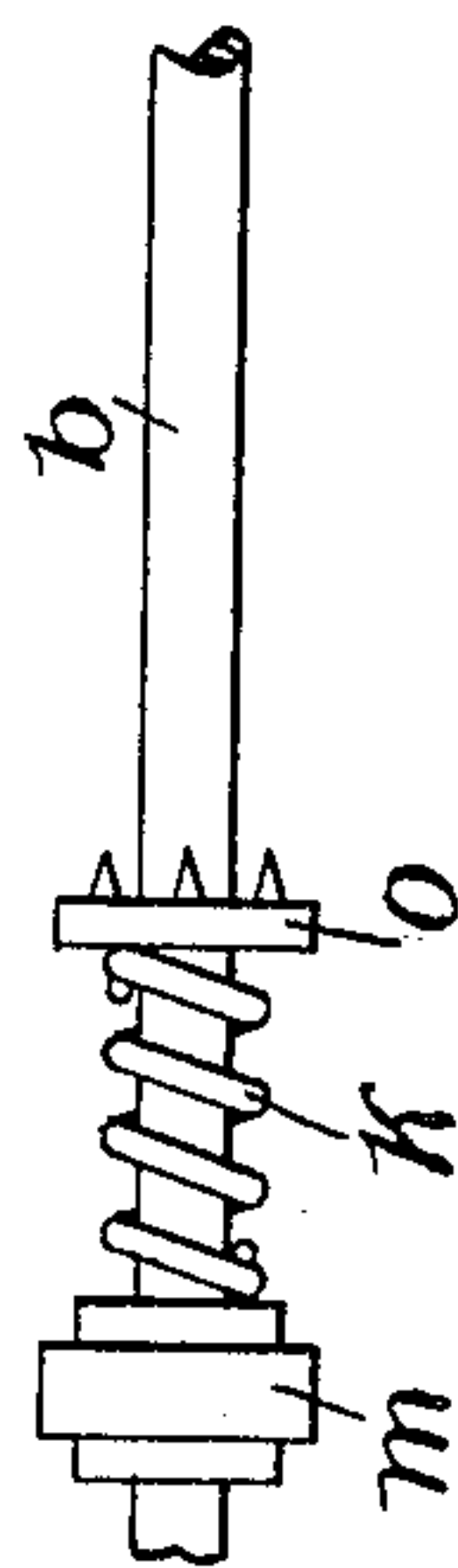
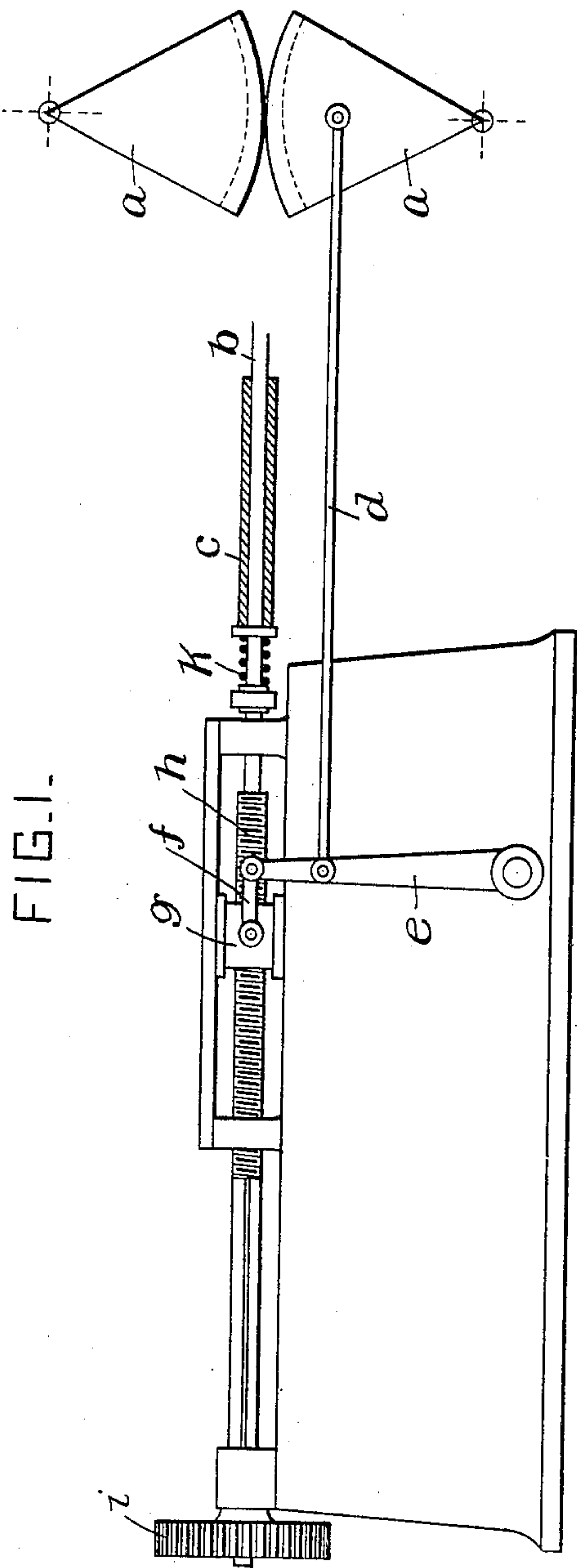


No. 808,001.

O. BRIEDE.
MANUFACTURE OF TUBES.
APPLICATION FILED AUG. 29, 1904.

PATENTED DEC. 19, 1905.



WITNESSES:

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UNITED STATES PATENT OFFICE.

OTTO BRIEDE, OF BENRATH, NEAR DÜSSELDORF, GERMANY.

MANUFACTURE OF TUBES.

No. 808,001.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Original application filed May 4, 1903, Serial No. 155,599. Divided and this application filed August 29, 1904. Serial No. 222,680.

To all whom it may concern:

Be it known that I, OTTO BRIEDE, a citizen of Germany, residing at Benrath, near Düsseldorf, in the Province of the Rhine, in the Kingdom of Prussia, German Empire, have invented or discovered a certain new and useful Improvement in the Manufacture of Tubes, of which improvement the following is a specification.

The invention described herein relates to certain improvements in reducing billets, &c., by means of oscillating or swinging dies or swages, said improvements being particularly applicable to the progressive reduction of hollow billets for the production of seamless tubes.

The invention has for its object a back-and-forth movement of the billet synchronous with the movement of the dies or swages, with a limitation of the movement of the billet in one direction proportional to reduction to be effected by the swages on each operative or reducing stroke.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a form of apparatus adapted to the practice of my invention, and Fig. 2 is a detail view illustrating the manner of connecting the rotary head to the feed-bar.

In the practice of my invention the heated billet is attached to a suitable holder, which in the manufacture of tubes consists of a mandrel *b*, secured in any manner to the feed-rod *h*. This feed-rod is mounted in suitable bearings *m* on the bed of the machine in such manner as to be capable of reciprocation simultaneous with the oscillations of the reducing dies or swages *a*. These dies or swages are provided with tapering grooves in their adjacent faces, so that the pass formed by the grooves will vary transversely with the swing or oscillation of the swages, which may be operated in any suitable manner known in the art.

The reciprocation of the billet holder or support synchronous with the dies may be effected by the grip of the dies on the article operated on, but preferably by power applied to the feed-bar cooperating with the dies or swages. While power may be applied in any convenient manner to the feed, it is to connect the feed-bar to the swages or dies or their operating mechanism. In the construction shown a threaded portion of feed-bar

passes through a threaded opening in the sliding block or carriage *g*, which is connected by a link *f* to a lever *e*, and the latter is connected by a pitman *d* to one of the dies or swages.

Provision is made for imparting a forward or feed movement of the feed-rod independent of the sliding block proportional to the reduction to be effected by the swages during each oscillation. This feed movement can be produced in many ways—as, for example, by rotating the feed-rod, which, as previously stated, may be formed with a threaded portion engaging the internal threaded opening through the sliding block. By the rotation of this feed-rod it, with the holder and ingot, would be advanced without any change in the back-and-forth movement of the sliding block. The forward feed of the billet occurs at the time the latter is released from the bite of the swages or dies or is, in other words, intermittent or step by step. Such feed can be effected by mechanism operative on the feed-bar to shift the same at the instant of release by the swages, or mechanism can be employed which would store up power, as by the compression of a spring which will become operative to shift the billet when released by the swages. Such a construction is shown in the drawings, where the power-driven wheel *i* is so mounted on the feed-rod that the latter will rotate with the wheel, but is free to move longitudinally through the same, the wheel being provided with a hub rotatively mounted in a bearing *n* on the bed of the machine. This construction permits of the back-and-forth reciprocation of the feed-rod without disengagement with the power-driven wheel. If the wheel is driven continuously, a spring *k* is interposed between an abutment on the feed-rod and a head *o*, movably mounted on the billet-holder, as the mandrel *b*, and serving as a bearing for the billet or ingot. While the billet is gripped by the dies or swages, it cannot be fed through between them, and hence forward movement of the feed-bar during such gripping by the dies will result only in the compression of the spring *k*; but as soon as the billet is released the spring will expand and force the billet forward between the dies or swages. In other words, feed of the billet or ingot is intermittent.

It is desirable that the ingot or billet should be rotated during reduction and preferably at each forward feed. Many ways will read-

ily suggest themselves to or be devised by those skilled in the art for effecting this rotation; but the construction shown seems to be readily applicable for this purpose. This
 5 construction consists in connecting the respective ends of spring k to the abutment on the feed-rod and to the head o , which, as shown in Fig. 2, is constructed to engage the rear end of the billet, as by prongs or other
 10 suitable means. When the feed-rod is rotated to effect the forward movement, as described, while the billet is gripped by the dies or swages, the spring will be placed in a torsional strain also, which when the billet is released will become effective to rotate the latter.
 15

It is characteristic of my improved method that the billet moves back and forward with the swages, the forward movement being
 20 equal to the forward swing of the swages; but the backward movement is limited by an amount equal to the forward movement of the feed-bar or proportional to the reduction to be effected on the next forward swing or
 25 oscillation of the swages. In other words, the billet while having a reciprocating movement will advance step by step through between the swages on each back-and-forth movement, such advance being equal to the
 30 feed effected by the feed-power and to the elongation by the reduction effected by the oscillating swages.

It will be noted that in the swaging method described herein the oscillatory swaging-dies
 35 engage or have a bite on the end of the billet, which, except at the brief moment of feed, is practically continuous, as a result of which the dies at the time when the feed is desired put the billet in position for such feed and
 40 also determine or fix and limit the amount of feed. In other words, the feed movement of the billet is determined and controlled by the operative faces of the oscillating swages. Although the feeding mechanism may be so
 45 constructed as to be ready for operation at

any time, it does not become practically operative to shift the billet forward until the swages reach a position in their oscillation where their bite is relaxed or entirely loosened. When the grip of the swages is relaxed, the
 50 billet is moved forward until a portion thereof abuts against the operative faces of the swages. This forward or feed movement will be dependent to a large extent on the reduction previously effected and will be largely
 55 independent of the movement of the feed mechanism itself.

While I have described with some particularity a form of apparatus for carrying out the method claimed, no claim is made herein
 60 for such apparatus, as the same forms the subject-matter of an application filed by me May 4, 1903, numbered serially 155,599, of which application this present case forms a
 65 division.

I claim herein as my invention—

1. As an improvement in the art of swaging billets, &c., the method herein described, which consists in causing the billet to move
 70 back and forth synchronously with oscillating swaging-dies, causing a forward feed movement of the billet independent of its reciprocation, and limiting such feed movement by the dies or swages substantially set forth.

2. As an improvement in the art of swaging billets, &c., the method herein described, which consists in causing the billet to move
 75 back and forth synchronously with and by oscillating dies or swages, causing a forward feed movement of the billet independent of the reciprocation of the latter and limiting such feed movement by the dies or swages substantially set forth.
 80

In testimony whereof I have hereunto set my hand.

OTTO BRIEDE.

Witnesses:

WILLIAM ESSENWEIN,
 PETER LIEBER.