other. The end of gripping lever 9 is provided with a projection 9*d* which extends into a recess 2*h* in the base of the housing where the end wall of the recess serves as a fulcrum about which gripping lever 9 may angularly shift.

As represented in Fig. 1 the rod member 4 is slidable through the adjustable head represented at 1 as explained in connection with Figs. 10–16. The end of the rod member 4 extends into the anchor or header 14 which is provided with a driving head 15 protected by annular ring member 16 for driving the insertable pins or nails 17 into the sub-flooring represented at 18 supported on rafters 19. Rod member 4 is secured in the header 14 by suitable set screw means 20. The removable pins or nails 17 are removably secured in header 14 by suitable set screws 21. In the arrangement illustrated in Fig. 1, the finish flooring of the tongue and groove type as represented at 22 laid over the sub-flooring 18, and against which a compressive force is exerted by engagement of the front end 23 of the adjustable header with the edge of the finish flooring 22. It will be observed that the force or pressure is applied on a substantially straight line from the anchor or header 14 to the work 22, so that there is no tendency to raise or buckle the work. However, in the application of force the location and the angle of impingement of the anchor teeth 17 is not changed.

In Fig. 2 I have shown the tool of my invention applied to the application of a finish flooring 22 directly upon rafters 19 without the interposition of the sub-flooring. It will again be observed that the application of force is in a substantially straight line. In this instance the header or anchor 14 is driven directly into the joists 19. As shown more particularly in Fig. 9 the anchor may be constituted by four pins or nails 17

but is not to be limited in this regard. The teeth or nails 17 may be inserted in tandem when anchoring to a joist, studding or rafter or other narrow section, as represented in Fig. 2, or they may be set side by side when used on sub-flooring, as represented in Fig. 1. This header or anchor section 14 may be formed of soft material such as lead, aluminum, etc., so as not to injure hammers and other tools when used to secure the anchor. When soft metal is used in the anchor a protecting ring of steel or other hard metal represented at 16 may be provided to prevent the splitting of the anchor in the process of securing the teeth of the anchor to the object. It will be readily seen that when the anchor teeth 17 are secured in the studding, joists, rafters or sub-floorings, the pressure may be applied against the work 22 (Figs. 1 and 2) and because there is available length on rod member 4 substantial amount of movement for tightening the work is available.

When the operation required is to draw the structural sections or members together, the free anchor 24 may be placed on the end of rod 4 in the direction of the travel of the head or body section 1 and the tool parts 24 and 1 spaced until they are on the outside of the two structural sections 25 to be moved (see Fig. 3), whence by actuating the propulsion mechanism of adjustable header 1 the two structural sections 25 are drawn together the required amount and can be secured in any conventional manner. The free anchor 24 is secured to rod member 4 by means of set screw 24*a*.

When the tool is used to straighten structural sections, such as studding, joists, rafters, etc., and where such members are sprung towards each other and the movement required is to spread them apart, as represented by rafters 25 in Fig. 4, the free anchor may be substituted for the anchor 14 and by placing anchor 24 and adjustable header 1 between the members 25 to be spread (Fig. 4) and by then actuating the handle 6 of the travel mechanism of adjustable header 1, pressure is applied between the two members 25 and they are then spread the desired amount at which time they can be secured and held in that position.

In the operation of the adjustable header, movement of the hand operating lever 6 toward the right (Figs. 10–12) rocks tongue 5*f* about operating lever fulcrum 12 and advances rod member 4 toward the left by the gripping relation of gripping lever 7 and rod member 4. Step-by-step increments of movement may thus be imparted to rod member 4. Gripping lever 7 is restored by spring 8 to a fresh position of engagement as the operating lever 6 is restored to the right, but rod member 4 is maintained in gripped position during the return stroke of operating lever 6 by means of gripping lever 9 under the action of spring 10. After rod member 4 has been advanced to the left for the full limit of its travel, gripping lever 9 is moved to a vertical position disengaging rod member 4 and allowing it to freely return to the right.

The applicator face 23 of the adjustable header 1 is quite broad as represented in Fig. 17, and presents a wide face for the transmission of the forces required for either contraction or expansion.

While I have described the tool of my invention in one of its preferred embodiments I realize that modifications may be made and I desire that it be understood that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim and desire to obtain by Letters Patent of the United States is as follows:

1. An expansion and contraction tool comprising a rod member, headers attachable to opposite ends of said rod member, one of said headers including means for adjustably gripping said rod member comprising a housing for the passage of said rod member, an operating lever fulcrum in said housing, an operating lever extending into said housing and around said rod member and pivoted on said operating lever fulcrum on the side opposite its point of entry into said housing, a gripping member surrounding said rod member and actuated by said operating lever and spring means interposed between said housing and said gripping member.

2. An expansion and contraction tool comprising a rod member, headers attachable to opposite ends of said rod member one of said headers including means for adjustably gripping said rod member comprising a housing for the passage of said rod member, an operating lever fulcrum in said housing, an operating lever extending into said housing and around said rod member and pivoted on said operating lever fulcrum on the side opposite its point of entry into said housing, a gripping member surrounding said rod member and actuated by said operating lever, spring means interposed between said housing and said gripping member, and an auxiliary gripping member surrounding said rod member and separated from said operating lever fulcrum by a separate spring, said auxiliary gripping member engaging said rod member at a position spaced longitudinally from the position at which said first-mentioned gripping member engages said rod member.

3. A contraction and expansion tool comprising a rod member, a header member fixed to said rod member, and a header member movable step-by-step along said rod member, said last mentioned header member including a substantially hollow housing through which said rod member extends, an operating lever fulcrum projecting upwardly substantially centrally of said housing, an operating lever extending substantially vertically into said housing and having an opening adjacent the end thereof through which said rod member extends and terminating in a tongue-like extension bearing against said operating lever fulcrum as a pivot on the side opposite the point of entry of said operating lever into said housing, a gripping member engageable with said rod member and movable under control of said operating lever for advancing said rod member in step-by-step increments, spring means interposed between one end of said housing and said gripping member and an auxiliary gripping member engageable with said rod member during the intervals that said first mentioned gripping member is disengaged therefrom.

4. A contraction and expansion tool comprising a rod member, a header member fixed to said rod member, and a header member movable step-by-step along said rod member, said last-mentioned header member including a substantially hollow housing through which said rod member extends, an operating lever fulcrum projecting upwardly substantially centrally of said housing, an operating lever extending substantially vertically into said housing and having an opening adjacent the end thereof through which said rod member extends and terminating

in a tongue-like extension bearing against said operating lever fulcrum as a pivot on the side opposite the point of entry of said operating lever into said housing, a gripping member engageable with said rod member and movable under control of said operating lever for advancing said rod member in step-by-step increments, spring means interposed between one end of said housing and said gripping member, a recess formed in the base of said housing intermediate the opposite end of said housing and said operating lever fulcrum, an auxiliary gripping member extending upwardly through said housing and having an opening therein for the passage of said rod member and a tongue thereon projecting into said recess and pivoted against one side of the recess as a fulcrum, and spring means interposed between said operating lever fulcrum and said auxiliary gripping member whereby said auxiliary gripping member operates to maintain the position of said rod member while said first mentioned gripping member is being progressively moved to successive gripping and moving positions.

5. A contraction and expansion tool comprising a rod member, a header member fixed to said rod member, and a header member movable step-by-step along said rod member, said last mentioned header member including a substantially hollow housing through which said rod member extends, an operating lever fulcrum projecting upwardly substantially centrally of said housing, an operating lever extending substantially vertically into said housing and having an opening adjacent the end thereof through which said rod member extends and terminating in a tongue-like extension bearing against said operating lever fulcrum as a pivot on the side opposite the point of entry of said operating lever into said housing, a gripping member engageable with said rod member and movable under control of said operating lever for advancing said rod member in step-by-step increments, spring means interposed between one end of said housing and said gripping member, an auxiliary gripping member projecting upwardly from said housing and pivoted therein with an opening therein for the passage of said rod member, and spring means interposed between said operating lever fulcrum and said auxiliary gripping member, the opening in said operating lever being formed by substantially cylindrical internal wall portions throughout one portion of the effective length of the opening and angularly inclined internal wall portions throughout the remainder of the effective length of the opening whereby said operating lever may be canted on said rod member to move said first mentioned gripping member in step-by-step increments and slide freely over said rod member to a restored position preparatory to a succeeding advancing stroke while said auxiliary gripping member holds said rod member in the advanced position thereof.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
746,123	Morehouse	Dec. 8, 1903
1,024,860	Kline	Apr. 30, 1912
2,174,489	Groves	Sept. 26, 1939
2,222,910	Luckner	Nov. 26, 1940
2,262,429	Luckner	Nov. 11, 1941
2,323,144	Long	June 29, 1943