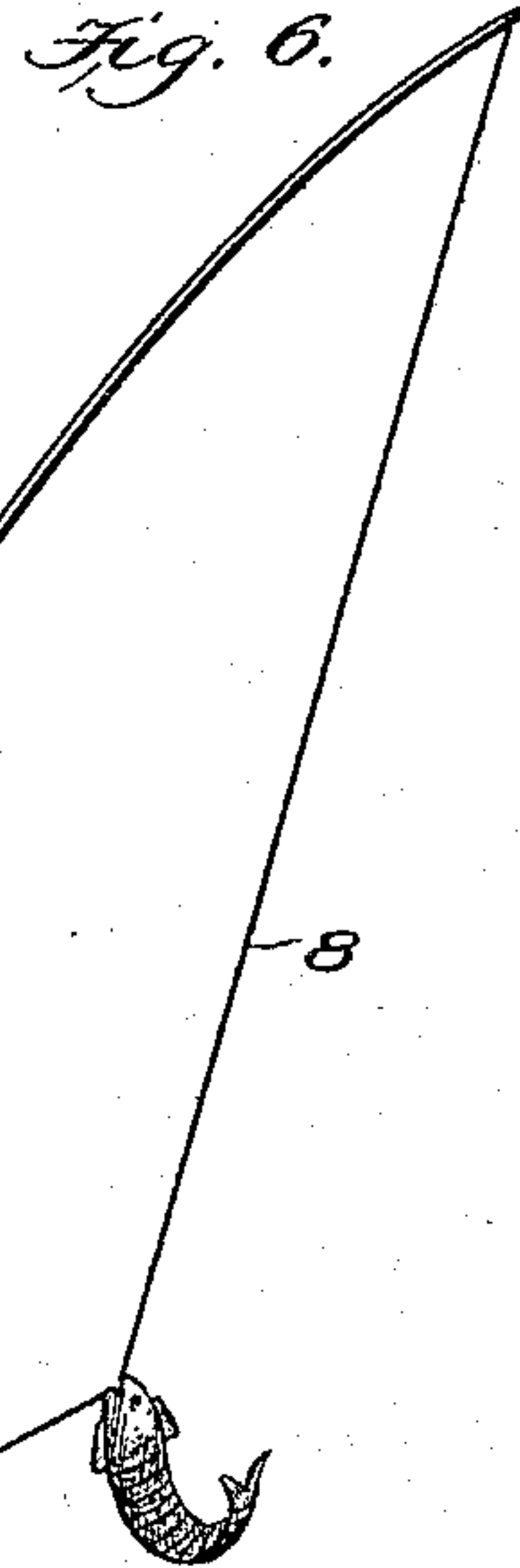
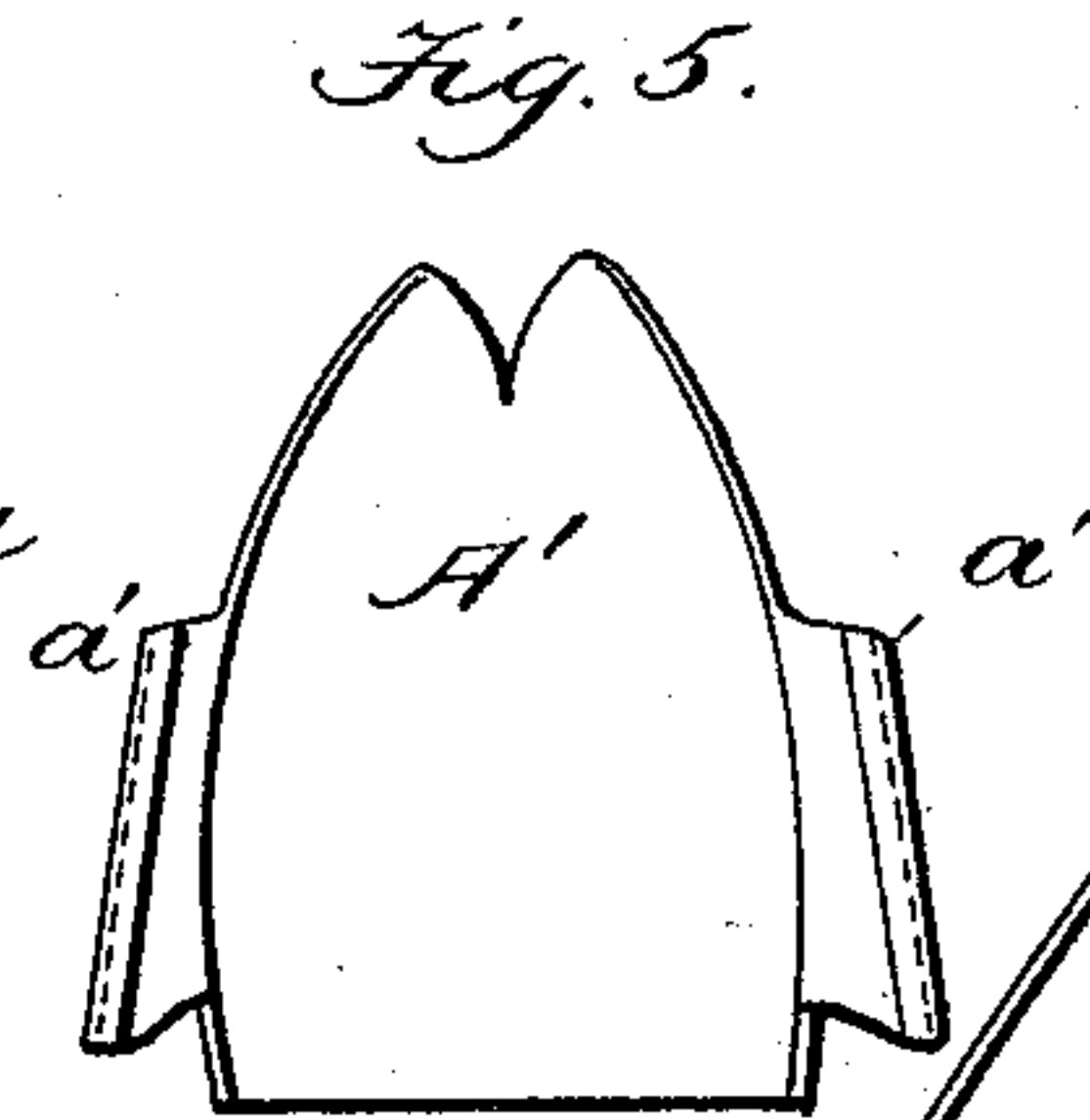
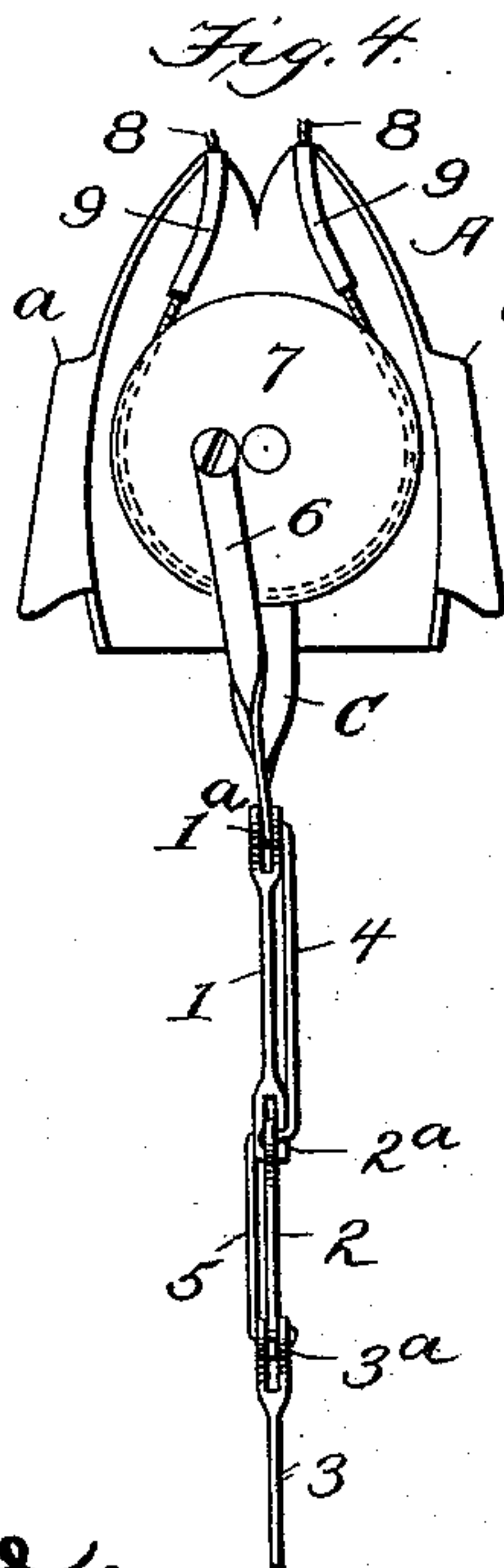
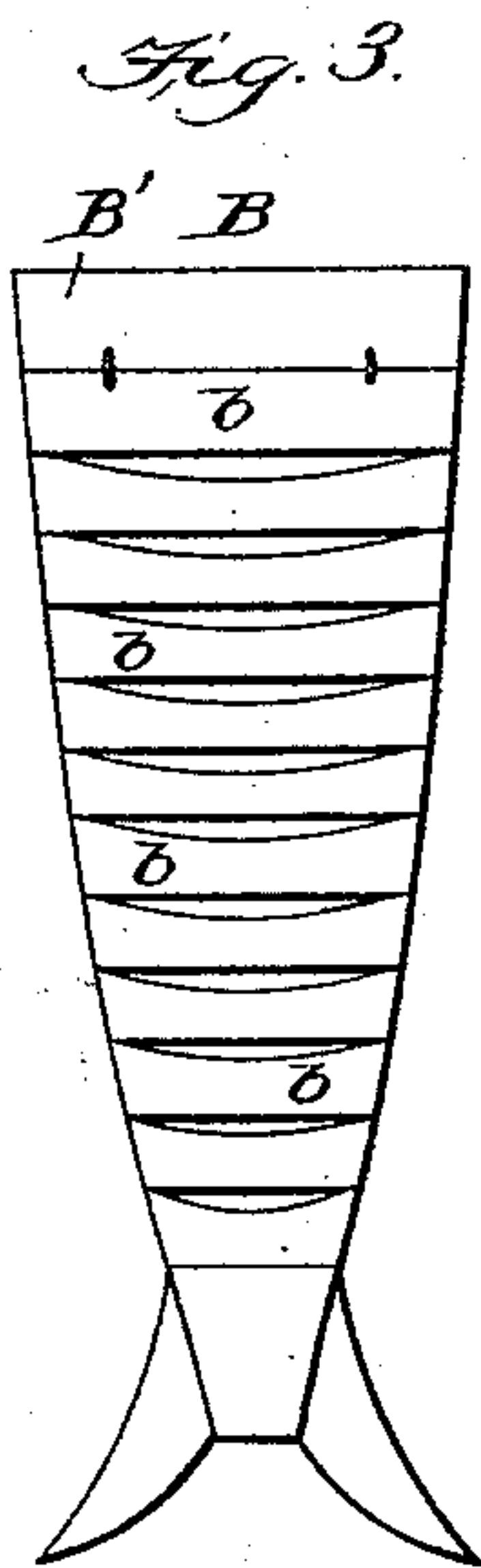
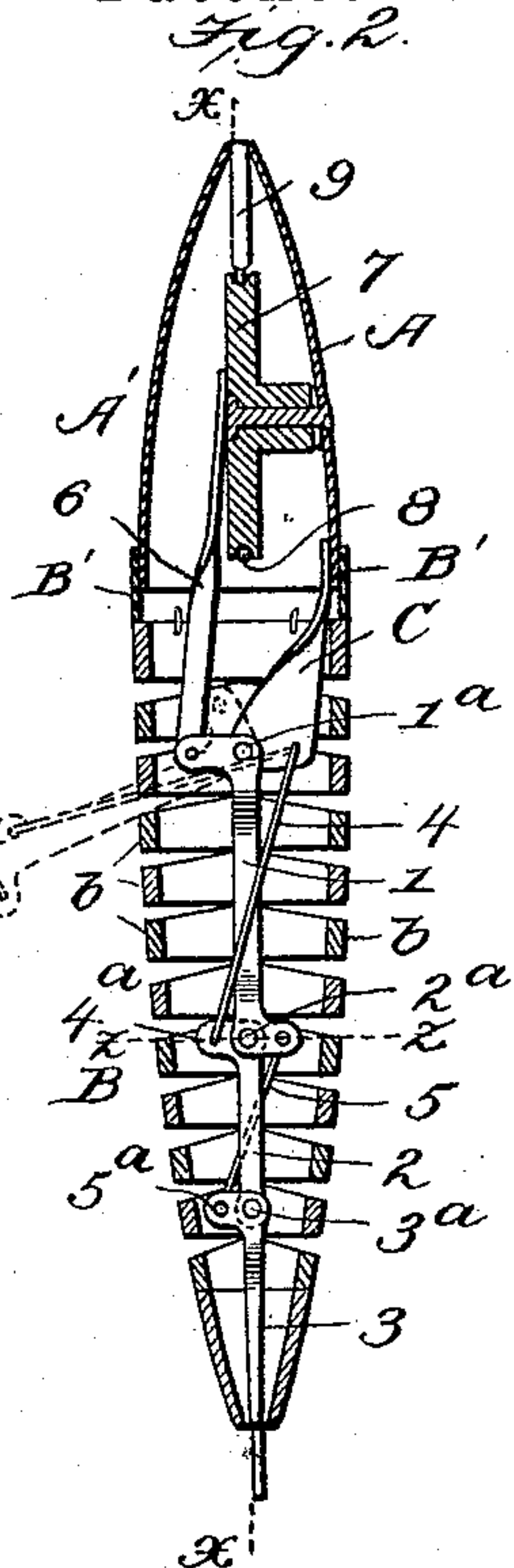
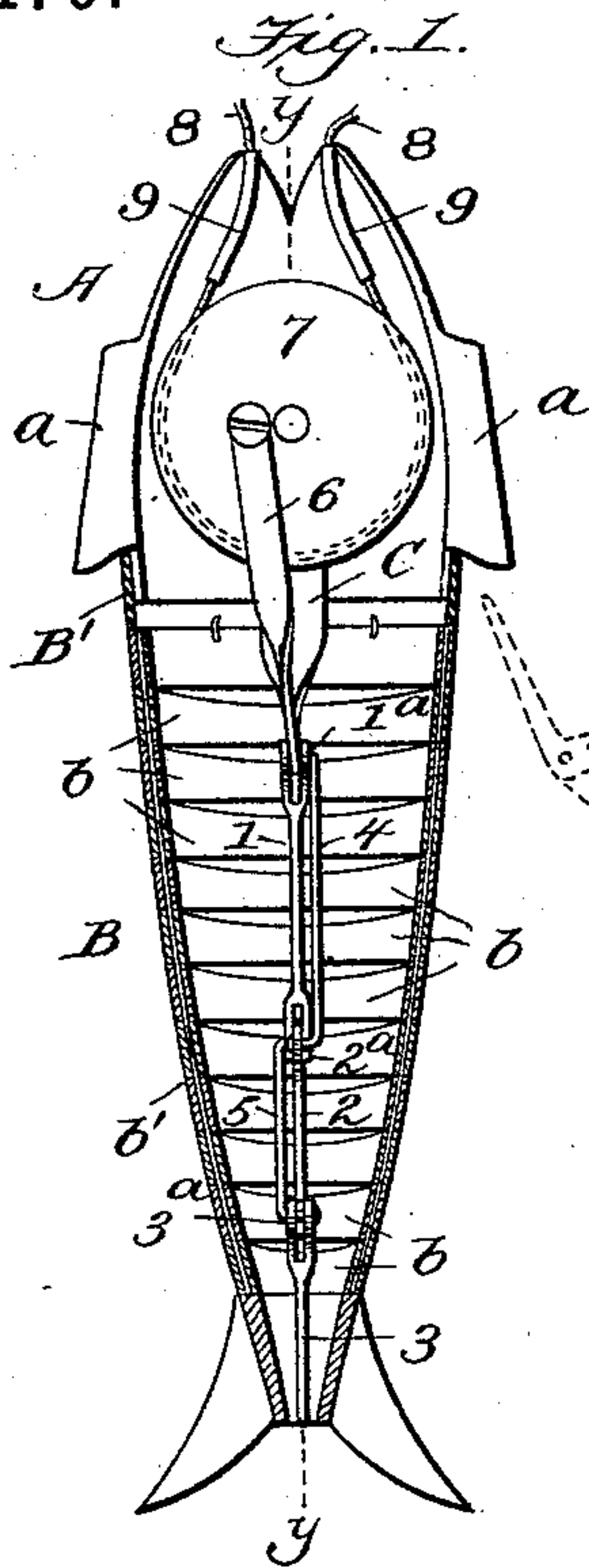


(No Model.)

H. W. HARRISON & LE ROI B. WADLEIGH.
MECHANICAL TOY.

No. 543,479.

Patented July 30, 1895.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY W. HARRISON AND LE ROI B. WADLEIGH, OF CLINTON, IOWA.

MECHANICAL TOY.

SPECIFICATION forming part of Letters Patent No. 543,479, dated July 30, 1895.

Application filed March 7, 1895. Serial No. 540,822. (No model.)

To all whom it may concern:

Be it known that we, HENRY W. HARRISON and LE ROI B. WADLEIGH, citizens of the United States, residing at Clinton, in the county of Clinton, State of Iowa, have invented certain new and useful Improvements in Mechanical Toys; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a mechanical toy embodying our invention, taken on the line $x x$, Fig. 2. Fig. 2 is a longitudinal transverse section of the same, taken on the line $y y$, Fig. 1. Figs. 3, 4, and 5 represent, respectively, the several detached sections of the toy, the body and two sections composing the head. Fig. 6 is a reduced view, showing the manner of attaching the cord on which the figure is strung, or the operating-cord, to the rod.

Like symbols refer to like parts wherever they occur.

Our invention relates to the construction of that class of mechanical figure toys which are composed of a series of flexible sections or joints to which automatic movement is to be imparted to simulate the natural movements of the figure, and for purposes of illustration only we have chosen a fish, without any intention of limiting the invention to said figure, as it will be apparent that the principle, as well as the special features of construction, may, without further invention, be applied to many other forms of like character.

To this end the main feature of our invention embraces the combination of a plurality of levers pivotally connected in series, said pivots being in substantially a right line when the levers are extended, of a plurality of tie-rods which cross the intermediate levers and are pivotally connected with the alternate levers of the series, one of said tie-rods being anchored or connected with a fixed point, whereby the series of levers are caused to vibrate alternately to opposite sides of a median line.

A second feature of our invention embraces the combination, with a plurality of levers pivotally connected in series, said pivot-points being in substantially a right line when the levers are extended, of a plurality of tie-rods

which cross the levers and are pivotally connected with the alternate levers, one of said tie-rods being anchored, and a sheath having a rigid section for the support and attachment of the mechanical movement, and a flexible portion which incases and is vibrated by the mechanical movement, whereby the natural movements of a figure toy may be simulated.

A third feature of our invention embraces the combination in a figure-sheath of longitudinally-separable rigid sections adapted to support and anchor the operative mechanism, and a transversely-separable flexible section adapted to inclose the mechanism and secure together the longitudinally-separable sections of the case, whereby the insertion, removal, and repair of the movement are facilitated.

There are other minor features of invention, all as will hereinafter more fully appear.

We will now proceed to describe our invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings the sheath or toy figure (in the present instance a fish) is composed of several separable sections $A A' B$, one of which A should be sufficiently rigid to afford support for the mechanical movement which is to actuate the figure, and another B should be of a flexible character, so as to be swayed or vibrated by said mechanical movement.

By preference the longitudinally-separable sections $A A'$ (the head and part of the body of the fish) are both rigid and provided with interlocking-joints $a a'$, which may be located at the ventral and dorsal fins, and said parts may be formed of hard rubber, papier-maché, or stamped up from light sheet metal, if preferred.

The transversely-separable or flexible section B (a portion of the body and the tail) is composed of a series of taper-rings or equivalent loose transverse sections b , articulated, as at b' , terminating at one end in a ring or collar B' , adapted to encircle and securely hold the longitudinally-separable sections $A A'$, and at the other in a tail, and said part may be of hard rubber, papier-maché, or sheet metal, but is preferably of soft rubber, paper, leather, or equivalent pliable material better adapted to sustain the wear of frequent vibration.

Within and concealed by the figure or sheath is the mechanical movement, the principal features of which are a series of levers 1 2 3—two or more in number, according to the extent of movement required and the length of the figure—the first of which levers is pivoted, as at 1^a, on a fixed bracket or support C secured to the rigid section A, and the second lever pivoted on the first, as at 2^a, the third on the second, as at 3^a, and so on, according to the number of levers which are to be linked in succession, the said series of pivotal connections 1^a, 2^a, &c., being in substantially a right line when the series of levers are extended. The second lever 2 is tied to the bracket C or other fixed point off of the pivot or fulcrum 1^a of lever 1 by a tie-rod 4, and the third lever 3 is similarly tied to the first lever 1 by a tie-rod 5. The rods 4 and 5, which cross the levers 1 and 2, are pivotally connected with the bracket and with alternate levers, the tie-rods being so proportioned and arranged with relation to such levers (see Fig. 2) that each lever after the first has a “floating fulcrum” 4^a 5^a, which is in line transversely of the figure (see dotted line *z z*, Fig. 2) with the pivotal connection of the respective lever only when the several levers are extended in a right line.

It will be noted that the tie-rods 4 and 5 cross the levers 1 and 2, and consequently the movement of the first lever is magnified in the second and that of the second in the third, and the movement as a whole is alternately to opposite sides of the median line, thus acquiring a curling or more natural movement in a fish or like figure than can be obtained by the single or simple lever or link movement.

Motion may be imparted to the first lever 1 in any suitable manner; but we prefer to accomplish it by means of a pitman 6, eccentrically connected with a grooved pulley 7, suitably journaled on the longitudinally-separable section A, around which pulley passes a cord 8, movable through guides 9, the mouth or other natural opening of the figure affording entrance and exit for the cord and the opposite ends of the cord being secured to the distant points of a suitable rod, sufficient slack being allowed in the cord for the free movement or traverse of the grooved pulley 7.

The construction being substantially of the character hereinbefore specified, the parts of the figure are assembled as follows: The cord 8 is first passed through the guides 9 and around the pulley 7, journaled on longitudinal section A, its free ends being conducted from a natural opening in the figure (mouth of the fish) and secured to a rod at distant points thereon, with sufficient slack between to allow for the play of the figure and the free rotation of pulley 7. The counterpart longitudinal section A' is then slid in position on the section A, the parts being held together by the interlocking parts *a a'*, after which the sleeve or flexible sheath-section B

is slipped over the extended lever movement 1, 2, &c., and the ring or collar B' forced over and caused to encircle the laterally-separable sections A A', thus binding together the several sections which compose the figure. Now, if the pulley 7 be rotated by means of the cord 8, (by alternately elevating and depressing the opposite ends of the rod, if a rod be used,) the first lever or lever 1 will be vibrated by pitman 6, carrying with it levers 2 and 3, and as each succeeding lever (no matter how many there may be) is tied at a point off its pivot, or, in other words, has a floating fulcrum, each of said subsequent levers will not only move with, but also independently of, the preceding lever first to one side and then to the other side of the median line, thus magnifying the movement and causing a curling movement to the flexible sheath B, (see dotted lines, Fig. 2,) so that in case of a fish or like figure an exceedingly natural movement of the flexible body is obtained.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a mechanical toy, the combination with a plurality of levers pivotally connected in series, said pivots being in substantially a right line when the levers are extended, of a plurality of tie-rods which cross the intermediate levers and are pivotally connected with alternate levers of the series, one of said tie-rods being anchored; substantially as and for the purposes specified.

2. The combination of a plurality of levers pivotally connected in series, said pivots being in line when the levers are extended, a plurality of tie-rods which cross the levers, and one of which is pivotally connected with alternate levers, a case which incloses the tie-rods and levers, the first of said levers and first of said tie-rods being pivotally anchored to said case, and means for vibrating the first of said levers; substantially as and for the purposes specified.

3. In a mechanical toy, the combination with a figure sheath having a rigid and a flexible section, of a plurality of levers pivotally connected in series, the first lever of said series pivoted on the rigid section of the sheath, and the said series of levers extending into the flexible portion of said sheath, and a plurality of tie-rods which cross the intermediate levers and are pivotally connected with alternate levers of the series and with the rigid section of the sheath; substantially as and for the purposes specified.

4. In a mechanical toy, the combination with a figure sheath having a rigid and a flexible section, of a plurality of levers pivotally connected in series, the first of said levers pivoted on the rigid section of the sheath, a plurality of tie-rods which cross the levers and are pivotally connected with alternate levers of the series and with the rigid section of the sheath, a pulley journaled on the rigid section of the sheath, and a pitman eccentrically

connected with the pulley and with the first lever of the series; substantially as and for the purposes specified.

5 5. A sheath for mechanical toys, said sheath composed of longitudinally separable rigid sections which afford support for the mechanical movement, and a flexible transversely separable section adapted to inclose the mechanical movement and provided with a collar or ring which encircles the longitudinally

separable sections; substantially as and for the purposes specified.

In testimony whereof we affix our signatures, in presence of two witnesses, this 1st day of March, 1895.

HENRY W. HARRISON.
LE ROI B. WADLEIGH.

Witnesses:

C. H. DENICK,
FRED EMMINGS.