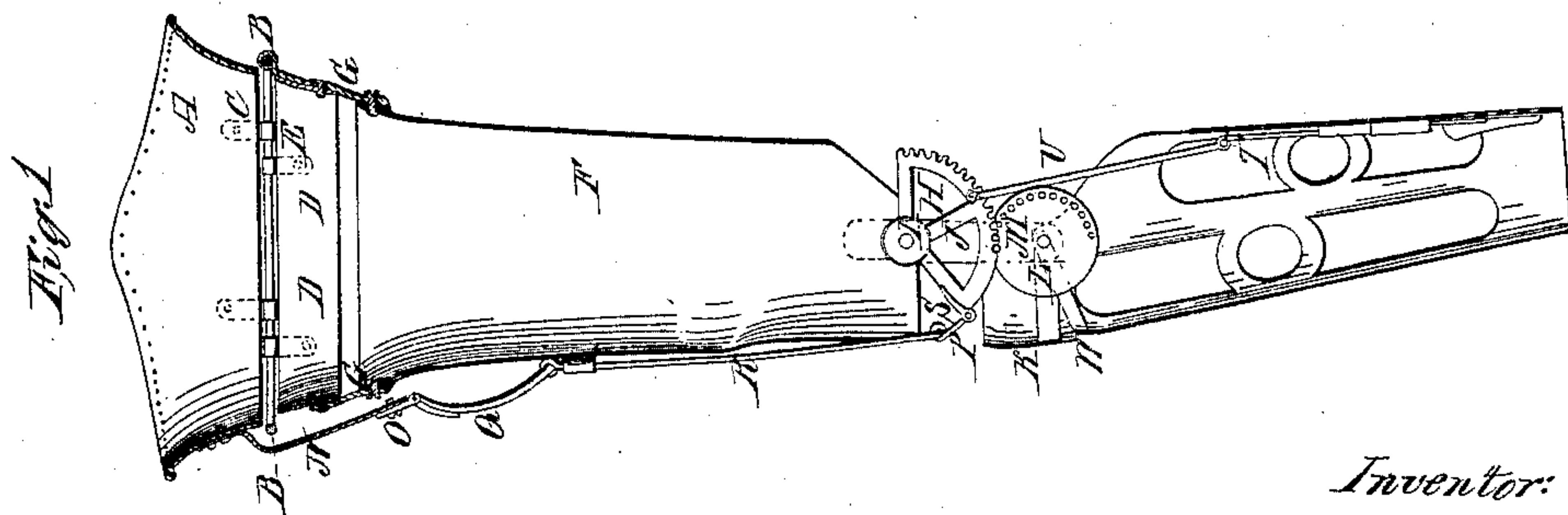
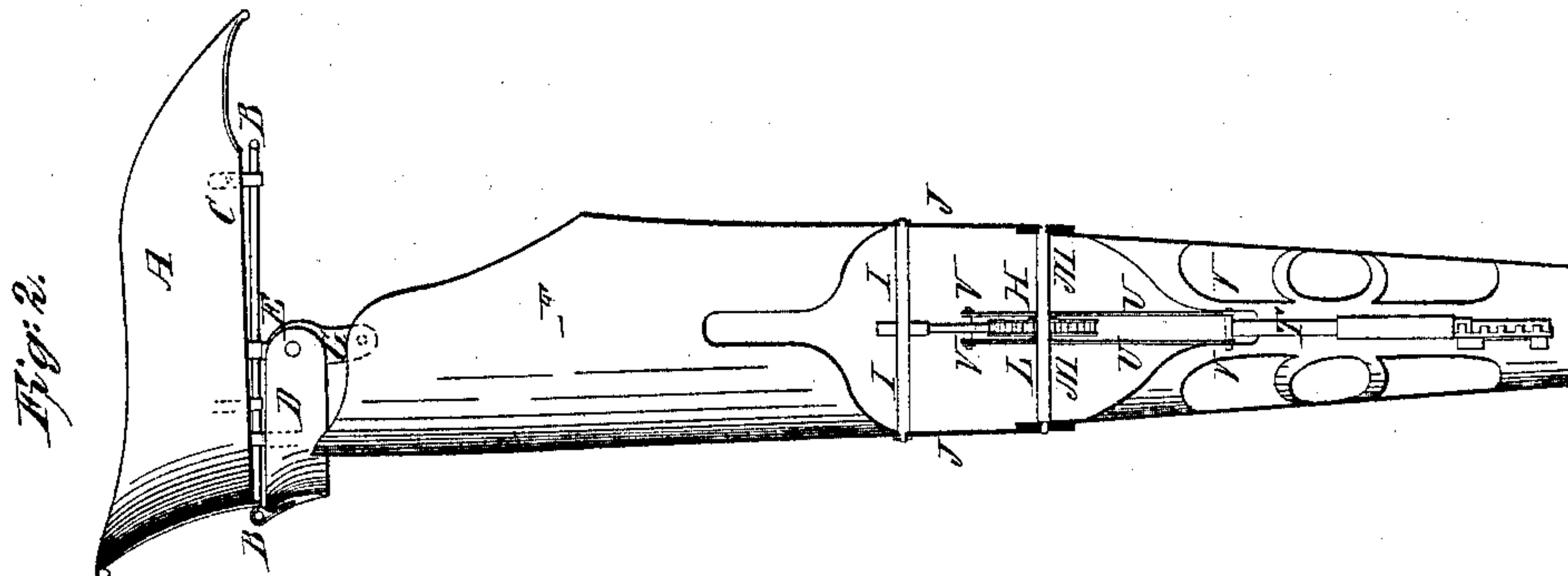
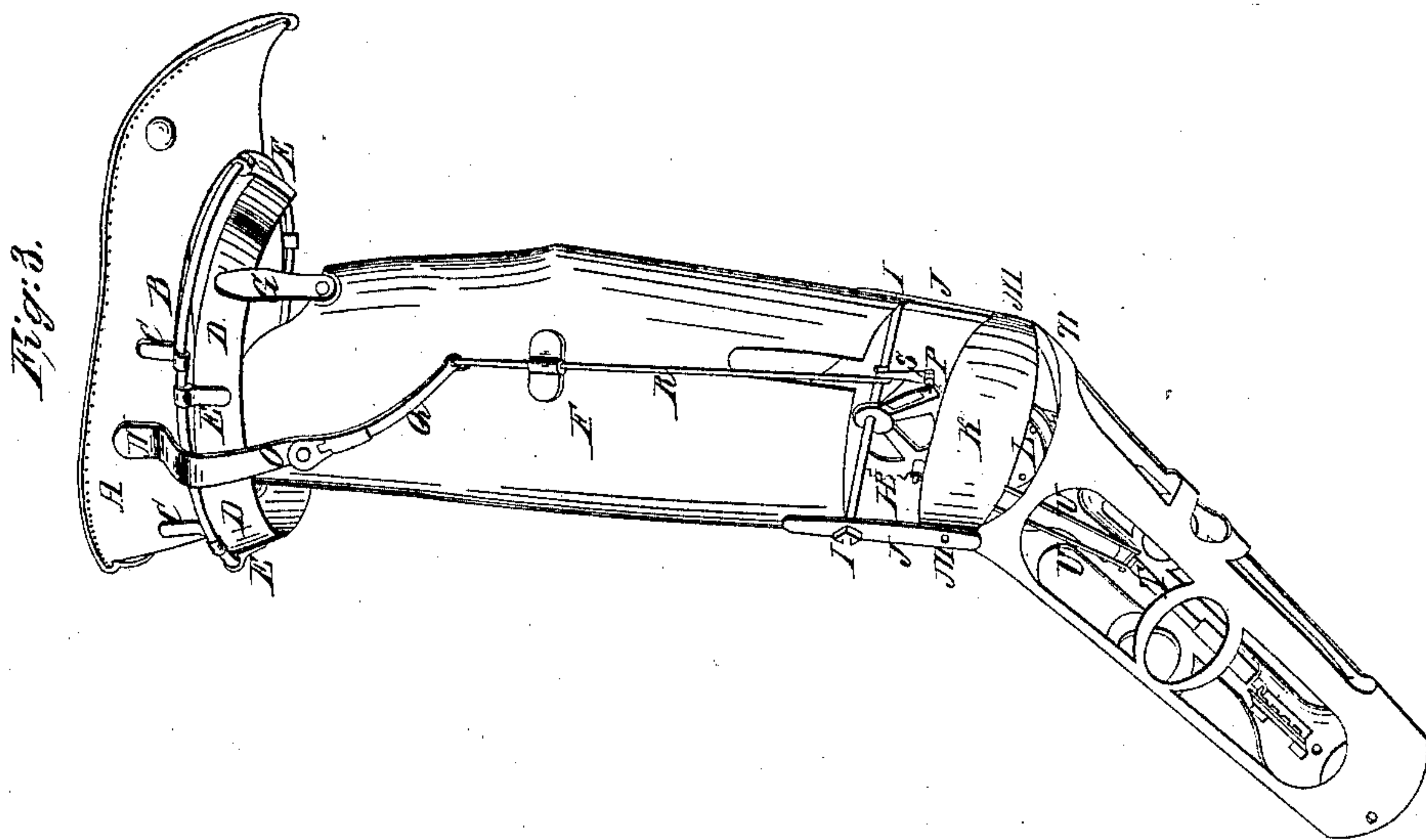


J. H. Koeller,

Artificial Arm.

N^o 44,638.

Patented Oct. 11, 1864.



Witnesses:
W. Morton
John Smith

Inventor:

Jon H. Koeller.

UNITED STATES PATENT OFFICE.

JON. H. KOELLER, OF NEW YORK, N. Y.

IMPROVEMENT IN ARTIFICIAL ARMS.

Specification forming part of Letters Patent No. **44,638**, dated October 11, 1864.

To all whom it may concern:

Be it known that I, JON. H. KOELLER, of the city, county, and State of New York, have invented a new and Improved Mode of Constructing the Artificial Shoulder-Joint and Arm; and I do hereby declare that the following is a full and accurate description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in supplying an artificial shoulder and shoulder-joint, arm, forearm, and elbow-joint where that member has been lost or amputated.

To enable others skilled in the art to make and to use my invention, I will proceed to describe its construction and operation.

Figures I, II, and III represent a sectional side, back, and a perspective quarter view of my invention.

A is a shoulder-collar, constructed of thin metal or other suitable material, molded to the form of the shoulder, and firmly attached thereto by straps or fastenings crossing the upper portion of the chest or trunk, and constituting the basis or foundation of all the required movements of the arm.

B B is a ring encircling the outer rim or opening of the shoulder collar, and firmly attached or fixed in its position by the brackets or stays *c c c*.

D D is a hoop, slightly conical in shape, and in length a little more than half the circle or outer rim or opening of the shoulder-collar, to which it is indirectly connected by the brackets E E, which, by sliding on the stationary ring B B, gives or allows a movement or motion in the artificial arm analogous to that which is obtained in the natural arm from the ball-and-socket joint at the shoulder. This sliding or semi-rotary movement of the hoop D D is also instrumental, as will be hereinafter seen, in giving flexion and extension to the forearm, as well as to the hand and fingers when they are brought indirectly in connection with it.

F F is the shell of the "humerus," or upper portion of the artificial arm, for the reception of the "stump," and is attached or suspended to the hoop D D by the two brackets G G, which brackets, being placed and firmly attached opposite to each other on the hoop D D, and their other ends similarly placed on the oppo-

site sides—*i. e.*, on the front and back part of the shell F—and this latter attachment being by means of pivots, I am enabled to accomplish another necessary movement of the upper arm—to wit, bringing it from the side of the body to a right-angled and almost perpendicular position. Thus, while the sliding of the hoop D on the ring C gives to the arm a motion backward and forward, or a "swing," as naturally occurs when walking, the hinge or pivot attachment of the brackets G G to the shell F gives the lateral elevating or right-angled movement, and the combination of the two constructions or arrangements gives all the intermediate motions and positions of the arm as are effected or accomplished in the natural arm by means of the ball-and-socket joint. This mechanical arrangement has the effect of an exterior capsular ligament, and, though not possessed of the elasticity of that membrane, would be viewed or regarded by the anatomist as the "analogue" of that membranous structure which surrounds the ball-and-socket joint of the shoulder, and which, with the muscles, hangs or sustains the arm in the natural subject.

The flexion and extension of the forearm is accomplished by the following described mechanism: H is the section of a toothed or cog wheel, acting measurably on the principle of the "bell-crank." Its shaft or center I I works in the two lateral braces J J, which are firmly attached to the lower portion of the shell F, and braced at their lower ends by the semi-hoop brace K. The "cogs" of the segment-wheel H work or "mesh" into the double-plate pinion-wheel L, whose shaft or center M passes through the lower ends of the lateral braces or straps J J.

The flexion and extension of the forearm by the backward and forward movement of the shell of the upper arm, or the muscular efforts of the stump within it, is finally accomplished or effected in the following manner: The bracket N, being firmly attached to the shoulder-collar A, its extremity O becomes a fixed point, and when that stationary point is brought in connection with the movable point P of the segment-wheel H by means of the curved hinge-strap Q, rod R, and hinge-link S, it is evident that a forward movement of the stump of the arm, carrying with it the shell F, must move the segment-wheel H in a reverse or

opposite direction, and the upper portion of the pinion-wheel L in the same direction, and, as the latter wheel and its shaft are firmly attached to the shell at either end of the shaft, and still further by the brace W, it becomes part and parcel of the shell of the forearm. The motion, then, of the latter (being a lever with its fulcrum at M) must be in a direction opposite to that of the upper part or periphery of the pinion-wheel L, and thus the forearm becomes flexed or bent upon the upper arm. In like manner the reverse or opposite movement of the stump and shell of the upper arm must produce or effect the extension or straightening of the forearm.

By the instrumentality of the same mechanism and movements of the stump and shell of the upper arm I accomplish the flexion and extension of the thumb and fingers. This is effected by communicating to the slide T the movements of the toothed section of a wheel, H by means of the two flat connecting-rods U U, their place of attachment to said wheel being determined by the extent of movement of the slide requisite for the due extension and flexion of the fingers. The two connecting-rods U U work or play at their two extremities on the pivots V V.

The mechanism employed and the manner in which the slide T is connected with the mechanism for producing the flexion and ex-

tension of the fingers has been fully specified and described in my application for patent filed on or about the 25th day of February, 1864, for improvements in the artificial metallic arm.

What I claim in the foregoing specification, and desire to secure by Letters Patent, is—

1. The method or mode of constructing the artificial shoulder-joint by means of the collar A, the ring B B, and the hoop D D, sliding or moving on the same by means of the brackets E E, together with the hinge motion of the shell F of the upper arm effected by the movement of the stump and by means of pivots g g, as hereinbefore set forth and described.

2. The arrangement and mode of constructing the artificial elbow-joint, and the following enumerated parts for effecting the flexion and extension of the forearm and the alternating right-lined motion of the slide T, for the flexion and extension of the thumb and fingers—to wit, the bracket N, the curved hinge-link Q, the rod R, the link S, with its hinge P, the segment of cog-wheel H, the pinion-wheel L, the brace W, the connecting-rods U U, and the slide T, as hereinbefore fully specified and described.

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Witnesses:

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