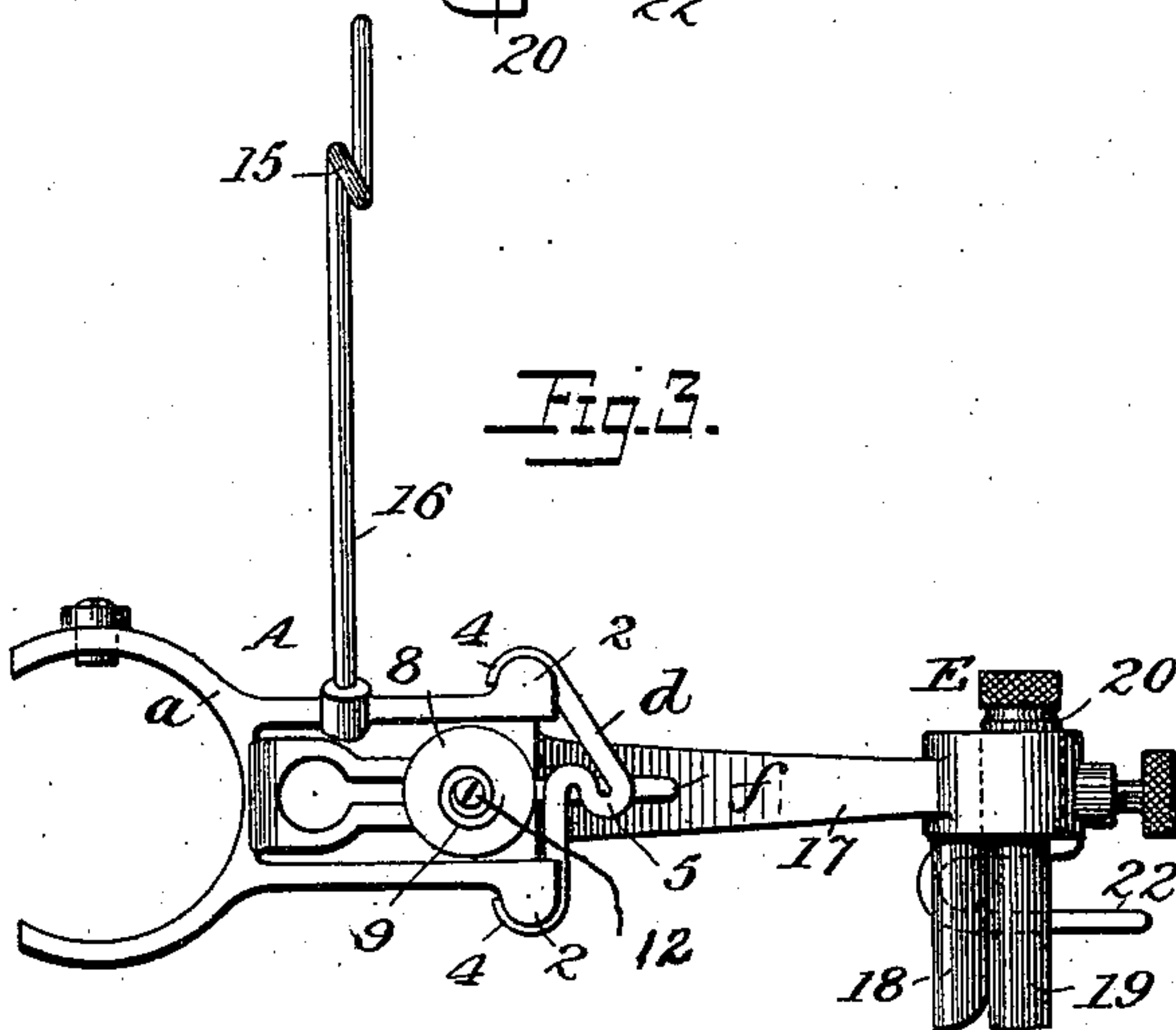
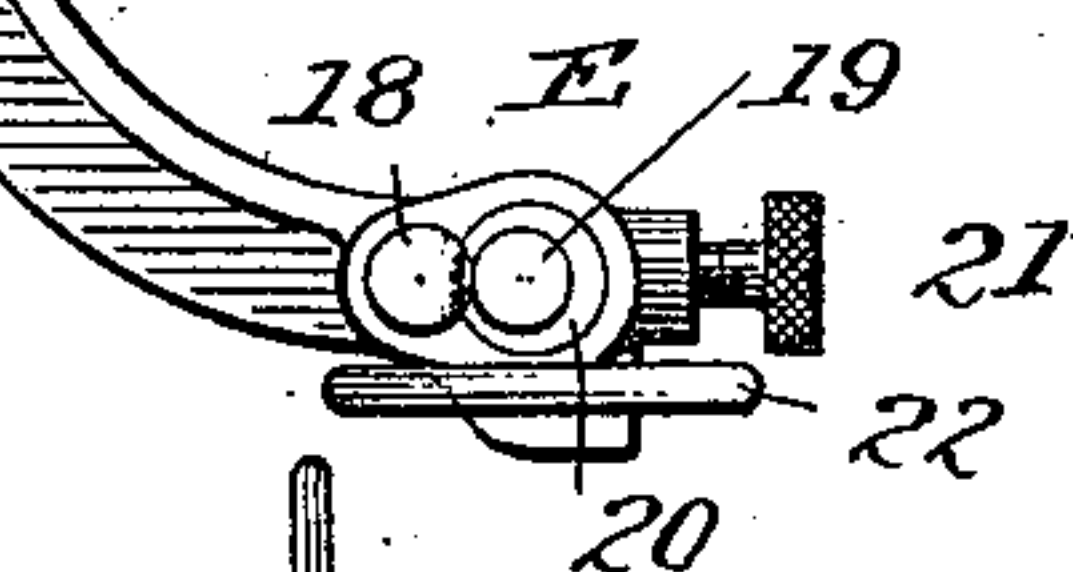
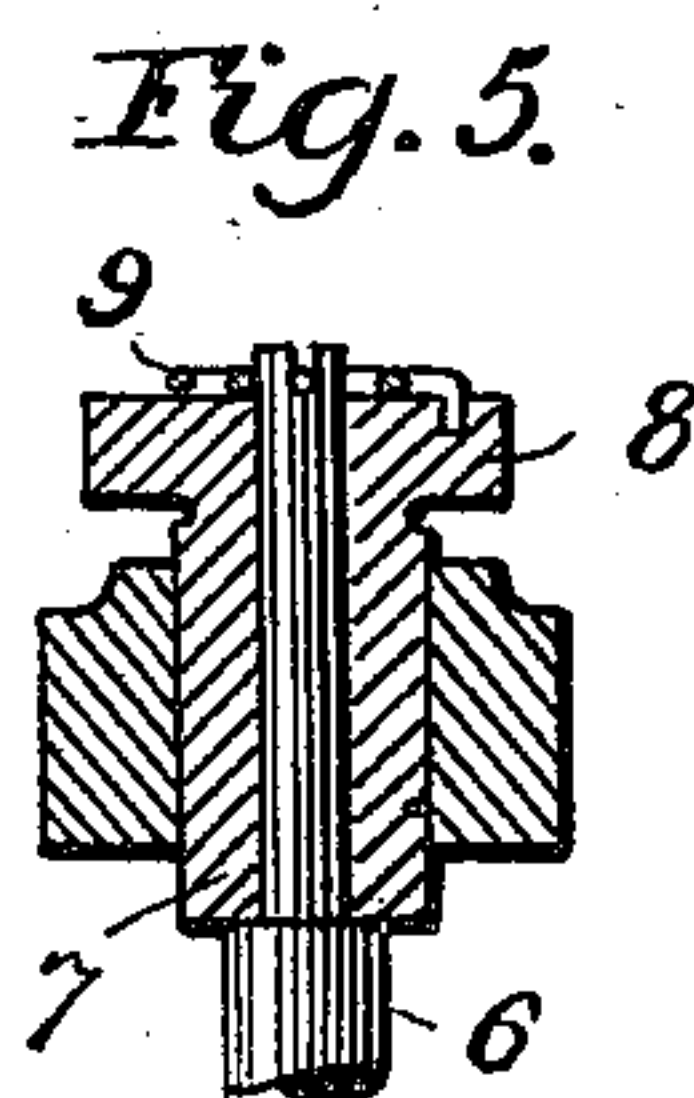
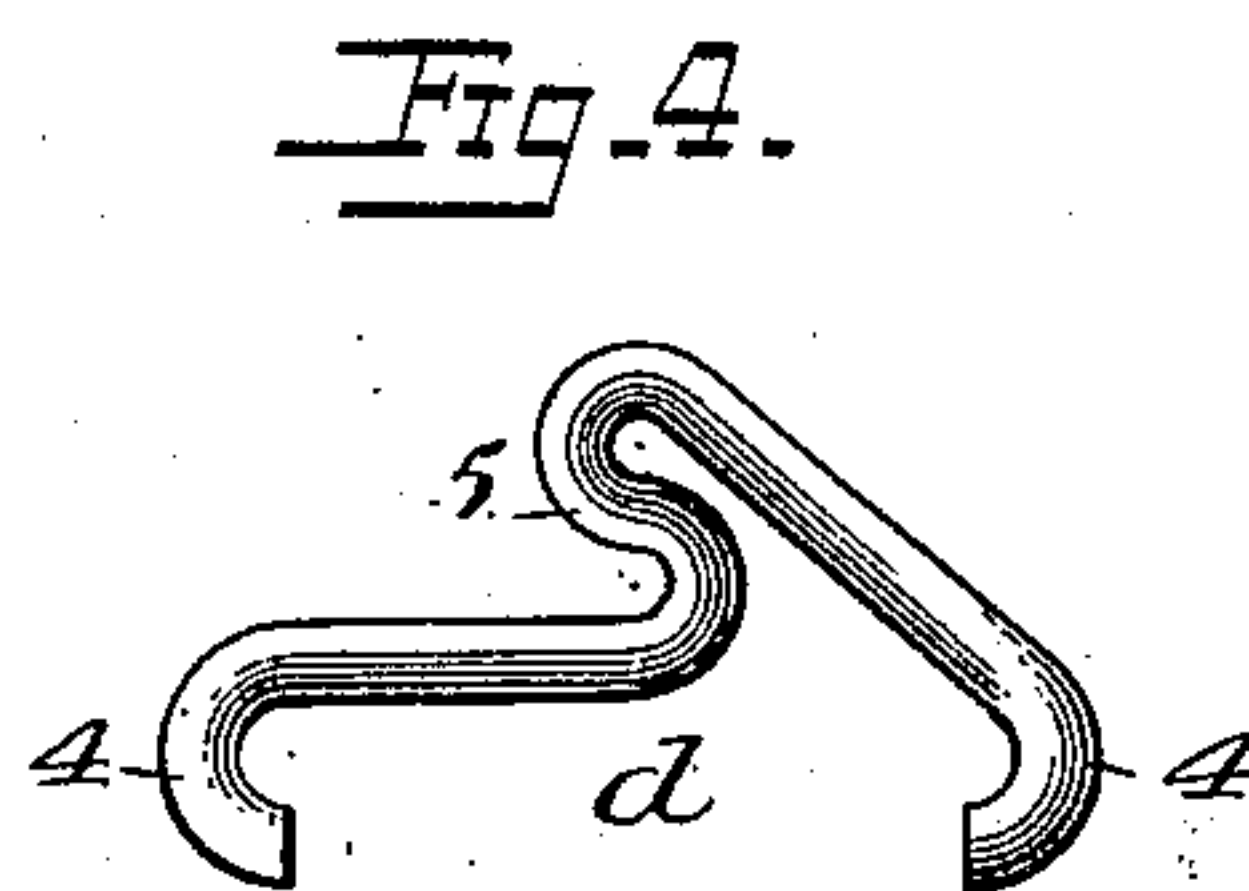
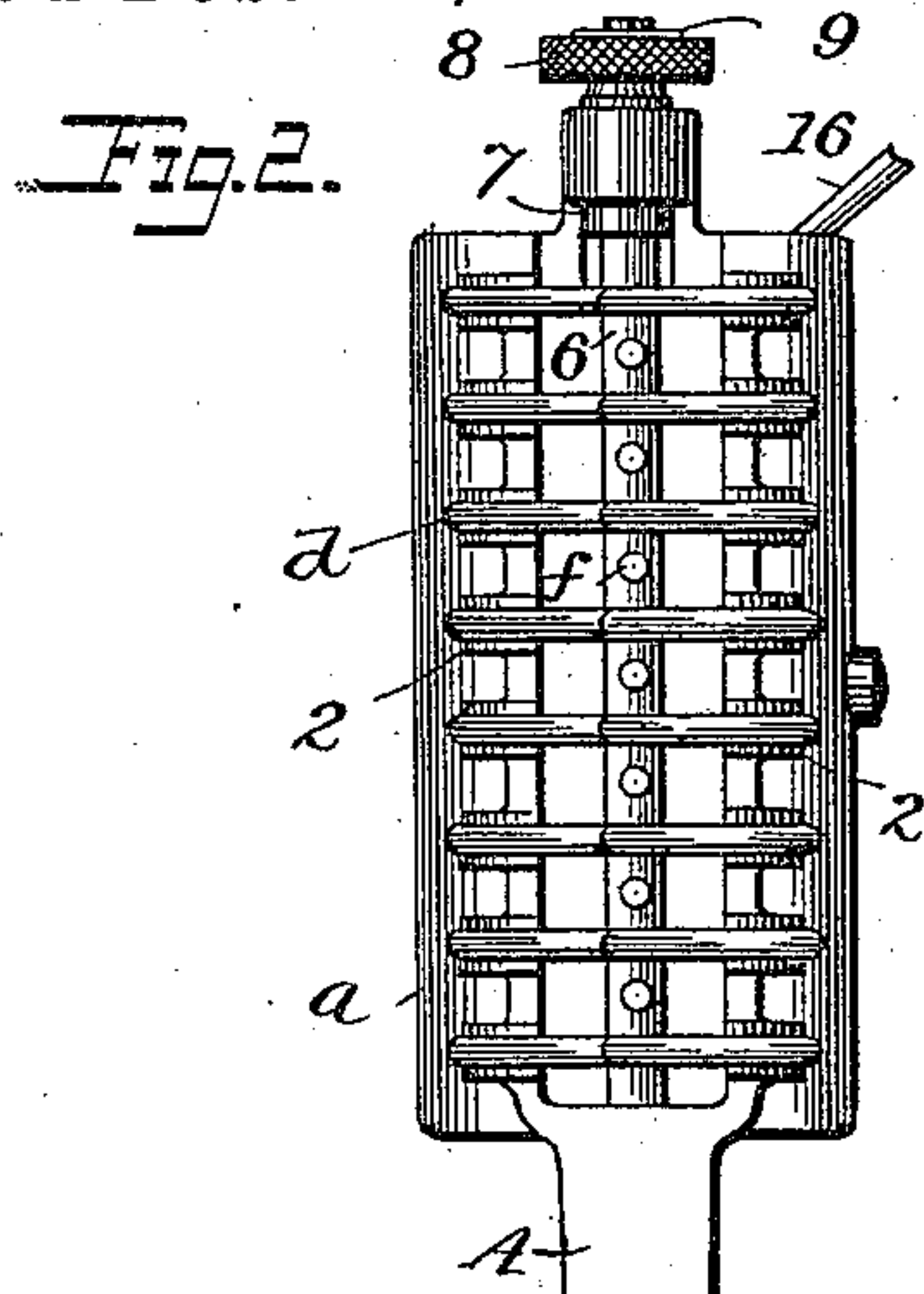
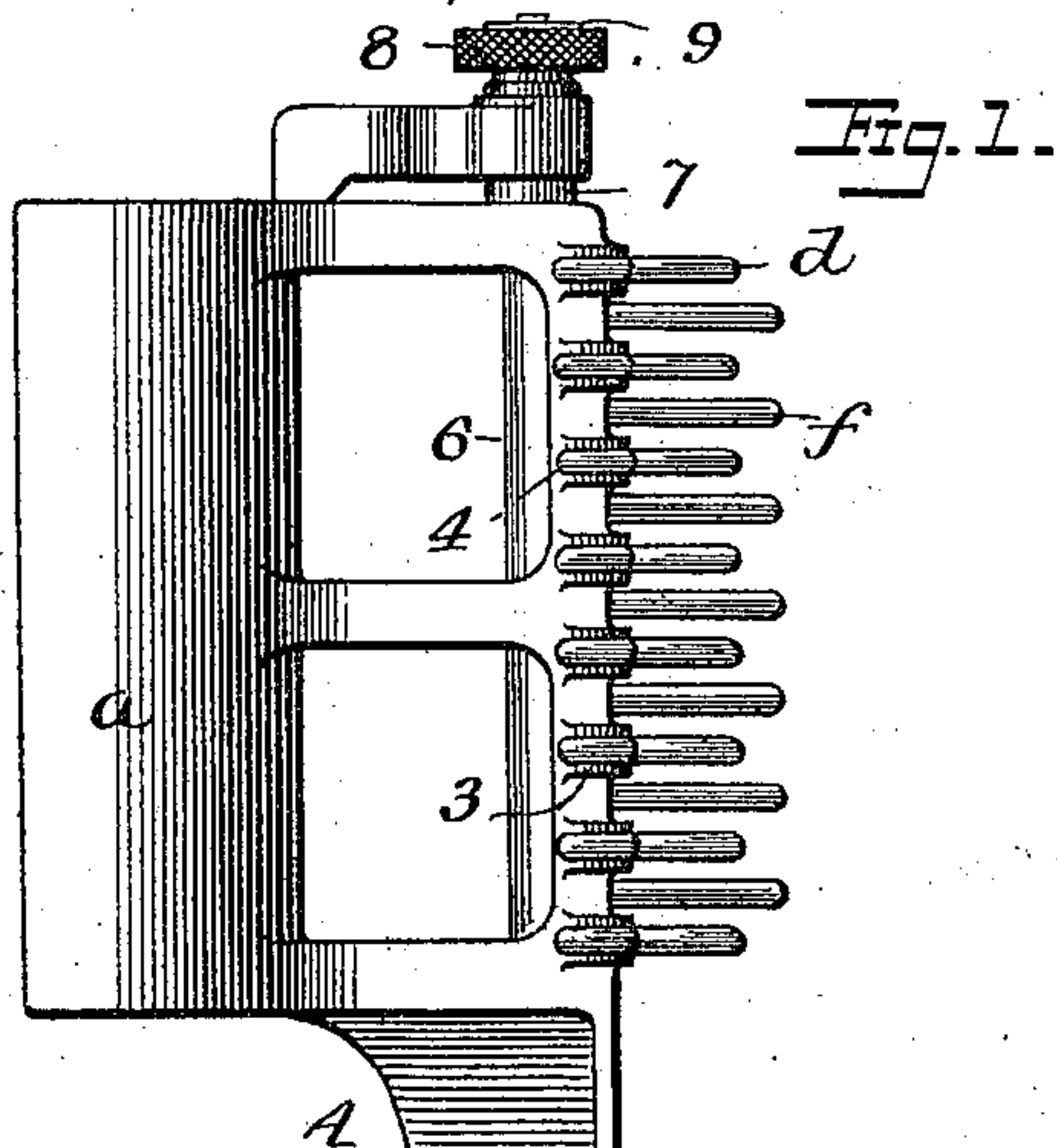


(No Model.)

S. W. WARDWELL, Jr.
TENSION DEVICE.

No. 577,337.

Patented Feb. 16, 1897.



Witnesses
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Attorneys

UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF BOSTON, MASSACHUSETTS.

TENSION DEVICE.

SPECIFICATION forming part of Letters Patent No. 577,337, dated February 16, 1897.

Application filed May 18, 1894. Serial No. 511,715. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., 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 Tension Devices, of which the following is a specification.

My invention relates to devices for applying tension to traveling threads or cords, and is more especially intended for winding-machines in order to properly regulate the tension upon classes of threads which it has heretofore been difficult to wind, and to this end I provide a tension device in which there are two series of fingers, one or both movable and arranged alternately, so as to bend the thread into a series of waves or loops under the action of an adjustable spring, as fully set forth hereinafter, and I also combine with the tension device a knot-catcher, all as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved tension device with a knot-catcher attached; Fig. 2, a front elevation; Fig. 3, a plan view; Fig. 4, a detached view of one of the stationary fingers. Fig. 5 is a detail view of the upper end of the movable finger-shaft and showing some of the parts in section.

The device consists, essentially, of two series of fingers, one movable toward and from the other, or both may be movable across the line of the direct path of the thread, so that as one series of fingers passes between the others the thread will be bent out of a straight line, taking a circuitous course, the bends of which vary in extent, according to the relative positions of the two series of fingers. The movable series of fingers is carried toward the other series under the action of a spring capable of being adjusted to vary its tension. These features may be embodied in various different constructions. I will now describe one which has proved to be most effective.

A is the frame of the device and is provided with a curved section *a*, adapted to receive the leg or bar of the machine to which it is to be attached, and with a set-screw 1 for binding it in place thereon. Upon the frame are two parallel ribs 2 2, each of which has a series of curved sockets 3, adapted to

receive the bent ends of the stationary fingers *d*. Each of said fingers consists of a rod of spring-wire bent to form the said bent ends 4 4, and also bent at the center upon itself and reversely to form a central hook 5. The fingers *d* are of such a shape as constructed and illustrated in Fig. 4 that the ends must be sprung apart to apply them to the sockets 3 in the ribs 2 2, so that after being so swung apart and brought into position and released they will hold themselves in place by their spring-pressure. The fingers thus arranged extend horizontally from rib to rib, as shown, with intermediate spaces for the reception of the movable fingers *f*.

The movable fingers *f* are straight rods extending from a vertical shaft 6, having its bearings in the frame at the lower end and extending at the upper end loosely through the hub of a cylinder 7, which latter fits closely a socket in the frame with sufficient friction to prevent it turning readily, and is provided with a milled head 8, by which it can be turned in said socket when sufficient force is applied. A coiled spring 9 has a bent end which extends into a hole in the head 8, and its other end extends through a cross-slot 12 in the shaft 6, so that by turning the cylinder or plug 7 said spring may be put under greater or less tension.

In placing the thread in the device the fingers *f* are swung to the left to permit the thread to be carried along the bends in the hooks 5 of the fingers *d*, after which the fingers *f* are released, when the spring will carry the latter between the fingers *d*, bending the thread into a series of equal loops, varying in extent according to the positions of the fingers *d*, depending upon the tension of the spring, and as the thread is drawn longitudinally and repeatedly bent in its course it is subjected to a frictional resistance proportionate to the number and extent of the loops or bends.

By providing a number of fingers in each series it is possible with the use of a spring of exceeding light character, such, for instance, as may be made of thin piano-wire, to apply all the power needed to the movable fingers and yet secure the maximum tension, while the tension can be readily varied to

any desired extent and can be maintained absolutely uniform whatever may be the degree of tension applied.

While the two series of fingers may be each supported at any suitable angle, so that one will swing between the other, and while the fingers may be of different shapes the construction which I have described can be manufactured with facility and economy and affords capacity for extremely nice adjustment.

In order to conduct the thread properly from the tension device, I form a guide-eye 15 in a wire 16, the lower end of which is inserted in a socket in the frame.

In many instances it is desirable to provide a knot-catcher in connection with a tension device, and I therefore extend the frame of the device in some instances to form an arm 17, supporting the knot-catcher E at the lower end.

As shown, the knot-catcher consists of a cylindrical pin 18, extending from one side of the arm 17, and a cylindrical pin 19, arranged eccentrically upon a plug 20, having a milled end and turning in a transverse socket in the arm 17, so that the pin 19 may be carried to or from the pin 18, and a set-screw 21 serves to secure the plug after adjustment. The end of the pin 18 is beveled off to facilitate the introduction of the thread between the two pins, and a guard-hook 22 below the pins prevents the thread from leaving the latter. The pin 19 is adjusted to permit the thread to pass through to the tension device, but so as to prevent the passage of any knot or enlargement upon the thread.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. A thread-tension device comprising a frame, a series of removable stationary fingers constructed of spring metal and each provided with a hook, a rock-shaft disposed at right angles to said stationary fingers and

carrying a series of fingers projecting between and alternating with said stationary fingers, and means for returning said shaft to position after the same has been rocked, substantially as described.

2. A thread-tension device comprising a frame, a series of removable stationary fingers constructed of spring metal and each formed with a corresponding hook, a rock-shaft disposed at right angles to said stationary fingers and carrying a series of straight fingers projecting between and alternating with said stationary fingers, a spring for returning said shaft to position after being rocked, and means for adjusting said spring to vary the tension thereof, substantially as described.

3. The combination of a series of parallel fingers, each bent to form a hook and a series of alternating fingers supported to swing upon an axis at right angles to and between the fixed fingers to and from the hooked portions thereof and a spring for actuating the movable fingers, substantially as set forth.

4. A tension device having a frame with two parallel series of bearings a series of fingers each consisting of a spring-rod having bent ends to engage opposite bearings and a shaft turning in bearings upon the frame and carrying a series of fingers and a spring for turning said shaft, substantially as set forth.

5. The combination with the thread-bearing elements of a tension device, of a rotatable knot-catcher consisting of a fixed bar and a plug carrying an eccentric bar, and means for securing said bar in position, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:

F. H. BISHOP,

PHILIP E. BRADY.