

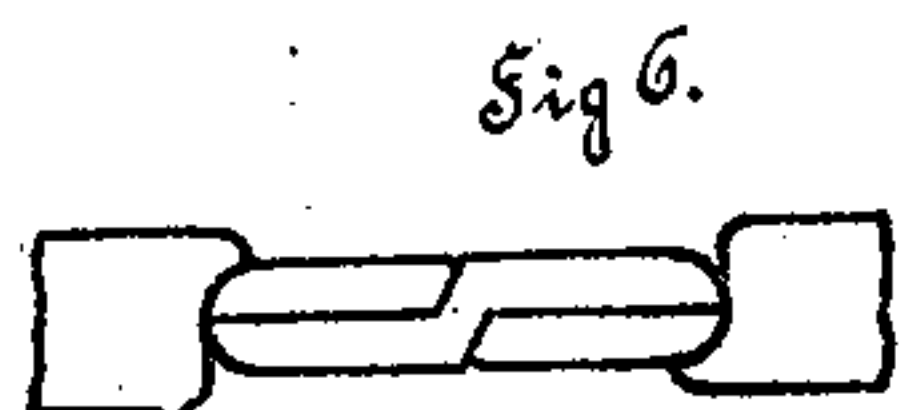
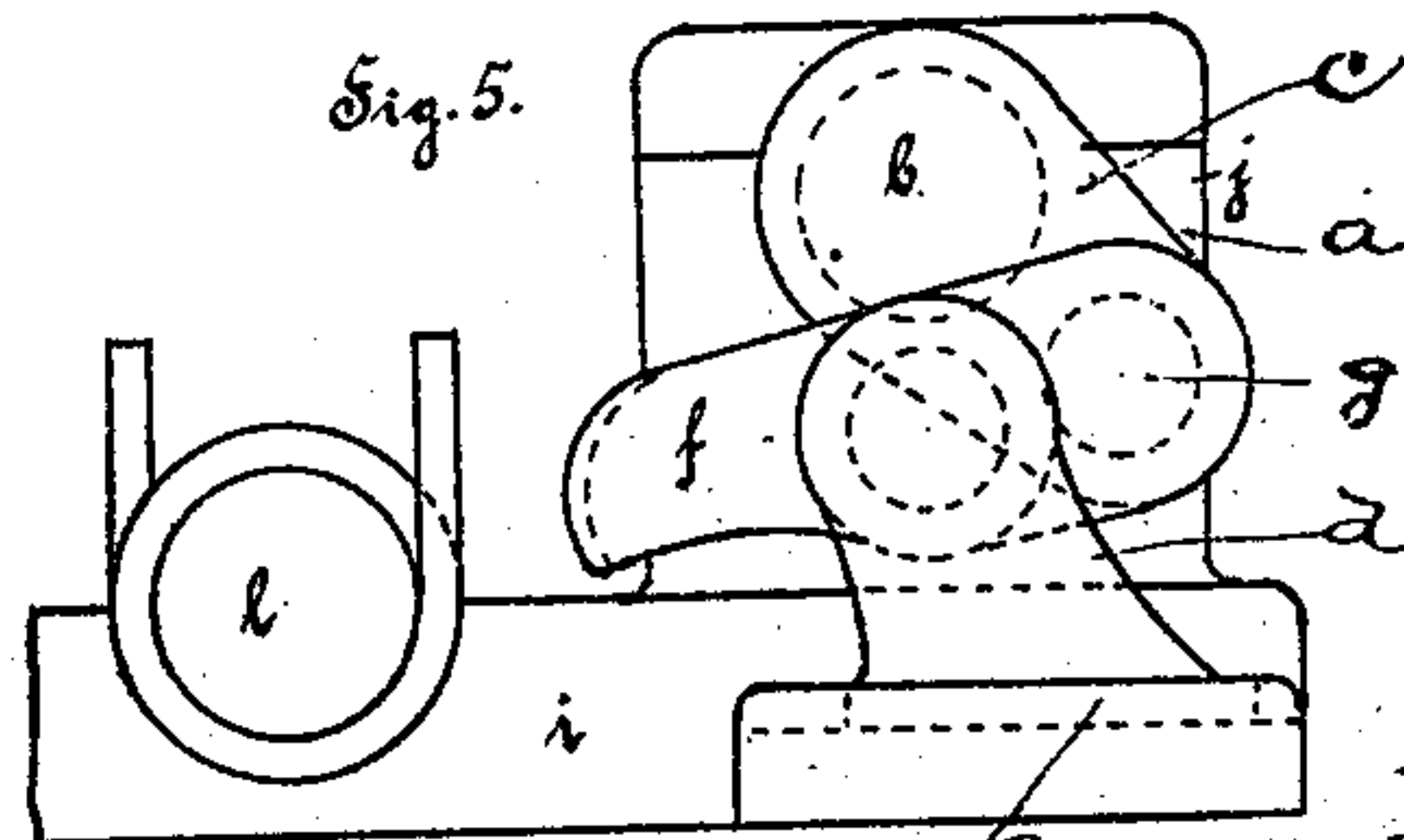
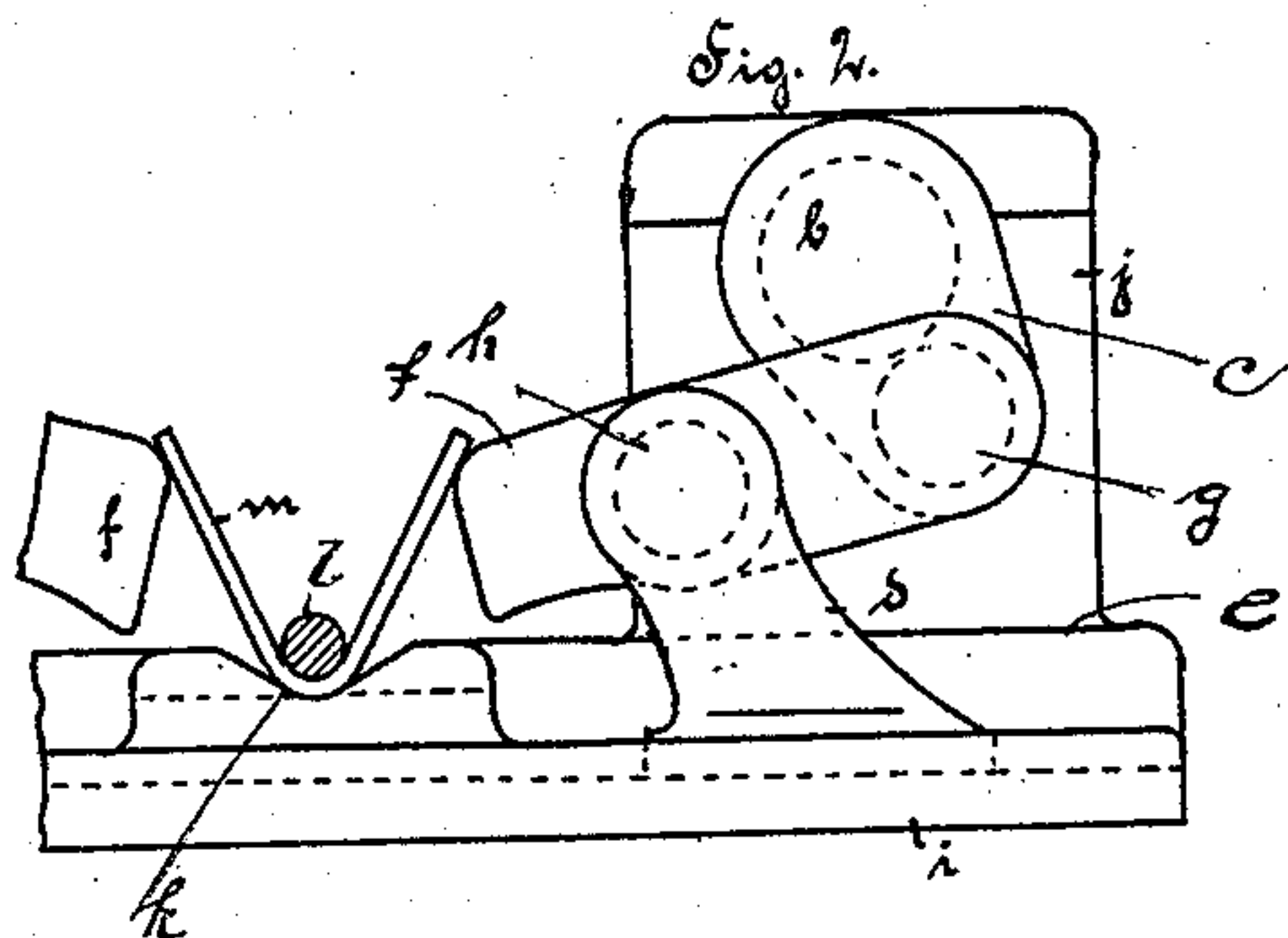
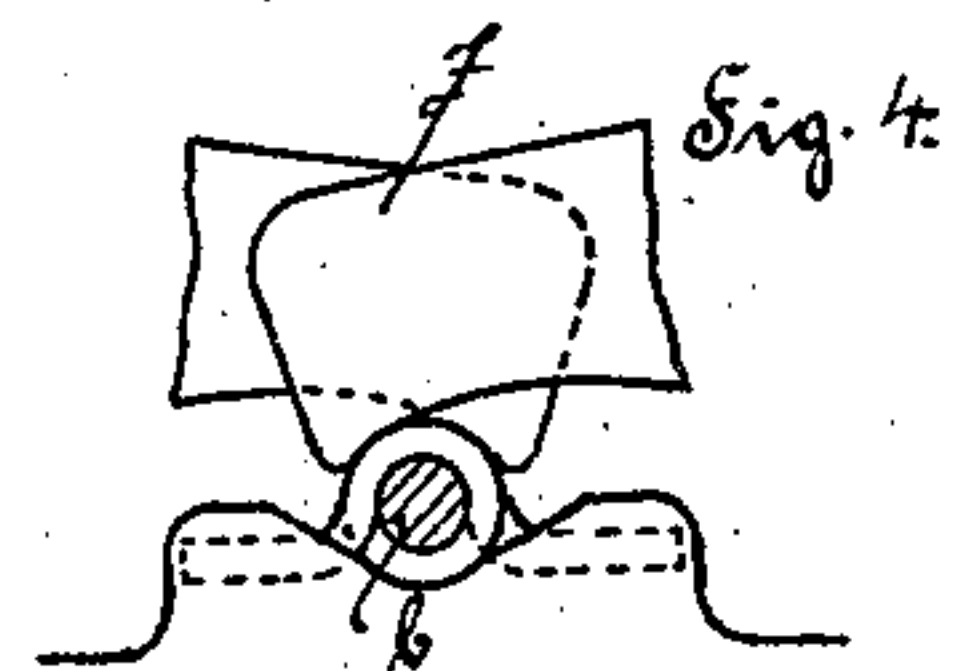
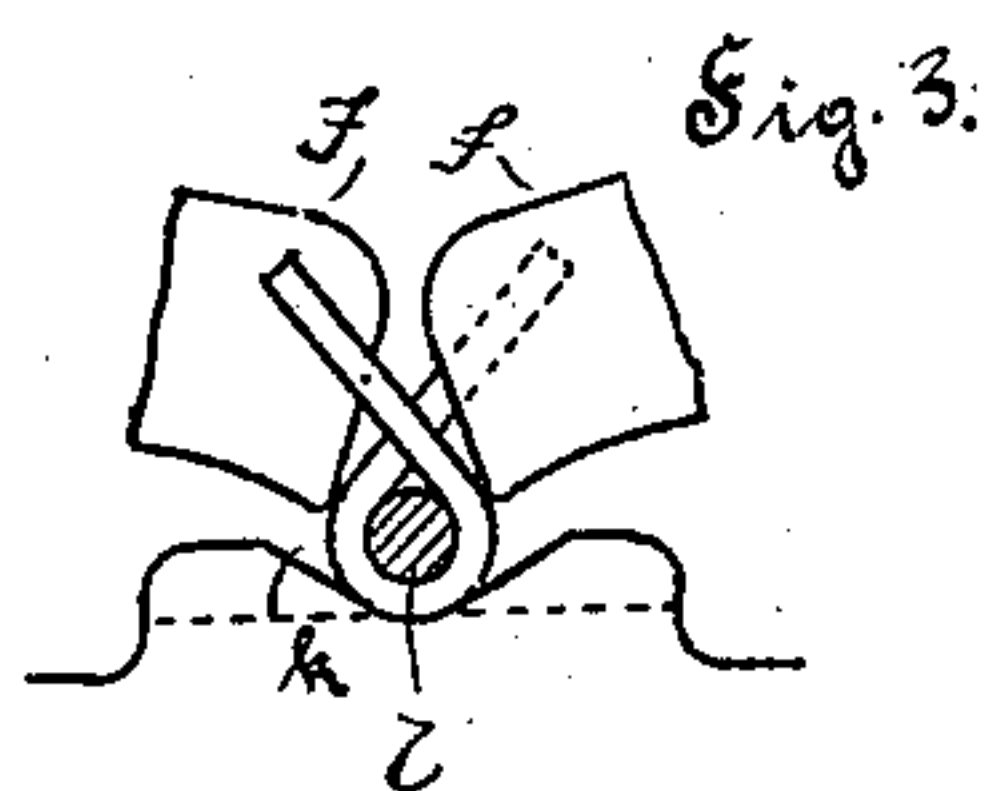
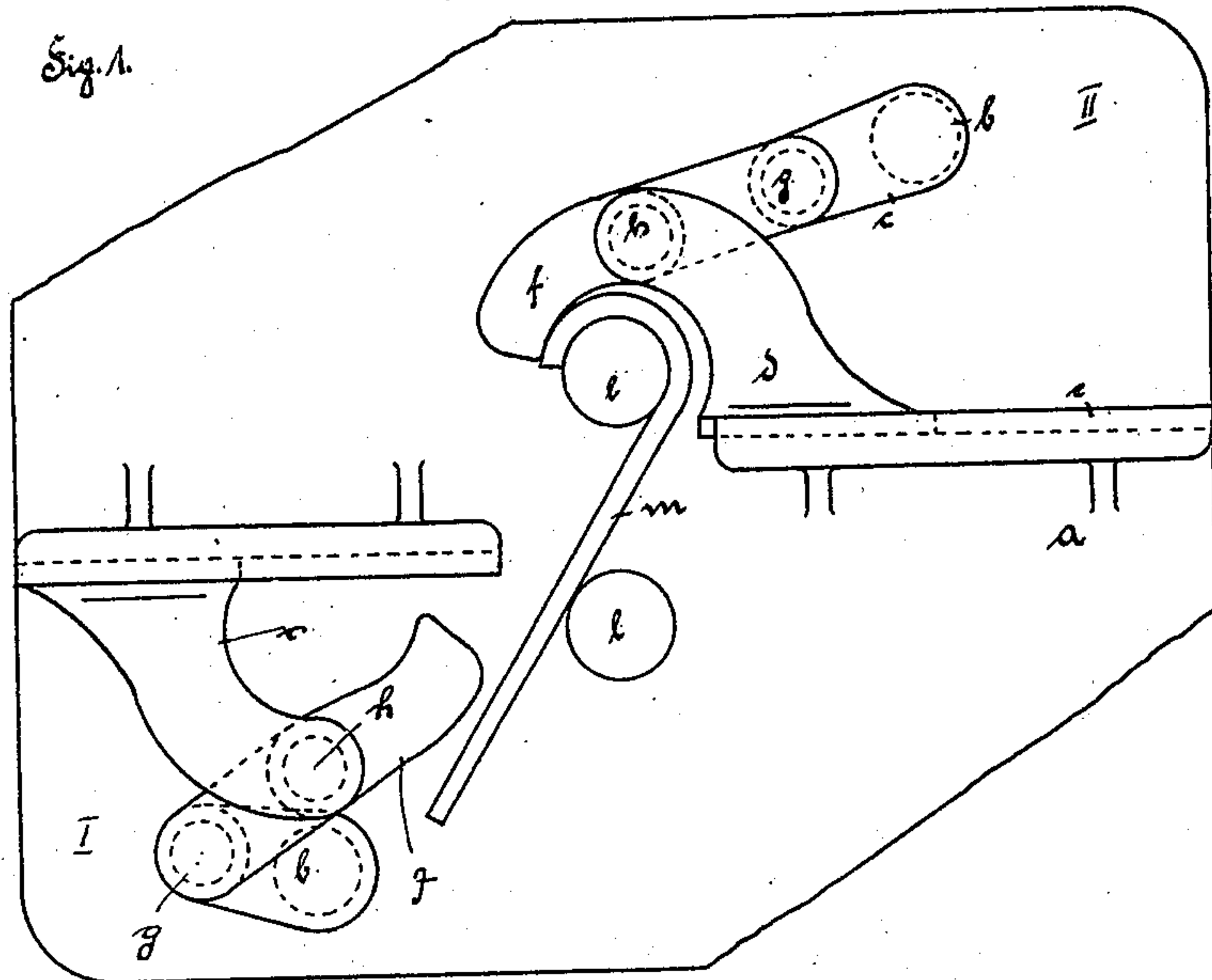
No. 847,102.

PATENTED MAR. 12, 1907.

E. NOLLE.

APPARATUS FOR BENDING OR COILING OF METAL BARS, STRIPS, WIRE, &c.

APPLICATION FILED AUG. 14, 1906.



Witnesses:

A. J. Kitchen.
J. H. Clark.

Inventor

Ernst Nolle
By
Chas. J. Inwick & Lawrence
his Attorneys

UNITED STATES PATENT OFFICE.

ERNST NOLLE, OF WEISSENFELS, GERMANY.

APPARATUS FOR BENDING OR COILING OF METAL BARS, STRIPS, WIRE, &c.

No. 847,102.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed August 14, 1906. Serial No. 330,570.

To all whom it may concern:

Be it known that I, ERNST NOLLE, a subject of the Emperor of Germany, residing at Weissenfels-on-the-Saale, Germany, have invented certain new and useful Improvements in Apparatus for Bending or Coiling of Metal Bars, Strips, Wire, and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus for the bending or coiling of metal bars, wire, sheet-metal strips, or the like around a mandrel or a core.

The invention comprises a bending-arm fastened at one end to a rocking crank and in the middle to a slide moving horizontally in a fixed guideway, so that the free end of the bending-arm describes an almost semicircular course around the circumference of the mandrel.

The invention further comprises the attachment of the arm to the crank, and the slide, which may be adjusted when mandrels of different sizes are used.

It also comprises the use of the free end of the thumb-like arm, which is so formed as to bend the metal piece preparatory to the coiling it around the mandrel, every injury of the metal or bending of the same in an undesired direction being thereby avoided.

In the accompanying drawing, Figure 1 shows the apparatus as applied to the manufacture of S-shaped hooks. Figs. 2 to 4 show the production of barbed wire by means of the apparatus. Figs. 5 and 6 indicate a modified form of the same for making spring-rings.

The crank-shaft *b*, carrying the lever *c*, is pivotally mounted on the base *a* and receives from a suitable source a rocking movement.

d is a slide reciprocating in a dovetail or other fixed guideway *e*.

The bending-finger *f* is at its end *g* attached to the crank *c* and at its middle to the slide *d*. On rocking the crank-lever causes both an oscillating movement of the finger *f* about *h* and a reciprocating one with the slide *d*. This twofold movement causes the free end of the finger to move in an almost semicircular path, in the center of which a mandrel *l* or a suitable core about which the metal is to be wound is arranged.

Fig. 1 shows the invention as applied to

the manufacture of S-shaped hooks. Two apparatus are reversely arranged on the frame, one at each side of its central line. Apparatus I is shown at the beginning of its motion, while apparatus II is at the end of its movement. The bending end of the finger may be formed with more or less edge; but I prefer to round it off as indicated in the drawing. By this means the apparatus is not only applied smoothly and without flattening the metal where it is operated upon, but it also controls the metal piece, which tends as it is worked upon to bend in an opposite direction to the required direction before it is coiled around the mandrel. The preliminary bending is easily effected, as the movement of the finger is at first almost entirely a rocking one, the back surface of the finger-head acting gradually to push the metal piece *m* forward, while the real coiling takes place during the period of the reciprocating movement of the head. At the end of the operation the movement of the finger is chiefly a rocking one, which has the advantage of pressing the end of the hook or other manufactured article firmly onto the mandrel, whereby the article assumes lastingly the required form. It is evident that with one apparatus with the twin arrangement shown ordinary hooks with one eye, hook-nails, and the like may be manufactured, the feeding of the metal being by hand or automatic. The other figures show a variety of the application of the new apparatus. Figs. 2, 3, and 4 indicate a modified arrangement of the binding-fingers for manufacturing of barbed wire, while Figs. 5 and 6 represent a similar arrangement for making spring-rings. Upon the plate *i*, having the guideways for the slide *d*, two standards *j*, carrying the bearings for the crank-shafts *b*, are mounted. In the construction in Fig. 2 the fingers *f*, and preferably the ends of the U-shape barb parts *m*, are previously set to each other, so as to make a crossing of the same possible. The parts *m* are put under the wire *h* into notches *k* of the plate *i*. For making ordinary and spring rings the bending-fingers are provided with guiding-ridges in their heads which move to each other until they are brought into contact.

The figures are diagrammatical only, and it will be obvious that many details can be replaced by others having the same functions without departing from the nature of the invention. For instance, the finger *f* instead of

being attached to the slide *d* could move with the same facility attached to a bolt sliding in a rectilinear slot of the frame *a* itself.

What I claim is—

5 1. In a device of the character described, the combination of a fixed mandrel, a reciprocating slide, a bending-finger pivotally connected at a point between its ends to the reciprocating slide, one end of the bending-
10 finger cooperating with the mandrel to enable a strip to be bent around the same, and a crank-shaft carrying a lever engaging the opposite end of the bending-finger and operating to produce both a reciprocating move-
15 ment of the slide and a swinging movement of the lever.

2. In a device of the character described,

the combination of a fixed mandrel, a reciprocating slide formed with an outwardly-projecting arm, a bending-finger pivotally 20 mounted at an intermediate point upon the arm, one end of the bending-finger cooperating with the mandrel, and a crank engaging the opposite end of the bending-finger and serving to produce both a reciprocating 25 movement of the slide and a swinging movement of the lever.

In testimony whereof I affix my signature in presence of two witnesses.

ERNST NOLLE.

Witnesses:

PAUL E. SCHILLING,
PAUL ARRAS.