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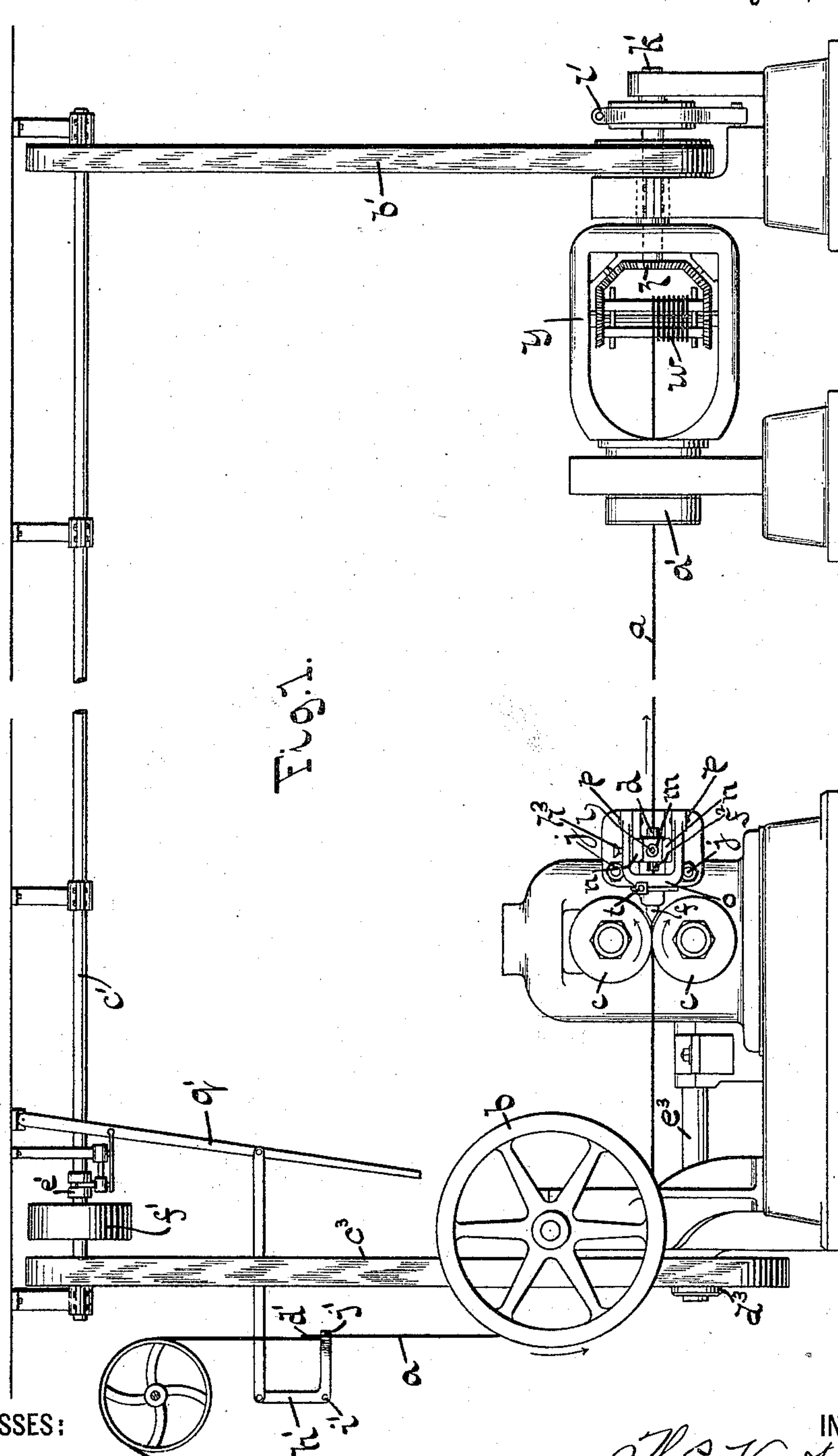
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T. V. ALLIS.

APPARATUS FOR TWISTING AND REELING METALLIC STRIPS.

No. 542,513.

Patented July 9, 1895.



WITNESSES:

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(No Model.)

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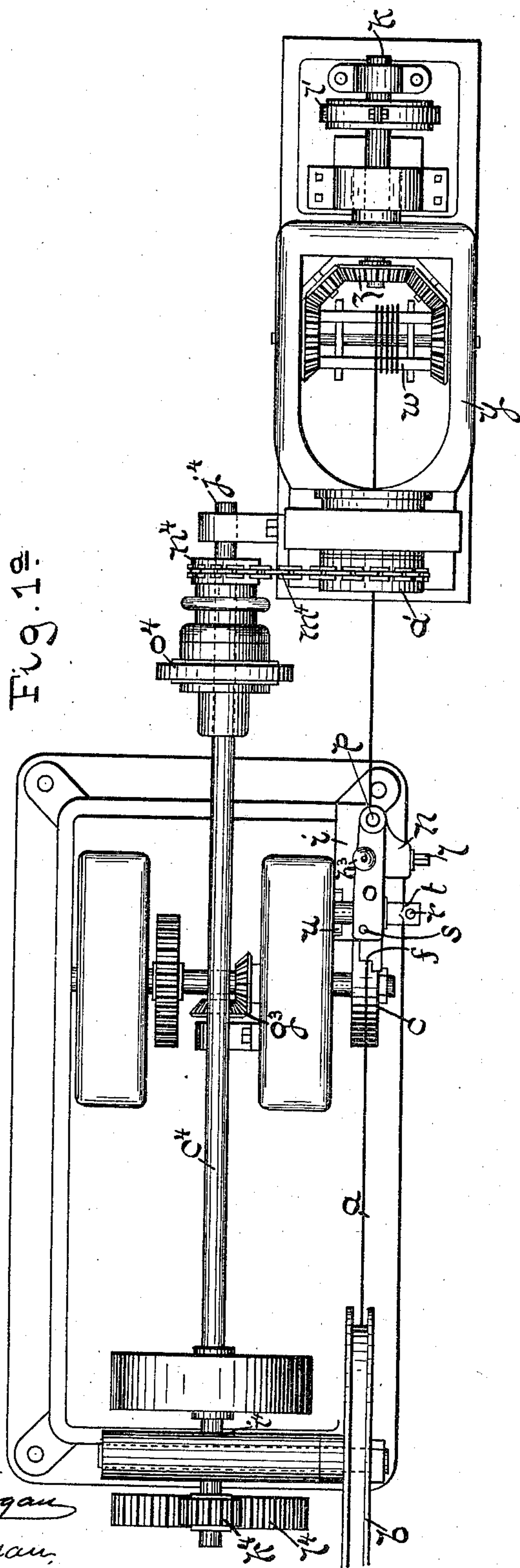
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Fig. 1.



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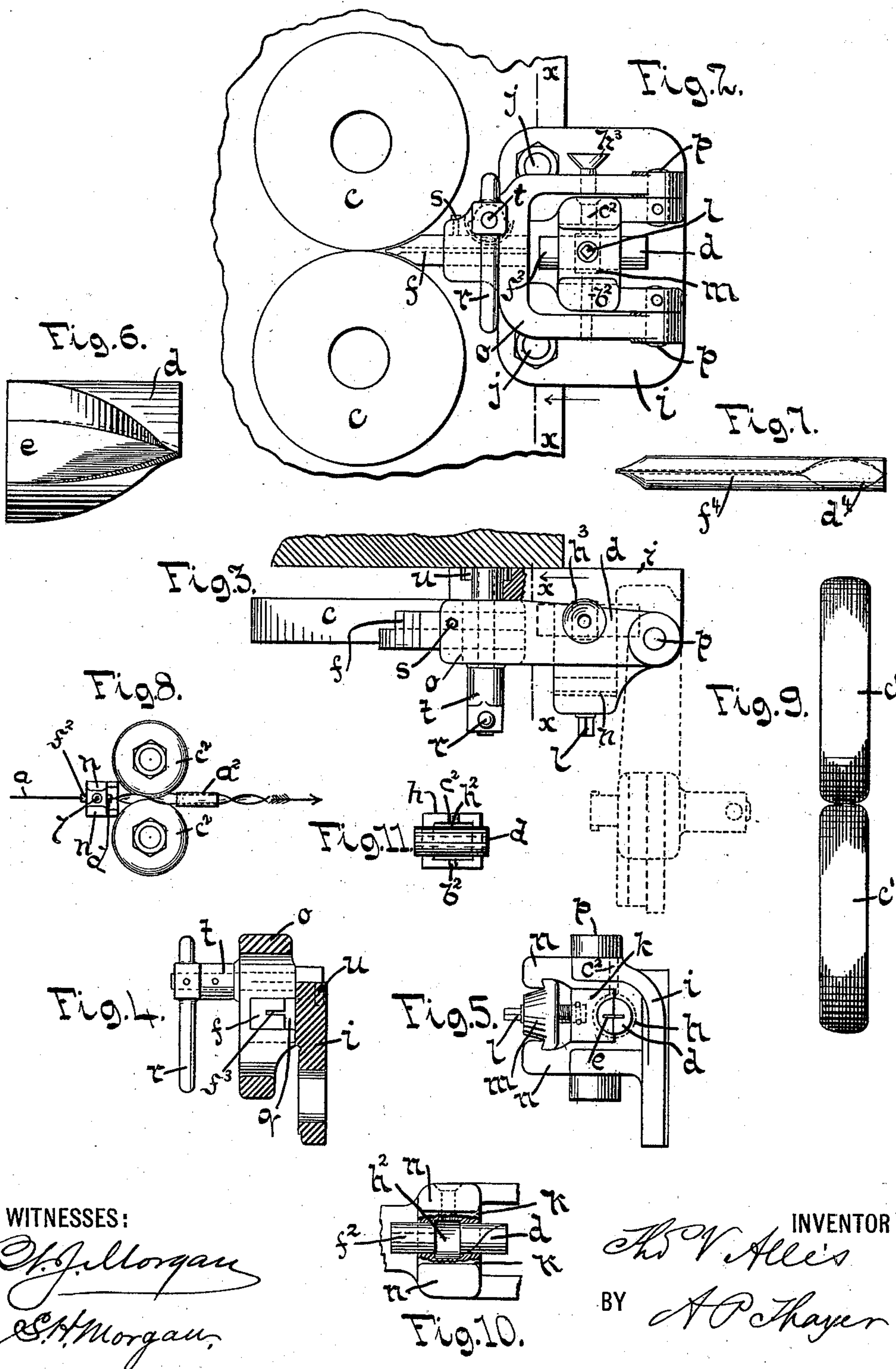
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UNITED STATES PATENT OFFICE.

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

APPARATUS FOR TWISTING AND REELING METALLIC STRIPS.

SPECIFICATION forming part of Letters Patent No. 542,513, dated July 9, 1895.

Application filed May 9, 1894. Serial No. 510,588. (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, in the county and State of New York, have invented certain new and useful Improvements in Apparatus for Twisting and Reeling Metallic Strips, of which the following is a specification.

My invention consists of means for twisting cold metallic resilient and galvanized strips, as fencing-strips, by passing them through a die or dies having a spiral channel or passage, in which the twist is produced as the strips pass through, as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of the twisting-machine as I prefer to make it, also of the reeling-machine, and also of automatic stop mechanism to stop the machines when a splice-joint in the strip which it is not feasible to pass through the die arrives near the twisting-machine for allowing the joint to be disconnected and the ends to be passed through the die separately, after which said ends are spliced again for reeling in larger coils. Fig. 1^a is a plan view of the twisting and reeling machines with some modifications of driving-gear that it may be desirable to employ. Fig. 2 is a detail of the twisting apparatus in side view on an enlarged scale. Fig. 3 is a plan view of a detail portion of the twisting mechanism, with the guide-holding gate shown in dotted lines as open and with part of the roll-housings in horizontal section. Fig. 4 is a section of the apparatus of Fig. 3 on line *x x*. Fig. 5 is an end elevation of the apparatus of Fig. 3. Fig. 6 is a side view of one of the parts of the twisting-die, said die being made in two parts divided on the spiral line of the twist. Fig. 7 is a side elevation of the guide and twisting-die made in one device, as they may be if desired. Fig. 8 is a side elevation of part of a twisting-machine in which the power to force the strip through the twisting-die is applied to the twisted strip as it issues from the die and pulls it through. Fig. 9 is a front view of the rolls shown in Fig. 8 for drawing the strips through the die. Fig. 10 is a detail of the twisting-die and its clamp in side elevation, with a part broken out. Fig. 11 is a side view of the twisting-die

and one of the clamping-jaws, showing modifications in the arrangement of the die and the water-jacket for cooling the die. Fig. 12 is a side view of a short section of twisted strip.

The flat strips, as *a*, having been previously spliced together for reeling in larger coils than single lengths will make, are received from the reels on which they are wound on the guide-pulley *b* of the twisting-machine and suitably guided therefrom to a pair of rolls *c*, by which the strips are to be forced through a twisting-die, said die consisting of two half parts made from a short block of steel, preferably of cylindrical form, as *d*, divided lengthwise in a spiral line and having a spiral passage *e*, adapted to produce the desired twist of the strips. Between this die, which is necessarily located at some distance from the feed-rolls, there is placed a guide *f*, when the rolls are arranged to push the strips through the die as in Fig. 1, said guide having the receiving end tapered to reach close in the angle of the discharging side of the rolls, as shown in Fig. 2, to receive the strip as close thereto as possible for greater protection against buckling. This guide is made in one piece and has a straight passage-way *f*³ for the strips. The die and the guide are preferably made separate, but may be united, as *f*⁴ *d*⁴ in Fig. 7, the straight passage-way and dividing-line of the guide portion of this device being changed to the spiral form in the portion serving for the twisting-die. Said die is secured in a seat *h*, provided for it in a supporting-bracket *i*, by an adjusting and detachable clamping-jaw *k*, which is swiveled to the end of a clamping-screw *l*, carried in a saddle-nut *m*, detachably hooked in the lips *n* of the bracket *i*, to facilitate ready removal and replacement of the die. The bracket *i* is secured to the roll-housing by bolts *j*. The clamp is constructed with a chamber *h*² for allowing circulation of water for keeping the die cool, the water being admitted through the funnel *h*³, mounted on the gate *o*, and through the said passage *c*², dotted in Fig. 2. The guide *f* is carried in a gate *o* pivoted to the bracket *i* at *p*, said gate having a channel *q* formed in and open at the back of the gate, the guide being secured therein by a set-screw *s*. The guide thus mounted in the swinging gate is readily

accessible for adjustment. The object of the channel in which the guide is placed being open at the back is that in case the strip should get stalled and jammed, so as to bind fast in the guide and obstruct its removal, by 5 slacking the set-screw s and opening the gate the guide can be released, so as to permit the gate to escape from the guide on being opened, after which the guide can be released from 10 the jammed strip and the strip can be cleared from the machine to better advantage.

The gate is provided with a revolving bolt t , having a bit u , that swings into a notch in the upper edge of the bracket i , as will be 15 understood by reference to Figs. 3 and 4, when the handle r swings down to its normal position to lock the gate shut.

From the twisting-die the twisted strips are caused to run on a reel w , which is carried 20 in a rotating frame y and geared with the toothed wheel z , controlled by the friction-clamp l' , so that while the reel is turned to coil the strips on it said reel is also rotated in unison with the rotation imparted to the 25 strips by the twisting-die, which is necessary to preserve the twist given to the strips.

The journal a' of the reel-carrying frame is made hollow through which to pass the strips to the reel inside of the frame. A suit- 30 able traversing guide will be employed to guide the strips forward and backward along the reel, but such guides are not new and need not be shown. The reel is also of a common form and is not specifically claimed herein. The stationary wheel z , which causes 35 rotation of the reel on its own axis, is mounted on the shaft k' , which is held by the friction-clamp l' , and as the size of the coil on the reel gives too much surface speed for the rate 40 of movement of the strip it opposes the rotation of the reel and causes the friction-clamp to slip and limit the surface speed of the reel to the speed of the strip.

The rolls are, in Fig. 1, driven from the 45 shaft c' by belt c^3 . Said shaft also drives the reel by belt b' , both being geared together for uniform relative speed and also to be automatically stopped together when it is necessary to open a splice-joint d' , which it is not 50 feasible to pass through the die, as before stated. The belt c^3 runs on the pulley d^3 on the shaft e^3 , which gears with one of the roll-shafts by the bevel-wheels g^3 , Fig. 1^a. The clutch e' for clutching the driving-pulley f' 55 to said shaft c' is connected to the clutch-shifting lever g' , which is connected to one arm of the bell-crank h' pivoted at i' , the other arm of which crank has a fork j' at its extremity, between the prongs of which the 60 strip runs, the space between said prongs being wide enough for the single thickness of the strip to pass freely, but too narrow for the splice to pass, so that the splice-joint will shift the bell-crank and disconnect the clutch.

65 The rolls may be made to pull the strips through the twisting-die, as c^2 , Fig. 8, said

rolls taking effect on the twisted strip issuing from the die, the die and the rolls being placed in such relation to each other that the transverse plane of the strip will coincide with the 70 plane of the meeting faces of the rolls at the point where the rolls impinge on the strip. These rolls are made slightly convex transversely of the face, as shown in Fig. 9, first, because the sides of the strip are slightly 75 concave through the effect of twisting, and, second, because flat faces would have contact with the curved edges each side of the biting-point of the rolls on the strip and would flatten it unless the rolls were made too small 80 in diameter for practical use. In this arrangement a tubular guide a^2 will be employed on the delivery side of the rolls.

In Figs. 1, 2, 3, and 10 I have represented a short die, d clamped at one end between the 85 jaw k and the seat h , with a guide f^2 of like size and form similarly clamped, with a space between their inner ends open to the water-chamber h^2 , so that water may flow through 90 the die along with the strip to lubricate the die and the strip, as well as to cool them. In such case no other escape-passage for the water need be provided, but the die may reach across the chamber h^2 , as in Fig. 11, if desired, 95 so that the water will only circulate around it with a passage b^2 for the discharge of the water.

I have found in practice that a spiral passage e through the die of slightly wider gage than the thickness of the strip, such as will 100 allow a short strip to pass freely and be twisted, will not work practically on galvanized strips, because it will soon clog with fine particles of spelter rubbed off; but by making the passage a certain extent wider than the 105 thickness of the strip these particles will escape and the strips will run free without clogging. The spiral pitch of the passage has to be made correspondingly shorter, however, to insure the same pitch of the twist in the 110 strip, and the pitch of the passage also has to be shorter than the desired pitch of the twist, owing to a certain amount of recoil due to the resilience of such flattened strips after issuing from the die. 115

Instead of gearing the rolls and the reel from the overhead shaft c' , as in Fig. 1, a corresponding shaft, as c^4 , may be mounted in bearings of the twisting-machine and the reeling-machine, as $i^4 j^4$, and be geared by the toothed 120 pinion k^4 with a spur-wheel l^4 on the shaft e^3 and geared with the reel by a chain m^4 , the chain being driven by the chain-pulley n^4 on the shaft and running on the projecting end of the hollow journal a' of the reel-carrying 125 frame y .

At o^4 a clutch is indicated for disconnecting the reel from the rolls, which is desirable in adjusting the reel.

I claim—

1. The combination in apparatus for twist- 130 ing long flat strips of a twisting die having a

spiral passage, rolls for forcing the strips through the die, a reel for reeling the twisted strips, and automatic stop mechanism subject to the strip splices for stopping the rolls and the reel substantially as described.

2. The combination with the rolls and the die, of the bracket having the seat for the die and the hooked lips, the hook-nut, adjusting screw in the nut, and the die clamp swiveled to the said screw, said hook nut detachably engaged with the hooked lips of the bracket substantially as described.

3. The combination with the rolls and the die, of the strip guide and the hinged gate carrying the guide, and having the locking bolt substantially as described.

4. A twisting die for flattened galvanized strips having a spiral passage for said strips, suitably larger than the cross section of the strips for clearance of particles of spelter rubbed off said strips, and also being in substantially the same degree shorter in pitch than the pitch of the twist to be produced substantially as described.

5. The combination with the rolls and the die, of the slotted strip guide, and the hinged gate carrying said guide, said gate having the open channel for holding the guide, and for

releasing the slotted guide substantially as described.

6. In a strip twisting machine the combination with the twisting die of the clamping seat and a jaw adjustable with respect thereto for holding the die, said seat and jaw having recessed faces forming together with the die when clamped therein a cooling chamber in which the die is exposed to the cooling fluid, and provided with circulating passages substantially as described.

7. In a strip twisting machine the combination with the twisting die and the strip guide, of the clamping seat and a jaw adjustable relatively thereto for holding the die and guide, said die and guide secured in said clamp with a space between them and together with said clamp forming a chamber for a cooling fluid, and said clamp provided with a supply passage for the fluid substantially as described.

Signed at New York city, in the county and State of New York, this 18th day of April, A. D. 1894.

THOMAS V. ALLIS.

Witnesses:

W. J. MORGAN,
A. P. THAYER.