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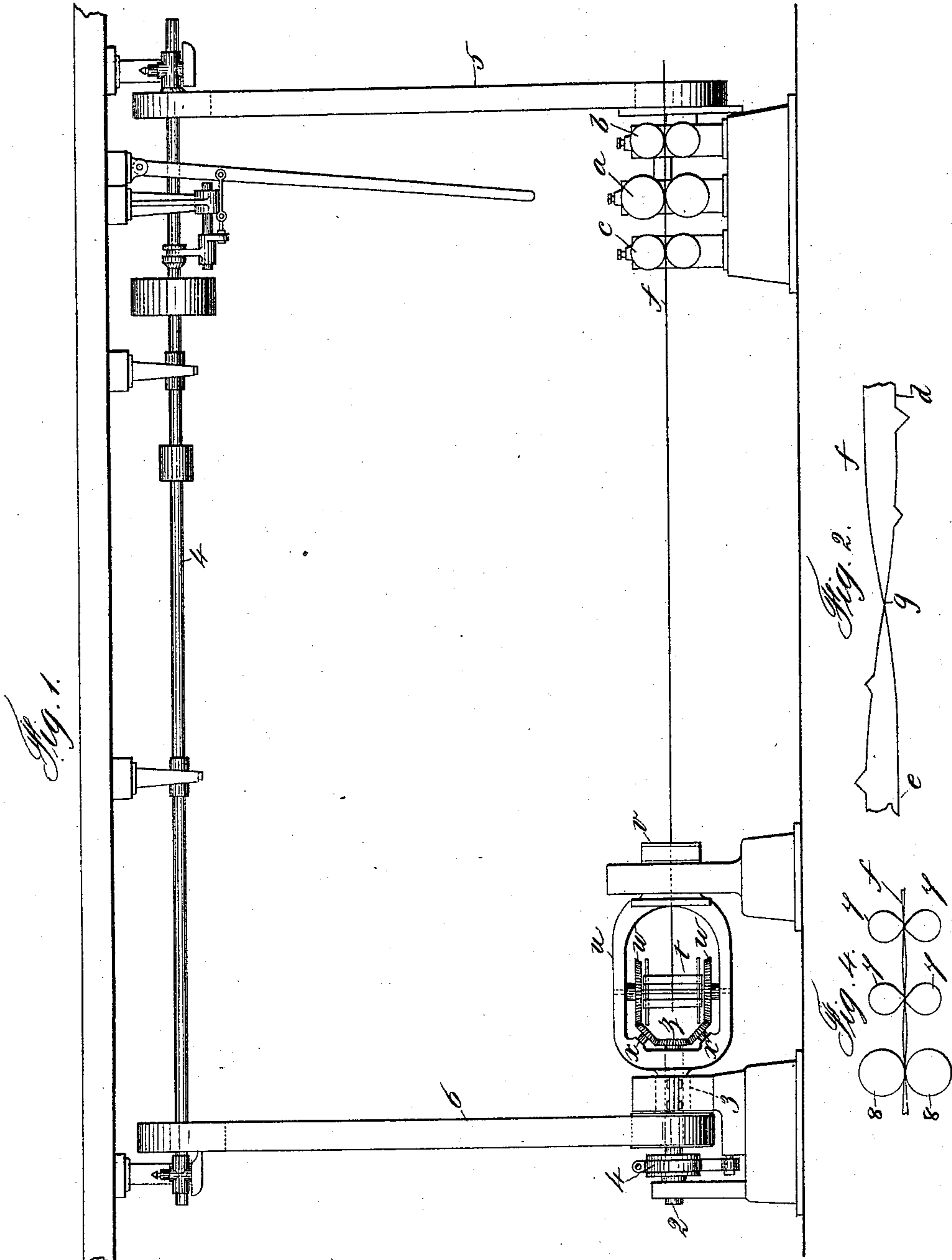
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T. V. ALLIS.

METHOD OF AND APPARATUS FOR TWISTING METALLIC STRIPS.

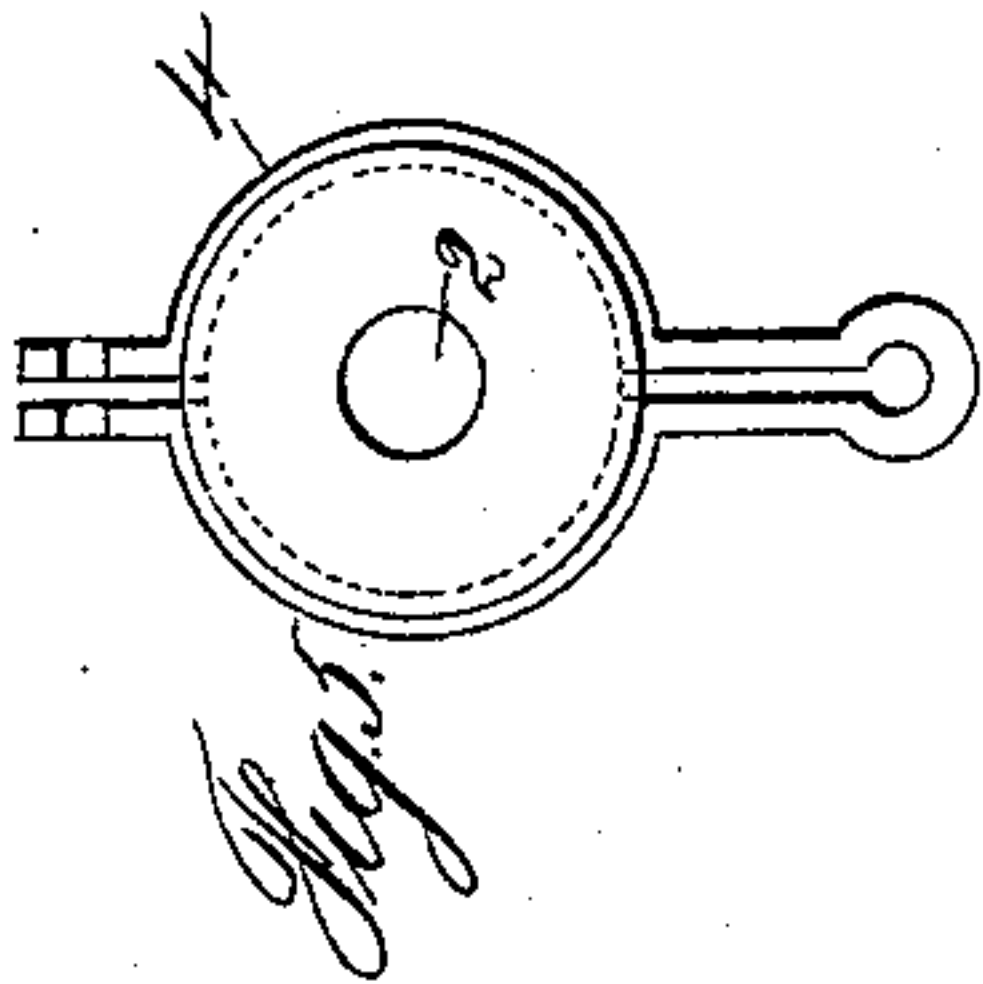
No. 486,174.

Patented Nov. 15, 1892.



WITNESSES:

Wm. Buckler,
Chas. J. Morgan



INVENTOR

T. V. Allis

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(No Model.)

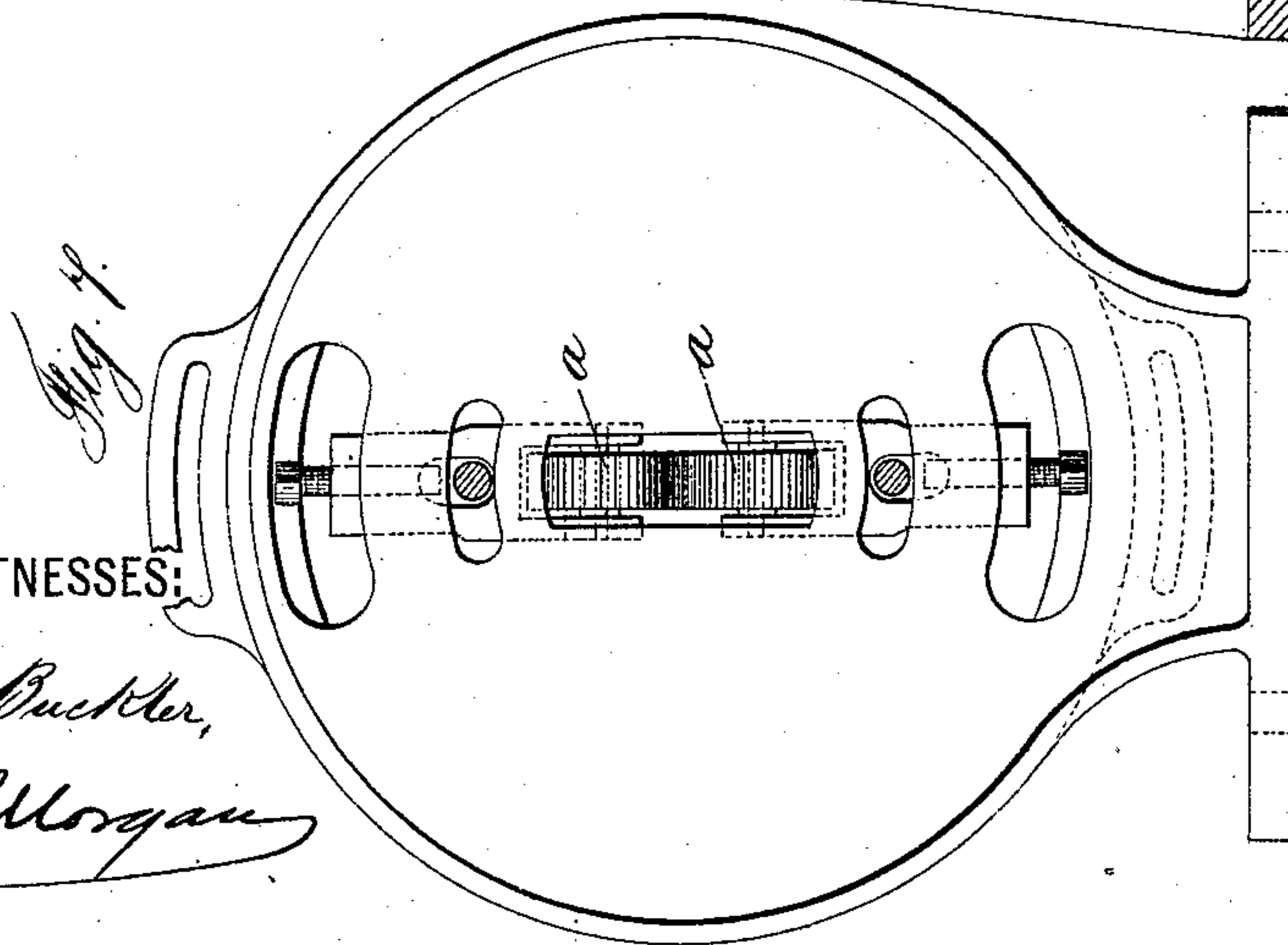
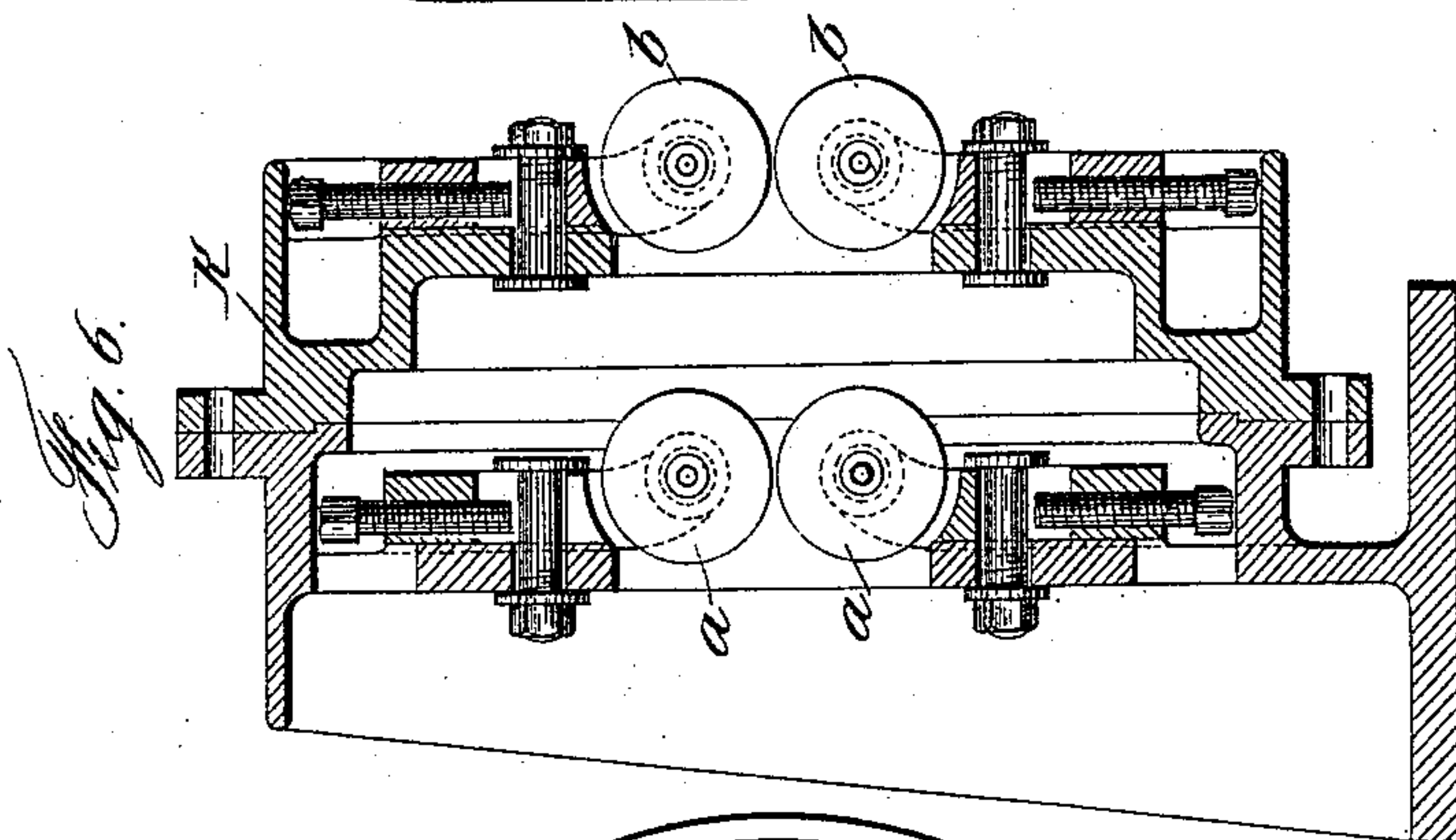
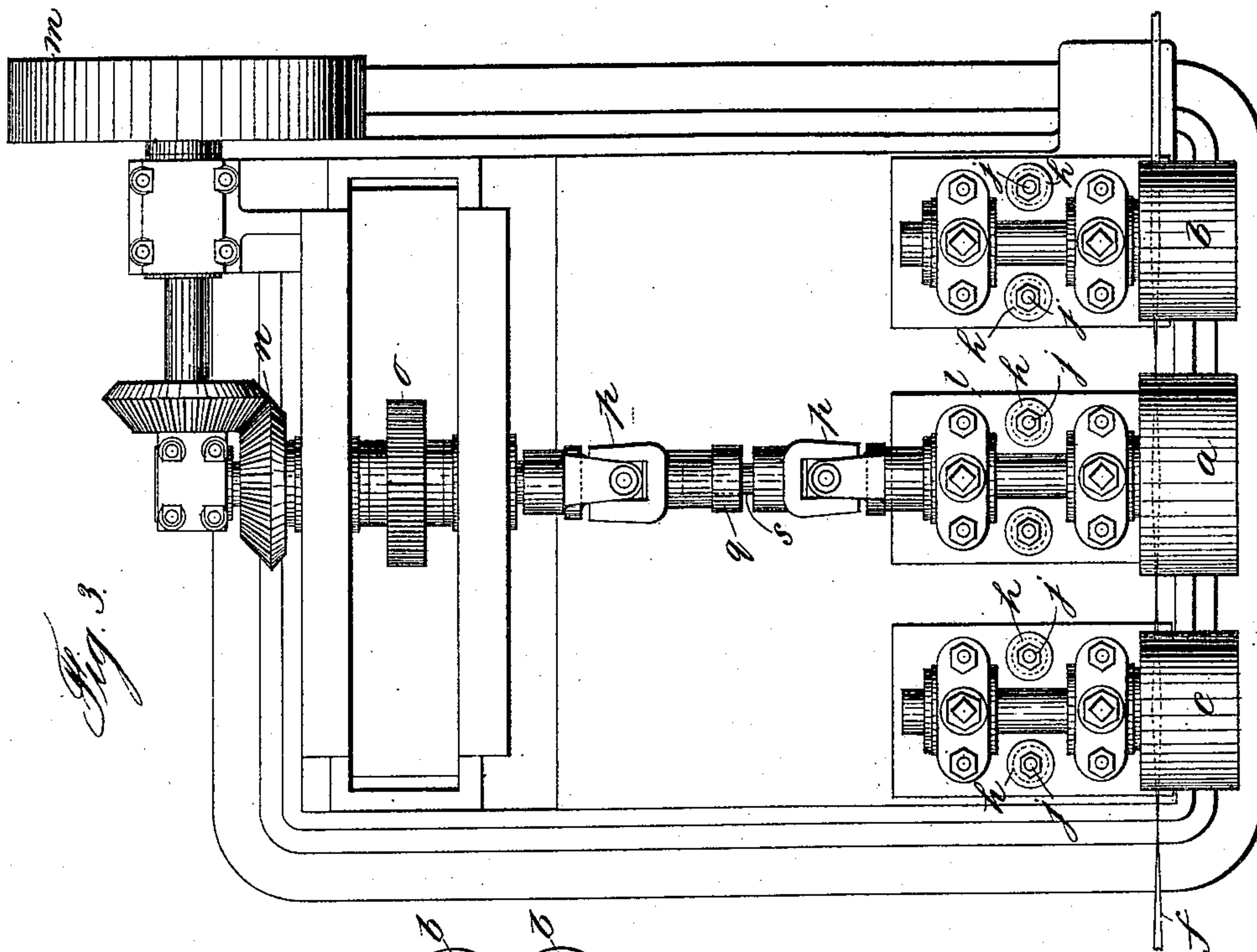
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METHOD OF AND APPARATUS FOR TWISTING METALLIC STRIPS.

No. 486,174.

Patented Nov. 15, 1892.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS V. ALLIS, OF NEW YORK, N. Y.

METHOD OF AND APPARATUS FOR TWISTING METALLIC STRIPS.

SPECIFICATION forming part of Letters Patent No. 486,174, dated November 15, 1892.

Application filed March 26, 1892. Serial No. 426,493. (No model.)

To all whom it may concern:

Be it known that I, THOMAS V. ALLIS, a citizen of the United States, and a resident of New York city, county and State of New York, have invented a new and useful Improvement in Methods of and Apparatus for Twisting Metallic Strips, of which the following is a specification.

My invention consists in an improved method of twisting metallic strips—such as plain or barbed fencing-strips of flat or approximately-flat shape—by causing the portions of the strips passing between two pairs of rolls or fixed dies to turn a part or entire round or more about the longitudinal axis as the strips are made to pass along through the pairs of rolls, the distance of the rolls apart being about the length of the pitch of the twist to be produced or less; and my said invention also consists in improvements of apparatus for so twisting such strips, and it also consists in reeling apparatus adapted for and combined with the said improved twisting apparatus, all as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of apparatus in which roll-twisting dies are used. It also shows the reeling apparatus and some of the driving-gear. Fig. 2 is a plan view of part of a twisted barbed fencing-strip. Fig. 3 is a plan of the twisting-roll dies on an enlarged scale. Fig. 4 is a side elevation of fixed dies which may be used instead of the roll-dies for twisting, with a pair of rolls for drawing the strips through the dies. Fig. 5 is an elevation of the clamp used to control the speed of the reel on which the twisted strips are wound. Fig. 6 is a sectional elevation of roll-dies in which one pair is adapted to be adjusted relatively to the other around the axis of the strip. Fig. 7 is a front elevation of the apparatus of Fig. 6.

In this example of my invention I represent the machine as adapted for plain unbarbed strips; also, for strips having barbs on one or both edges projecting in the plane of the strip, the strip represented in the drawings being barbed on one edge only; but like strips having barbs projecting laterally from one or both edges may also be twisted in the same machine, suitable notches being provided in

the rolls for permitting the barbs to pass between the rolls.

I employ two or three pairs of rolls, as *a b* 55 *c*, as preferred, preferably three pairs, said rolls being plain on the face except that for strips having barbs projecting laterally from the flat plane. The rolls will be suitably notched or recessed, as above stated, to permit the barbs to pass, the strips being gripped between the rolls of each pair, also preferably arranging the several pairs of rolls all in the same plane, which will most conveniently be the horizontal plane; but they may be in any other plane, and the several pairs of rolls may deviate more or less angularly from each other, and they may also be adjustable toward or from each other in the line of the passway of the strips through them. The preferable arrangement of the rolls as to distance apart is about half the length of the pitch of the twist to be produced from the first to the second pair, and if a third pair is used it will be a like distance beyond the second pair. Two pairs of rolls placed the whole length of the pitch from each other may be used, and a third pair may be placed a half or a whole pitch beyond the second pair, if desired.

To begin the operation, the end portion of the strip is twisted by hand a half or a whole turn, according as the distance between the first and second pair of rolls may be, and then inserted between the rolls of the first pair and passed into the second pair of rolls, thus giving a leading twist, which the rest of the strip follows in due course, and is thereby twisted accordingly. If a third pair of rolls is used, the preparatory twist is made sufficiently longer to enter said rolls. The rolls will be opened to adjust the twisted portion to begin with and then be suitably closed for the further operation. The twist is effectually and permanently set and the resilient power of the metal overcome in the first two pairs of rolls. The third pair of rolls is mainly used to equalize the twist, which may issue rather unequally out of the two pairs; otherwise the third pair may be omitted, for the twist may be effectually completed with two pairs of rolls. This will be readily understood on reference to Fig. 2, wherein the distance of the transverse lines *d e* apart on the portion of the twisted strip *f* therein represented indicates half the

pitch of the strip, and these lines bisect the strip in one and the same plane, corresponding with the plane of the rolls a b , in which the half-twist represented may be supposed to have been produced; but said rolls must either be as much closer together as will compensate for a certain amount of resilient recoil of the strip or they must so diverge angularly from each other as to overtwist the strip to the extent that the pitch is correct when the recoil is spent. It will thus be seen that two pairs of rolls will serve to effect the twist; but with three pairs the necessary overtwist is divided and graduated to a greater extent.

As it is more convenient and simple to adjust the rolls toward and from each other than to adjust them angularly for controlling this overtwist, I have arranged rolls c and b so as to be shifted toward and from rolls a , as indicated, by the slotted holes h in the base-plates i for the fastening-bolts j , (see Fig. 3;) but I may of course arrange the roll-housings of one pair of rolls, as b , on base k , adjustable around the axis of the passway, as in Figs. 6 and 7, and in such case they may be placed at right angles to rolls a , corresponding to the plane of the twisted strip at g , or at any other angle, according to the pitch of the twist and the distance from rolls a at which it is convenient to place them.

It is preferred to drive one of the pairs of twisting-rolls with power for forcing the strips along between the rolls; but the strips may be pulled or pushed through by other rolls, if desired. When three pairs of rolls are used, it will be preferred to gear the middle pair, as is represented in this example, wherein the counter-shaft, to which the power is applied through the pulley m , is geared by the bevel-wheels n with one of the roll-shafts, the shafts of both rolls being geared together by spur-wheels o in the usual manner.

The roll-shafts have the usual universal coupling-joints p to allow the rolls to be adjusted toward and from each other, and in order to permit the rolls to shift lengthwise for retiring the worn places out of and substituting other unworn parts in the passway I have provided the extension-joint in each shaft, consisting of the socket q and the part s , adjustable in said socket, and have adapted the slots for the fastening-bolts of the base-plates to allow the rolls to be so shifted. Any approved guideway for directing the strips into the first pair of rolls may be employed, said strips being delivered from reels to the rolls; but from the twisting-rolls the strips are to be delivered onto the reels, as t , which have to turn in the axis of the strip in unison with the rotation imparted to the twisted portion of the strip—that is, it must rotate once in the axis of the strip for every full twist of the strip. For this purpose the reel is pivoted to rotate in the line of the passway of the strip in the yoke-frame u , having a hollow trunnion v and pivoted to rotate in

the axis of the said passway, so that the strips passing through said hollow trunnion may be wound on the reel. The reel is geared by the toothed wheels w on its pivots and intermediate wheels x on studs of frame u with another wheel z on the end of a shaft 2 through the other hollow trunnion 3 of said yoke-frame and having a friction-clamp 4 to hold it, so that motion of the reel on its own axis will be imparted to it by the wheels geared with wheel z and carried around it by the rotating yoke-frame. The wheels w , x , and z are so proportioned that with the yoke-frame duly speeded relatively to the rotations of the strips said strips will be wound on the core of the reel on which the coils are shortest as fast as delivered. As the coils increase in length by accumulation, the increase of tension overcomes the power of the friction-clamp holding the shaft, causing it to slip therein, so that the speed of rotation of the reel on its axis is correspondingly slower, and thus the winding of the strips on the reel progresses in due order without difficulty in consequence of the increasing size of the bulk. For a twist of about eight-inch pitch it will be preferred to have the twisting-rolls about three inches in diameter, and the middle or drawing roll may be a little larger than the others, say about four inches in diameter. With such dimensions of rolls and pitch the yoke-frame u , carrying the reel, will have to be speeded about fifty per cent. higher than the speed of the rolls, for which the pulleys by which the rolls and frame are driven from the power-shaft 4 through the belts 5 6 will be duly proportioned.

While it is preferable to employ rolls as thus far described, it is obvious that the same method of twisting can be carried out with fixed dies 7, as I have represented in Fig. 4, together with one pair of rolls, as 8, to pass the strips along through the dies, which with good lubrication will accomplish the work about as well, though somewhat more power will probably be required.

I claim—

1. The method of twisting metallic strips, which consists, first, in twisting a short section of a strip; second, inserting the twisted portion through two or more pairs of dies with a portion of said twisted section between each of the pairs of dies, and, third, forcing the strip along through the dies, and thereby causing it to twist between the said pairs of dies, substantially as described.

2. In a metallic-strip-twisting machine, the combination of two or more pairs of dies located apart in line a distance proportionate to the pitch of the twist to be produced, substantially as described, and means for forcing the strips through said dies, said strips having an initial twisted portion and inserted in said dies with a twisted portion between each pair of dies, as set forth.

3. In a metallic-strip-twisting machine, the combination of two or more pairs of dies lo-

cated apart in line a distance proportionate to the pitch of the twist to be produced, substantially as described, means for forcing the strips through said dies, said strips having an
5 initial twisted portion and inserted in said dies with a twisted portion between each pair of dies, and a reel receiving the strips from said dies and having rotation in the axis of the strips in unison with the pitch of the twist,
10 substantially as herein set forth.

4. In a metallic-strip-twisting machine, the combination of two or more pairs of roll-dies located apart in line a distance proportionate to the pitch of the twist to be produced, sub-
15 stantially as described, and means for fore-

ing the strips through said dies, said strips having an initial twisted portion and inserted in said dies with a twisted portion between each pair of dies, and a reel receiving the strips from said dies and having rotation in
20 the axis of the strip in unison with the pitch of the twist, substantially as herein set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 25th day of March, 25
1892.

THOMAS V. ALIIS.

Witnesses:

W. J. MORGAN,
CLINTON E. WHITNEY.