

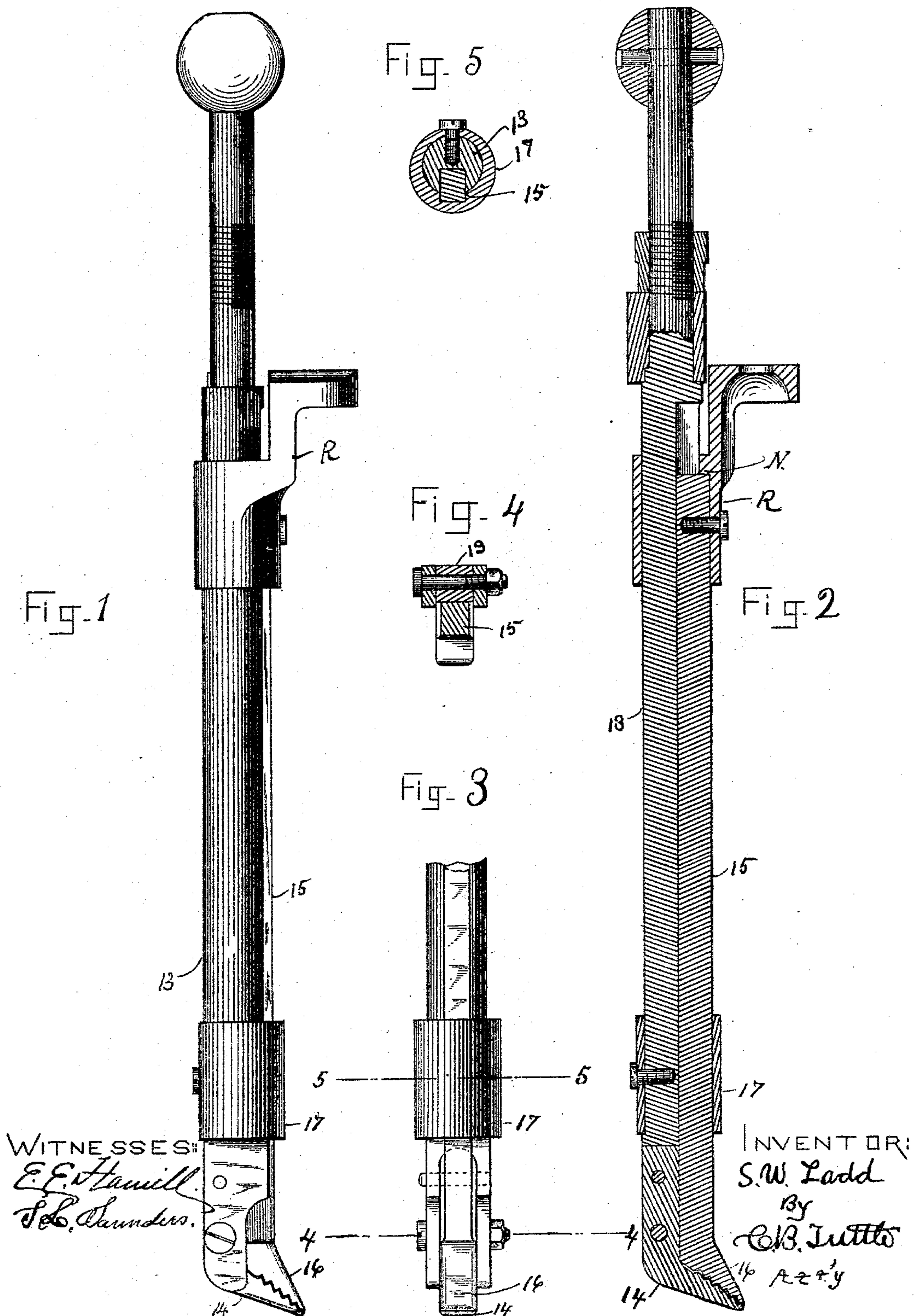
(No Model.)

6 Sheets—Sheet 1.

S. W. LADD.
LASTING MACHINE.

No. 510,977.

Patented Dec. 19, 1893.



(No Model.)

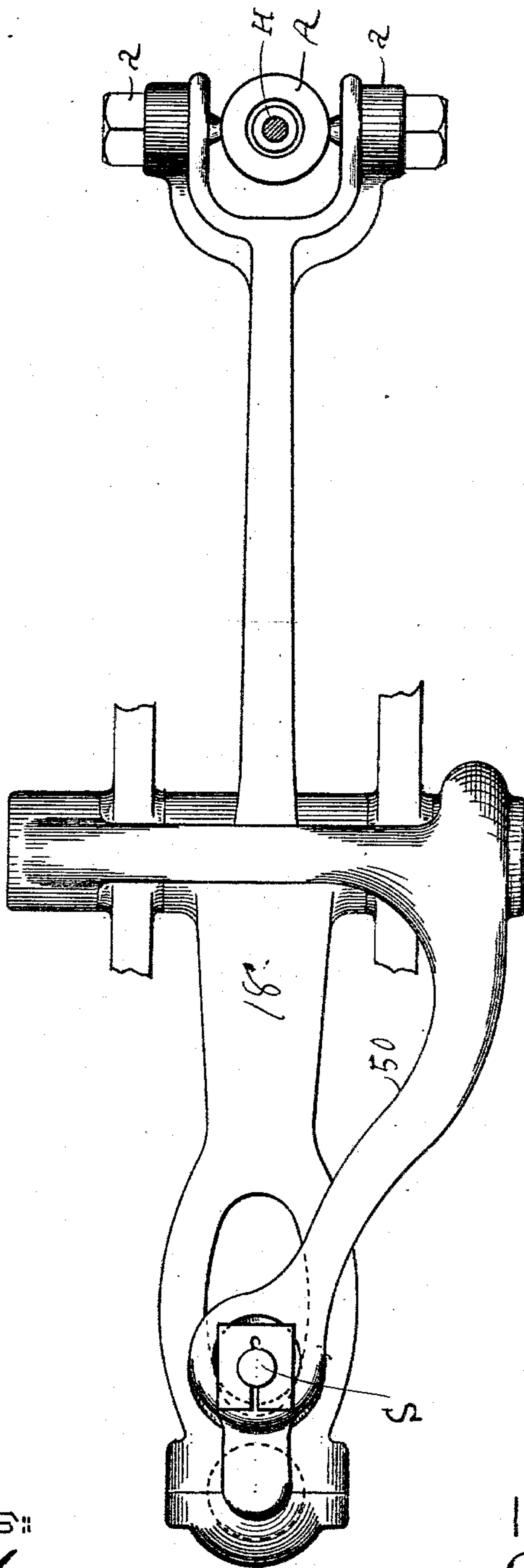
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Fig. 6.



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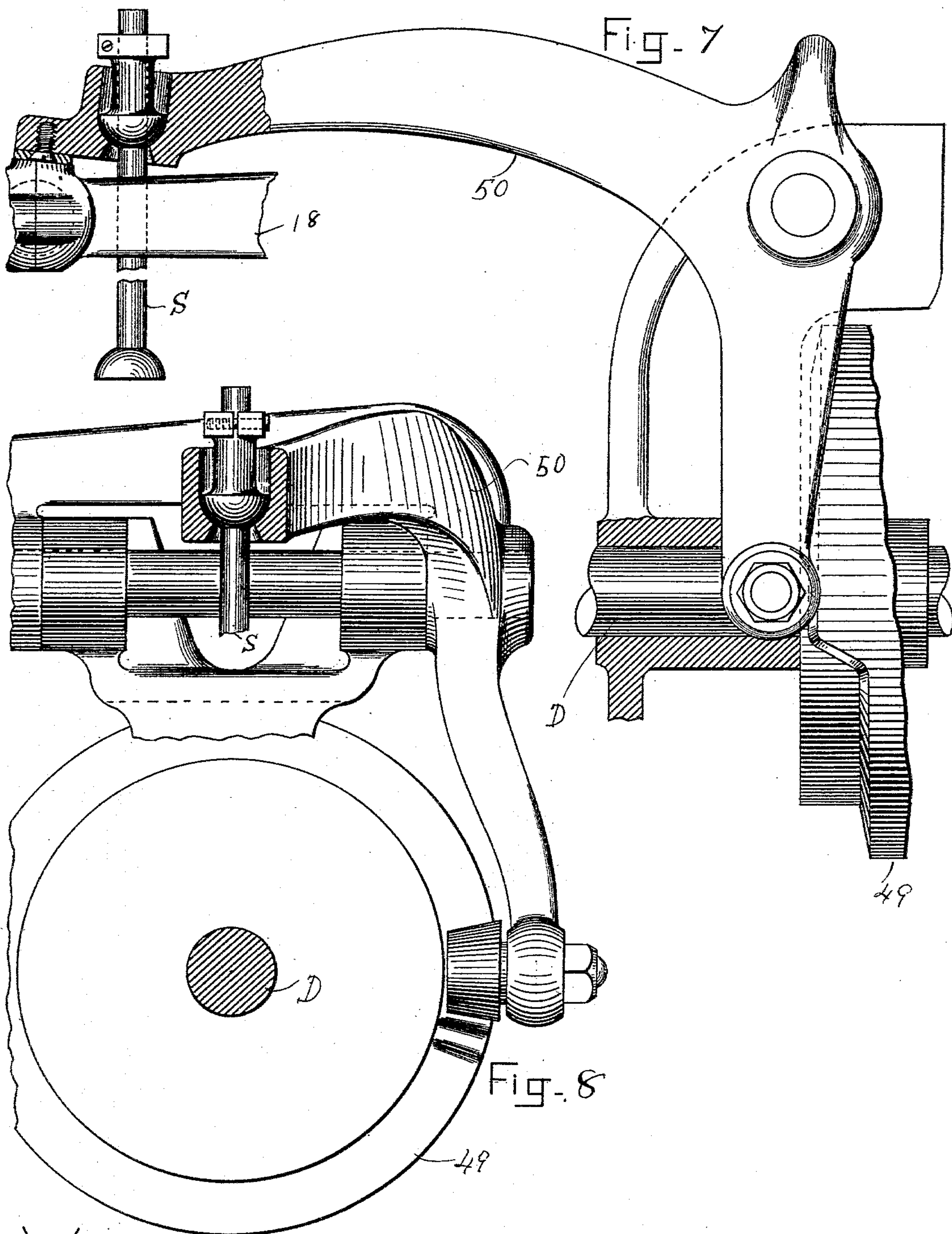
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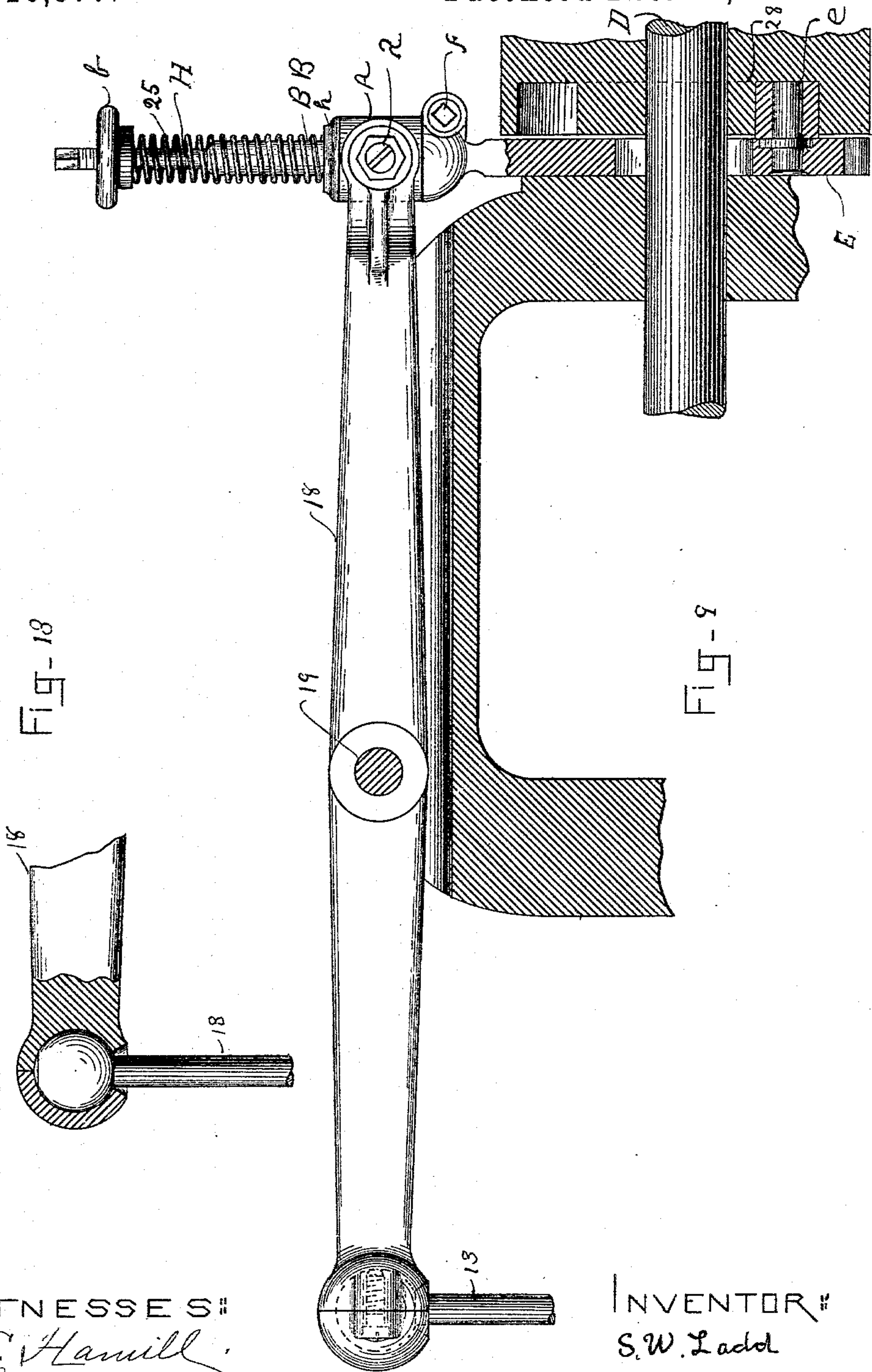
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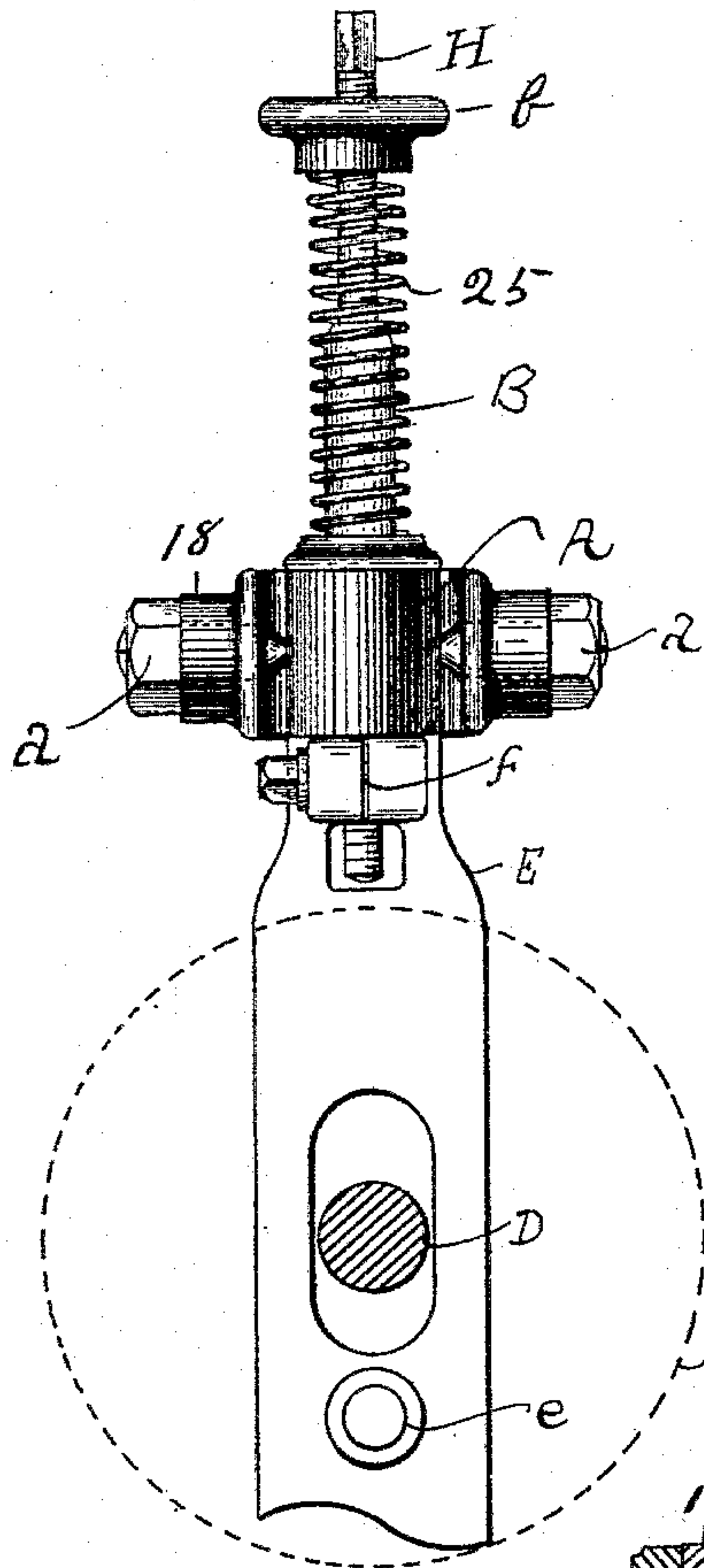


Fig-10

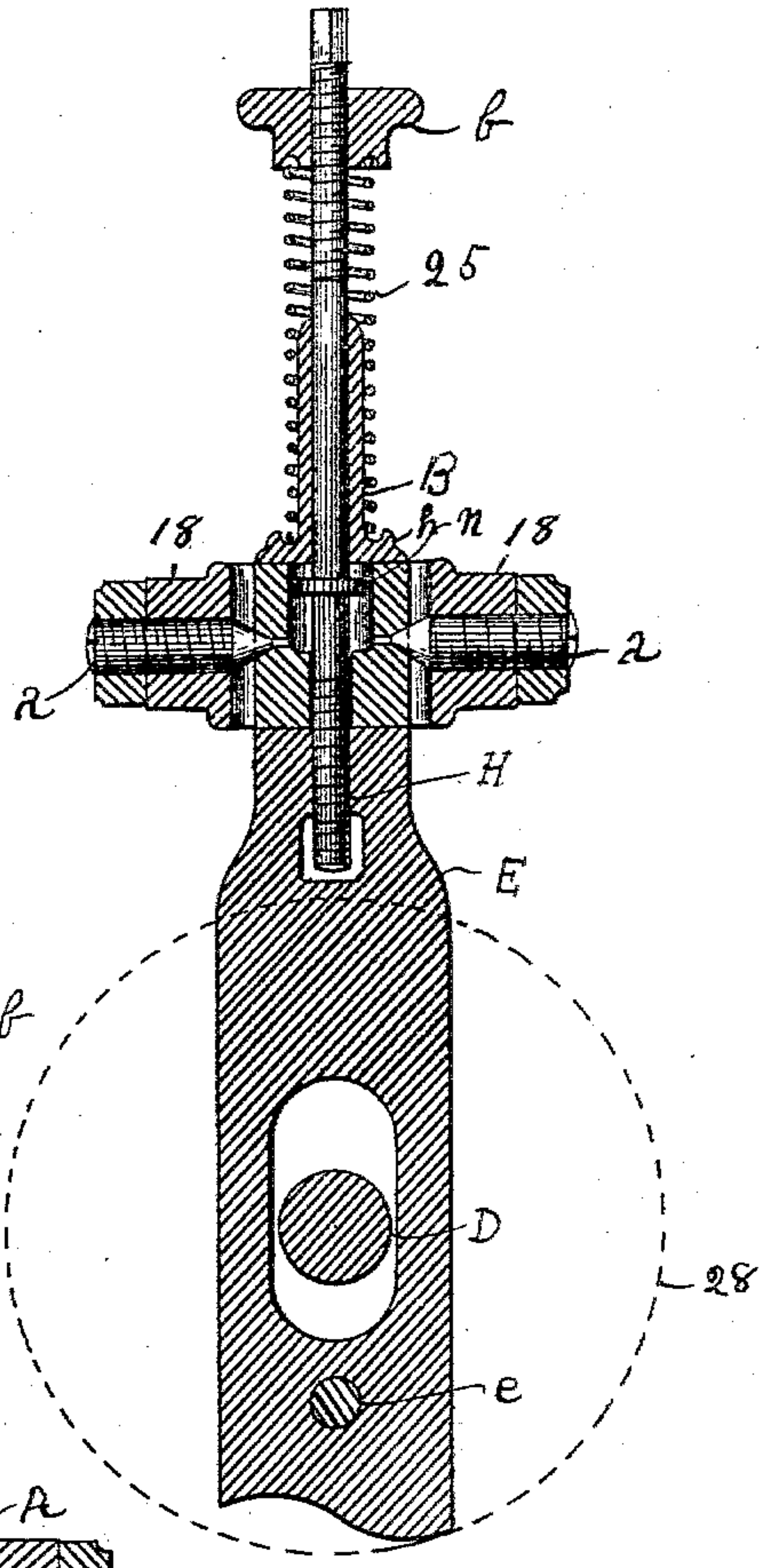


Fig-11

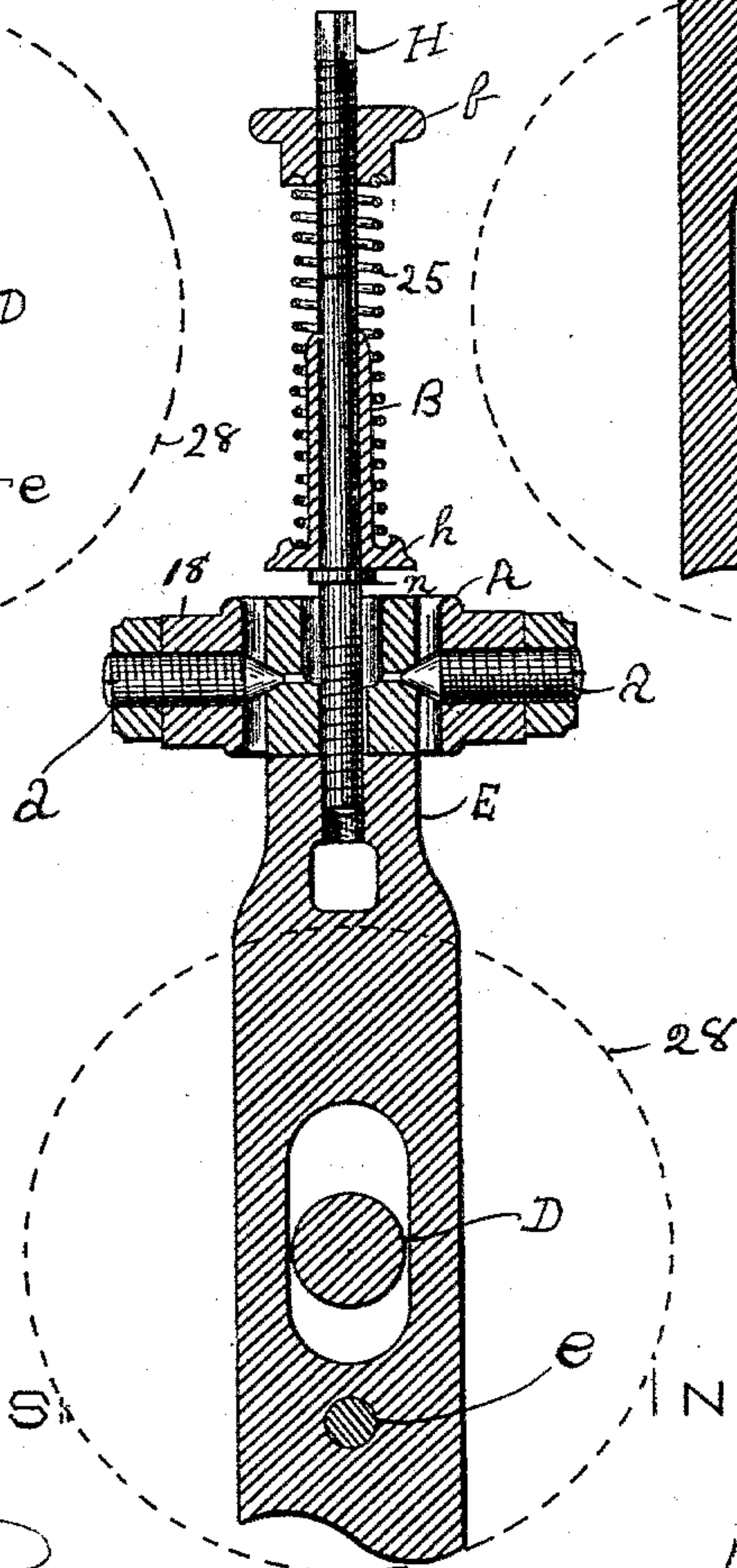


Fig-12

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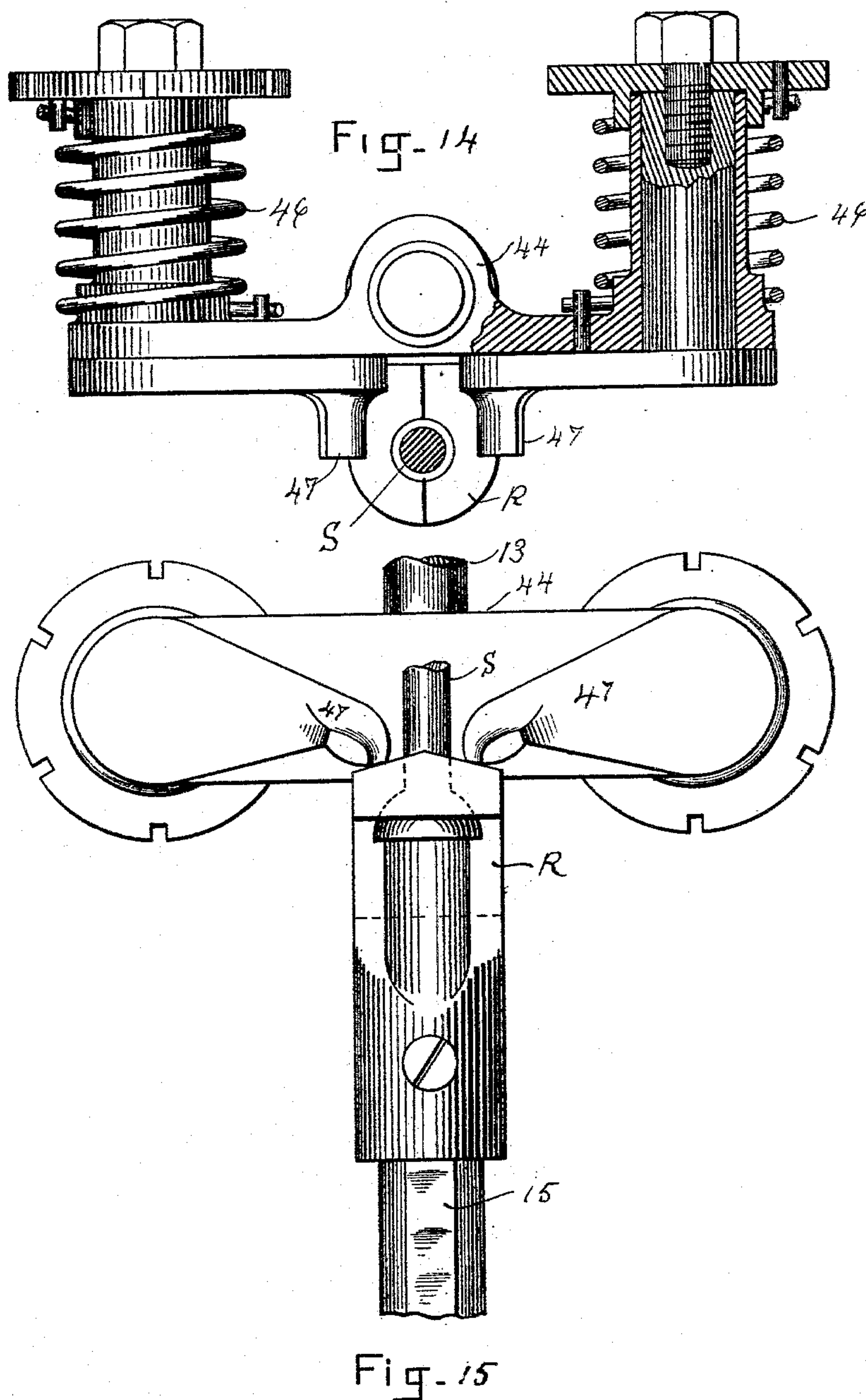
(No Model.)

6 Sheets—Sheet 6.

S. W. LADD.
LASTING MACHINE.

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UNITED STATES PATENT OFFICE.

SHERMAN W. LADD, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO
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LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 510,977, dated December 19, 1893.

Application filed December 10, 1890. Renewed November 4, 1893. Serial No. 490,006. (No model.)

To all whom it may concern:

Be it known that I, SHERMAN W. LADD, of Somerville, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Lasting-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in machines for lasting boots and shoes.

It is an improvement on the machine shown and described in Letters Patent of the United States, No. 423,922.

It relates to the mechanism for imparting to the pinchers devices a yielding, variable, uplifting movement for drawing and straining the upper.

It also relates to the mechanism for opening and closing the pinchers jaws and to matters of construction of the pinchers mechanism.

In the drawings, Figure 1 is a side elevation of the pinchers mechanism. Fig. 2 is a vertical central section of Fig. 1. Fig. 3 is a front elevation of Fig. 1. Fig. 4 is a section on line, 4, 4, of Fig. 3; and Fig. 5 is a section on line, 5, 5, of Fig. 3. Fig. 6 is a plan of the pinchers supporting and operating levers. Fig. 7 is a side elevation of the pinchers opening lever, its operating cam and certain details connected therewith. Fig. 8 is an end view of Fig. 7, in part section. Fig. 9 is a side elevation of the pinchers up-draw lever and details connected therewith. Fig. 10 is an end view of parts shown in Fig. 9. Figs. 11, and 12 are longitudinal vertical sections of Fig. 10, showing the pinchers up-draw lever under different conditions. Fig. 13 is a detail sectional view connected with Fig. 9. Figs. 14 and 15 illustrate the mechanism for closing the pinchers together.

The mechanism described in this specification is designed to readily combine with the machine described in the specification of Letters Patent No. 423,922, as a substitute for mechanism described in that specification for performing functions of a similar character. In this specification such parts only of the machine are described and shown as are necessary in order to present, clearly, the

construction and arrangement of the parts embodying this invention and also the relation and connection of such parts with the machine, as a whole. For a description of the parts not shown and described in this specification, as also for a description of the general operations of the machine, as a whole, and consequently for a better understanding of the matters described and claimed in this specification, reference is had to Letters Patent No. 423,922.

It may be here stated that in carrying out the work of lasting boots and shoes, with the machine to which this invention relates, the pinchers mechanism is first made to seize the edge of the shoe upper and then lift upwardly to draw and strain the upper over the last. The uplifting movement of the pinchers is effected according to the machine as described in Letters Patent No. 423,922, by a two-part lever, a spring interposed between the two parts of the lever, a cam on the main shaft of the machine and intermediate connections between the cam and lever. To that end the two-part lever is pivotally supported on the machine frame, the pinchers mechanism being supported on one end of the lever and the cam being connected with the other member of the lever, the spring being interposed between the members of the lever to impart a yielding quality to the uplifting movement of the pinchers.

The yielding quality of the uplifting pinchers movement is a very important feature in the practical working of the machine. It must yield sufficiently to prevent tearing the shoe upper; at the same time it must apply force sufficient to pull and strain the upper tightly over the last. The movement must be rapid to the end that a quantity of work may be done sufficient to render employment of the machine profitable and the yielding quality must be sensitive and quick to respond to the requirements of this rapid movement.

One feature of my present invention has for its object to provide, in the pinchers uplifting mechanism, that quality of yielding, uplifting tension, which, in practice, I have found most universally applicable to the varying conditions of movement and strain re-

quired of the machine in order to accommodate the yielding and non-yielding qualities of different kinds of leather, or of a particular kind of leather under different conditions of temper. In carrying out this feature of my invention I employ a single pinchers-uplifting-lever, 18, (Fig. 9.) This lever is arranged to permit tilting movements on its fulcrum pin, 19; which pin is supported in the machine head and engages the uplifting-lever about centrally. Said lever carries, on its forward end, the pinchers mechanism and receives tilting movements from a force applied to its rear end. This force is supplied to the pinchers-lever from a cam, 28, which, to that end, is fixed on the machine main shaft, D, (the specific construction and shape of this cam are fully described in Letters Patent No. 423,922.) It is provided with a cam-groove, into which is projected a pin, *e*, (Fig. 9.) Said pin is supported in the bar, E, and the cam-groove is so fashioned as to impart, through this pin, to the bar, E, a longitudinal movement of the bar, once in each direction, during a single revolution of the cam. These movements of the bar, E, longitudinally, it will be understood, effect the tilting movements of pinchers-uplifting-lever, 18.

In applying the movable force from bar, E, to the pinchers-lever, 18, I have had in mind the desirability of having the connecting devices permit of adjustment, so as to impart a more or less extended movement to the pinchers-uplift and thus render the pinchers' movement adjustably conformable to the yielding and non-yielding qualities of leather. To this end the bar, E, is provided with a screw-threaded socket in which to receive the screw-threaded spindle, H, as shown, (Figs. 10, 11, and 12). The spindle, H, by reason of its screw-thread connection with bar, E, may be turned so as to move it in either direction, longitudinally, so as to obtain any desired adjustment of the spindle in relation to bar, E. The bar, E, has a boss provided with a longitudinal groove, opening into the spindle, and a clamp-nut, *f*, whereby the bar is clamped tightly about the spindle to hold it in any position to which it may be adjusted. On said spindle, H, is a loosely sliding collar, A. This collar permits contact with the top end of bar, E, and is connected with the forked rear end of pinchers operating lever, 18, the connection being made by means of pivotal connecting screws, *a*, (Fig. 12.) The top end of spindle, H, is screw-threaded to engage and support, as shown, a screw-threaded nut, *b*. Said spindle has a loosely sliding collar, B, and is formed with a shoulder, or fixed collar, *n*.

Interposed between the nut, *b*, and the enlarged head, *h*, of collar, B, on the spindle, H, is a spiral spring, 25. Said spring bears one end against the enlarged head, *h*, of collar, B, and its opposite end against the nut, *b*. The collar, B, is arranged to slide loosely on spindle, H, to the end that the tension of

spring, 25, may be exerted, downwardly, with a yielding tension, against any force opposed to a downward movement of the collar, B.

In operation, an upward movement of the bar, E, lifts upwardly the rear end of pinchers-lever, 18, and the pinchers are thereby lowered to a position for grasping the shoe upper. A reverse movement of the bar, E, carries downwardly the spindle, H, its nut, *b*, the spring, 25, and collar, B, and brings the enlarged end, *h*, of collar, B, to bear upon the top face of collar, A. A force is thus applied directly to the collar, A, which operates to depress the rear end of pinchers-lever, 18, and this force, it will be understood, is what, operating through the pinchers-lever, 18, lifts the pinchers and pulls and strains the shoe upper. This force, it will be observed, is supplied from the cam, 28, and is applied to the top end of spring, 25, in a positive form. The spring, 25, moves downwardly in unison with the downwardly moving bar, E, spindle, B, and nut, *b*, and acts as a connecting rod, transmitting the downward movement and force of the bar, E, to collar, A, and consequently to the pinchers-lever, 18, in a positive form, until the tensional strain of the leather developed by the pinchers uplifting movement, overcomes the tension of spring, 25, whereupon the spring, by contracting, operates to take up a part, at least, of the further downwardly moving action of the bar, E, and applies the force, yieldingly, with increasing tension, to the pinchers operating lever. It will be observed that the spring, 25, acts as a connecting rod, simply transmitting movement and force from the bar, E, to the pinchers-lever, in a positive manner, up to the point where the tensional strain of the leather, developed by the uplifting pinchers, acting through the pinchers-lever, 18, resists the downward movement of collar, B, with force sufficient to overcome the normal tension of spring, 25, and after this takes place, the spring, 25, contracting, acts as a take-up of movement imparted from bar, E, and as a yielding connecting rod, transmitting movement and force to the pinchers-lever, yieldingly, so as to impart a yielding quality to the pinchers uplifting movement.

In practice, I have found that the spring acts more responsively, with greater sensitiveness and gives better results when the spring is contracted and held under a condition of normal tension. To this end, the spring is preferably made of a length and temper so that its normal length may be contracted by a suitable movement of the nut, *b*, and a tensional force developed in the spring, so contracted, instead of relying upon the normal force of an uncontracted spring.

At times, when certain classes of leather are being lasted, it is desirable to have a long or extended pinchers uplifting movement to compensate for the stretching qualities of the leather. At other times, when other classes of leather are being lasted, it is desirable to

have a short pinchers uplifting movement conformable to the non-yielding qualities of the leather. To this end the spindle, H, is made adjustable, longitudinally in relation to its supporting bar, E, and is provided with the collar, *n*. When the spindle is adjusted so that the collar, *n*, sets within the cavity of collar, A, as shown in Fig. 11, the spring, 25, bears, continuously, upon the collar, A, and, acting downwardly, conveys motion to the pinchers-lever, 18, during the entire downward throw of the bar, E, and thus effects a long or extended pinchers uplifting movement, but when the collar, *n*, is, by a suitable adjustment of spindle, H, lifted to a position above the collar, A, as shown in Fig. 12, then a portion of the downward throw of bar, E, is taken up in bringing the collar, *n*, and consequently the spring, 25, down to contact with collar, A, and the remaining portion of the downward throw of bar, E, only, is transmitted through the spring, 25, to depress the pinchers-lever and consequently a short uplifting movement of the pinchers is effected. This arrangement obviates the necessity of forcing an extensive contraction of spring, 25, while the pinchers are held down by the excessive strain of a non-yielding lever. This arrangement also permits the development of a normal contracted tension in the spring, 25, by contracting it, in one case, between the nut, *b*, and collar, A, and, in the other case, between the collar, *b*, and collar, *n*. By a suitable adjustment of the spindle, H, the machine may be adapted to work upon the different kinds of leather with a practically uniform action of the spring, 25, and this arrangement permits of a nicer determination and maintenance of the normal tension in contracted spring, 25.

I now proceed to describe that portion of my present invention which relates to the pinchers mechanism and the mechanism for opening and closing the pinchers. The pinchers mechanism, proper, is represented in Figs. 1, 2, 3, 4, and 5 of the accompanying drawings. The shank, 13, carries the outer fixed jaw, 14, and is grooved longitudinally to receive, (Fig. 2,) the shank, 15, which carries the jaw, 16. The collar, 17, fixed to the shank, 13, holds shank, 15 in place within the shank, 13, but allows a vertical movement thereof, necessary for opening and closing the pinchers-jaws. Said shank, 13, carries on its top end a ball, which enters a suitable socket formed in the end of the pinchers lever, 18, (Figs. 9 and 13.) This ball and socket joint connection differs from the cup joint connection of Letters Patent No. 423,922 and is preferable thereto as it gives more solidity and wear. The pinchers jaws are opened and closed by lifting and depressing the movable pinchers-jaw-shank and jaw, 15, 16. The lifting movement is effected by a cam, 49, (see Figs. 7 and 8,) on the main shaft, D, operating through the intermediate lever, 50. To that end the lever, 50, is pivotally supported on the ma-

chine frame with one end bearing on the face of cam, 49. The opposite end of said lever extends forward to a point over the forward end of lever, 18, (Fig. 6,) and is connected with the pinchers-shank, 15, by the intermediate link, S. To that end the link is provided with enlargements at each end, adapted to play, one in a socket formed in lever, 50, (Fig. 7) and the other in a socket formed in the collar, R on the shank, 15, (Fig. 2.) The collar, R, is made to surround the shank, 13, and permits sliding movement thereon. For convenience, it is made a distinct piece from the shank, 15, but it is desirable that it should have a close and solid connection with shank, 15. To that end, it is provided with a shoulder, N, adapted to rest snugly down upon the top of shank, 15, as shown in Fig. 2.

For a further description of the cam, 49, and the action thereof, in point of time, and relation to the other co-operating machine parts. See Letters Patent No. 423,922. The pinchers-jaw-shank and jaw, 15, 16, are depressed for closing together the pincher-jaws and causing them to grip the leather, by a mechanism represented in Figs. 14 and 15 of the accompanying drawings. Said mechanism comprises a shell, 44, which is provided with duplicate spiral springs, 46, 46, that are respectively coiled about a central core and carry, on their outer ends the levers, 47, 47. These levers bear upon the top of collar, R, in line with the uplifting draft of the link, S, (Fig. 2.) To that end the shell, 44, is fixed upon the pinchers-shank, 13, in position as shown. This depressing mechanism is further described in the Letters Patent No. 423,922, but the arrangement thereof, as shown here, differs from the Letters Patent No. 423,922 in that here the levers, 47, 47, are positioned to act in alignment with the link, S. This arrangement obviates the twisting of the pinchers' closing parts and the liability of said forces to act obliquely and consequently it gives greater durability and greater length of wear. By this arrangement too the downward acting forces of springs, 46, 46, are exerted in a more direct line with the shank, 15, and the parts, through the medium of the collar, R, have a more solid and direct connection with said shank, 15, whereby breakage, incident to the wearing of the parts, as effected by the jaws coming suddenly together is greatly lessened. It will be understood that the leather is held by being compressed between the pinchers-jaws, the holding power being determined by the tension of springs, 46, 46.

The mechanism, taken as a whole, described in this application, is designed to readily combine with the machine described in Letters Patent No. 423,922, but I do not herein seek claims to cover any of the devices shown in said Letters Patent.

What I claim is—

1. In a lasting machine, a single or one part pivoted lever, as 18, a pinchers mechanism

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jointed to and supported by the lever on one side of the pivotal point and a yielding connection between the lever on the opposite side of the pivotal point, and the lever operating mechanism through which the lever operates to lift the pinchers, substantially as described.

2. In a lasting machine, a single or one part pivoted lever, as 18, a pinchers mechanism jointed to and supported by the lever, on one side of the pivotal point and a spring applied to the lever on the opposite side of the pivotal point, combined with an operating mechanism, arranged to engage positively with the lever for moving the same to carry the pinchers toward the last and to operate upon the lever through the said spring for moving the pinchers mechanism away from the last to stretch the leather, as and for the purposes described.

3. In a lasting machine, a pivoted lever, as 18, a pinchers mechanism jointed to and supported by the lever on one side of the pivotal point, combined with a spring contracted to a degree of normal tension, as described, arranged to have engagement with the lever on the opposite side of the pivotal point and an operating mechanism for lifting and depressing the lever, substantially as described.

4. In a lasting machine, a pivoted lever, a pinchers mechanism jointed to the lever at one side of its fulcrum, a spring connection applied to the lever on the side of its fulcrum opposite to that to which the pinchers mechanism is applied, an operating mechanism for

moving the lever, and an adjusting device situated between the said operating mechanism and the said spring connection, substantially as and for the purposes set forth.

5. In a lasting machine, a pivoted lever, as 18, a pinchers mechanism jointed to and supported by the lever on one side of the pivotal point, a cam and intermediate connections consisting of bar, E, spindle, H, provided with collar, n, and spring, 25, for lifting and depressing the lever, substantially as described.

6. In a lasting machine, in combination, the pinchers-shank, 13, and its jaw, 14, the pinchers-shank, 15, and its pinchers-jaw, 16, and the collar, R, provided with shoulder, N, and secured to the shank, 15, substantially as described.

7. In a lasting machine, the combination of the pinchers shank, 13, supporting the lower pinchers jaw, the shank 15, carrying the upper pinchers jaw and movable relatively to the shank 13, means for uplifting the shank 15 connected thereto by a rod, and the spring actuated levers carried by the shank 13 and adapted to bear downward upon the shank 15 in line with the said connecting rod, whereby the movable shank and its jaw are moved without being twisted and directness of movement is insured, substantially as set forth.

Signed at Boston this 1st day of November, A. D. 1890.

SHERMAN W. LADD.

Witnesses:

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C. B. TUTTLE.