

(No Model.)

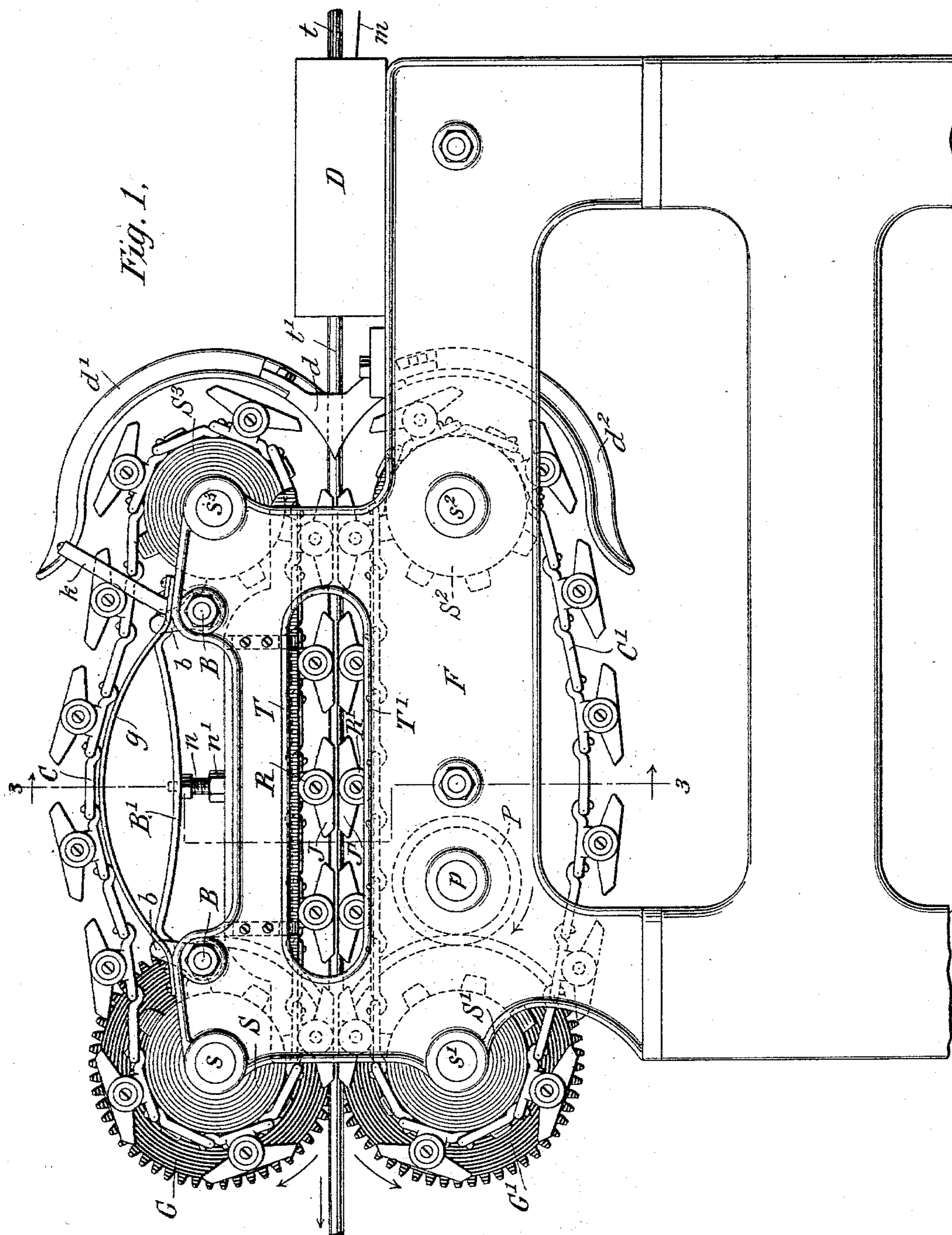
2 Sheets—Sheet 1.

E. T. GREENFIELD.

MECHANISM FOR DRAWING AND COVERING TUBES.

No. 548,637.

Patented Oct. 29, 1895.



Witnesses  
C. E. Ashley  
H. W. Lloyd

Inventor  
Edwin Greenfield  
By his Attorney  
Charles J. Kintner

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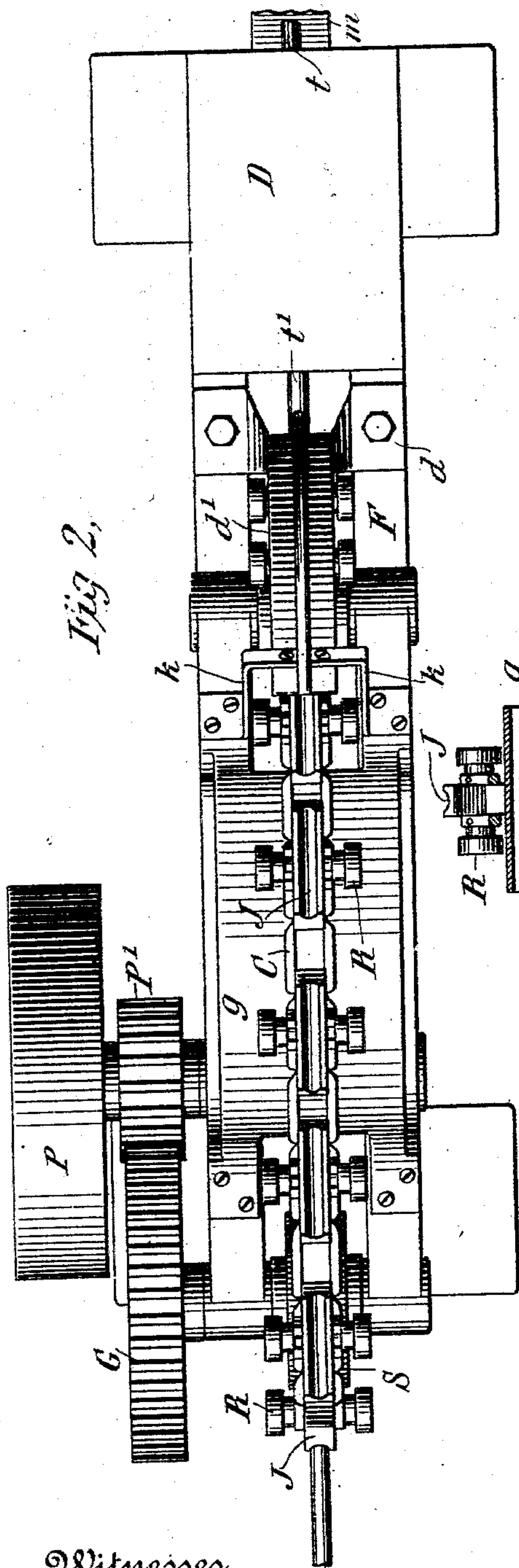


Fig. 2,

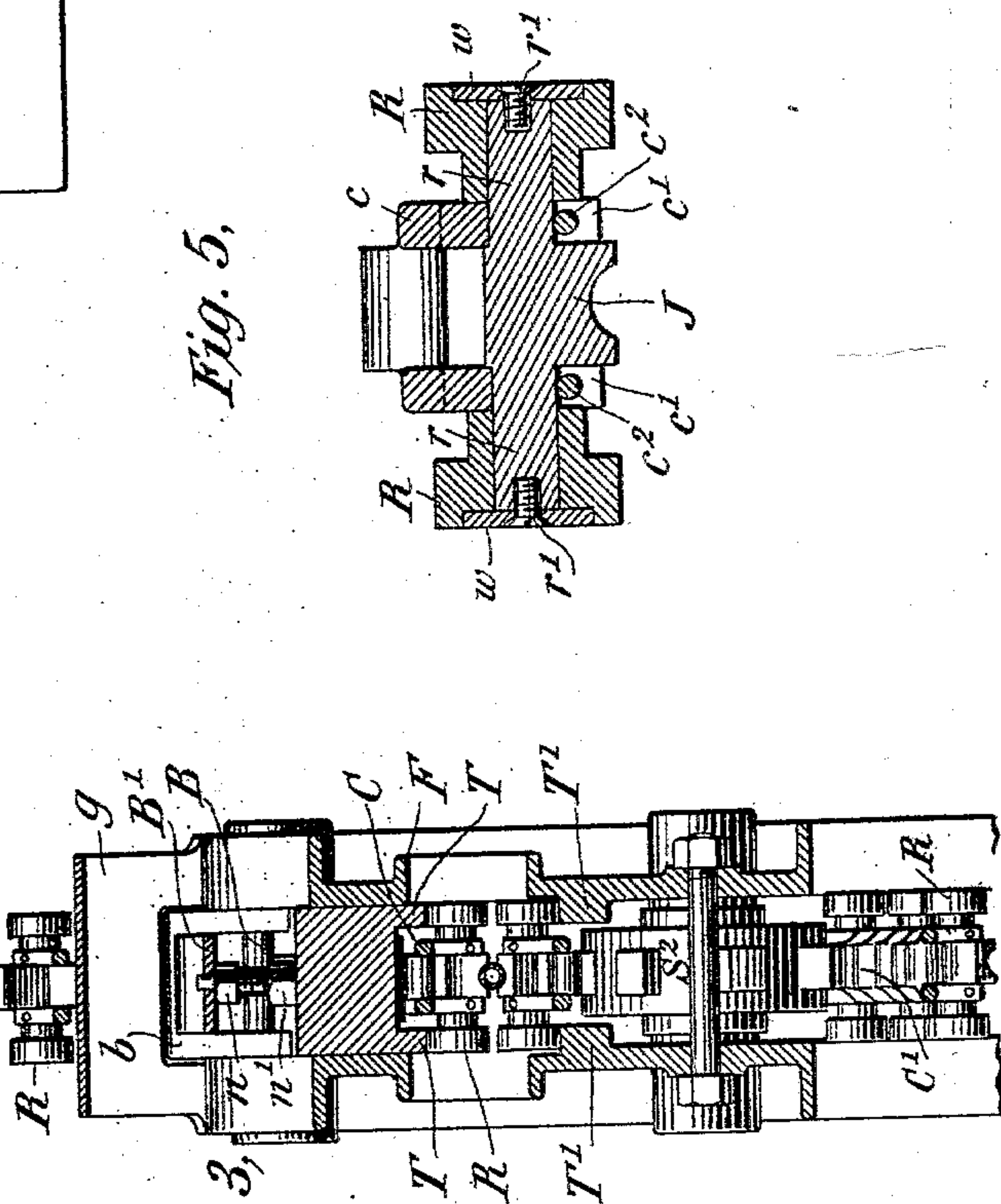


Fig. 3,

Fig. 4.

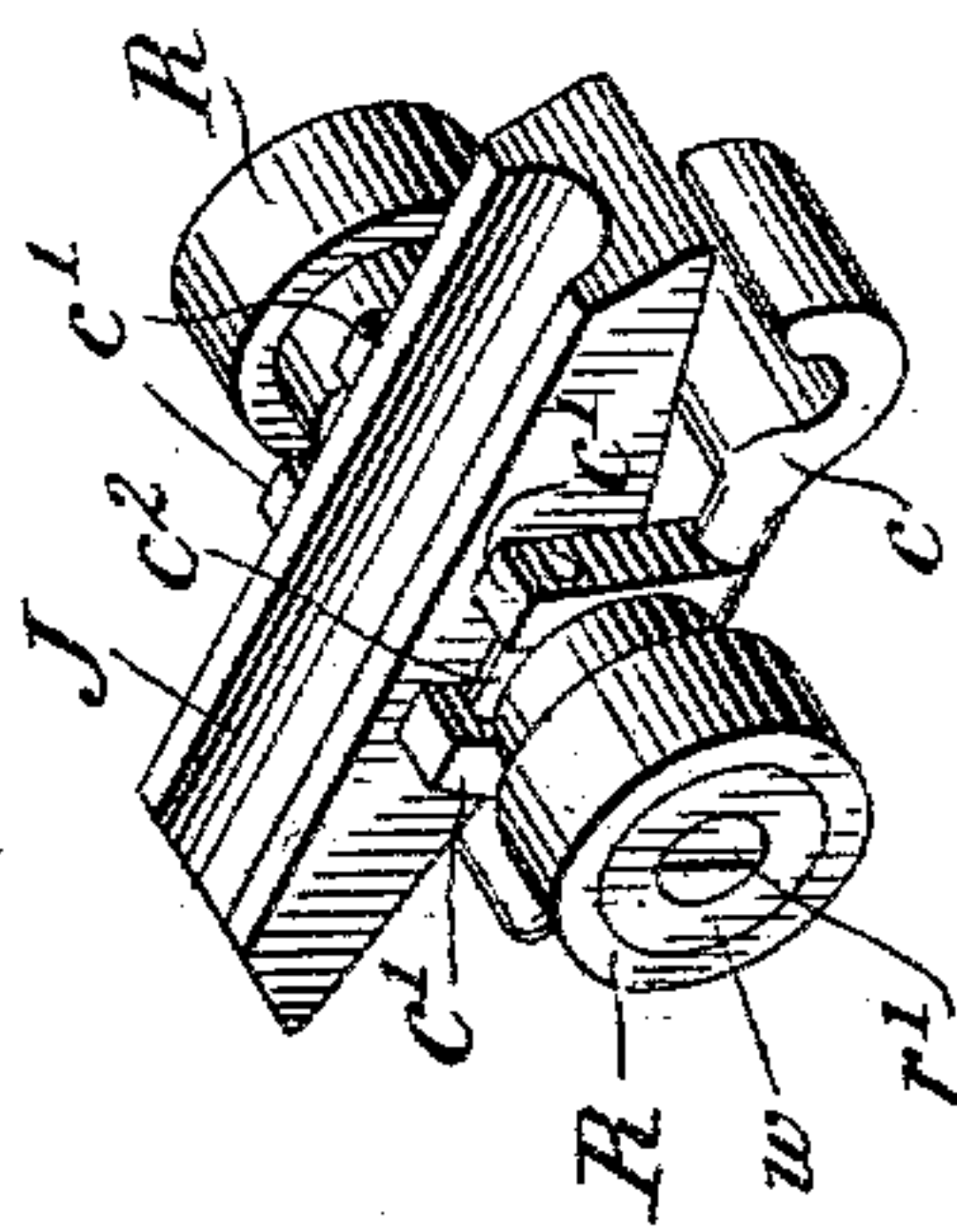
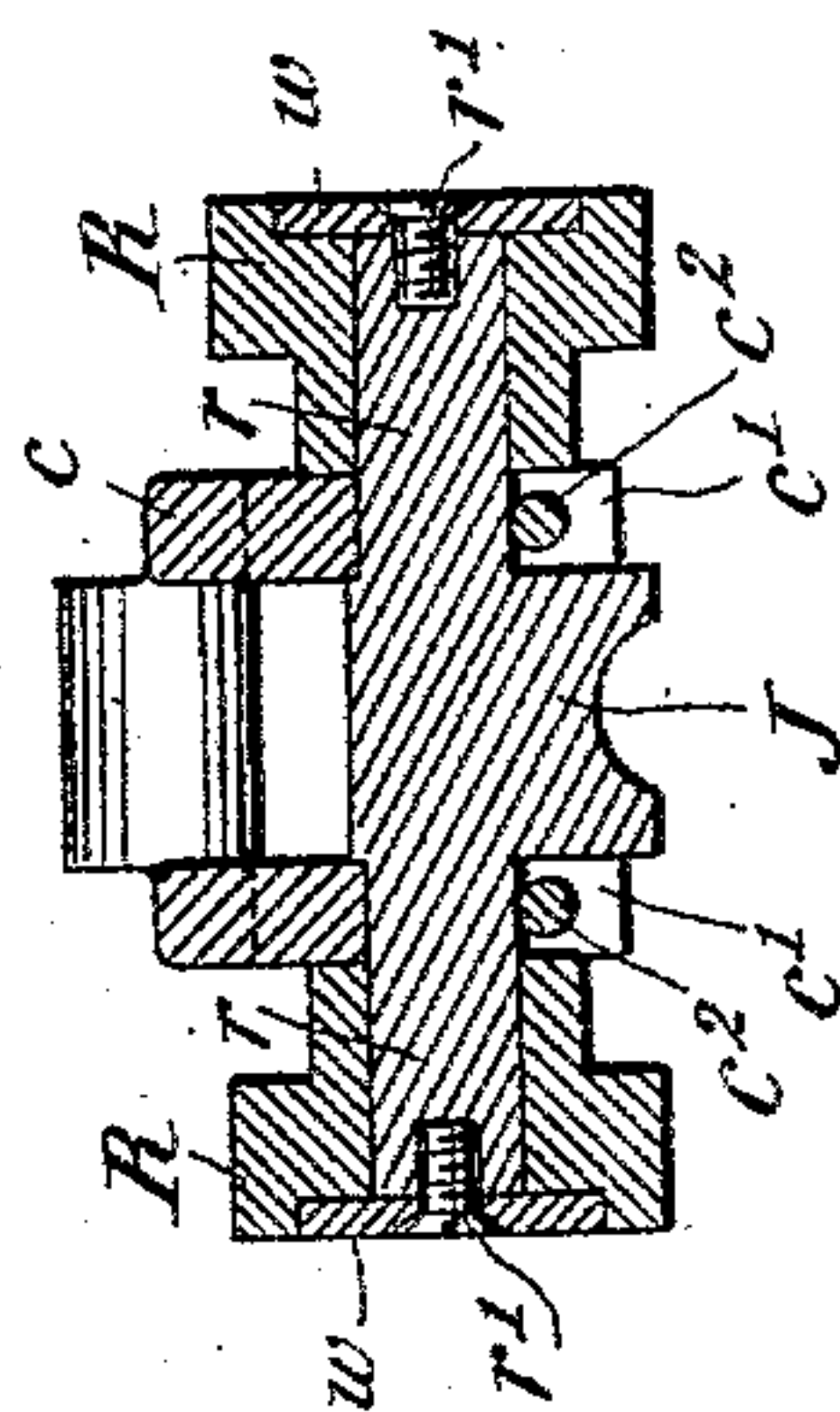


Fig. 5,



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# UNITED STATES PATENT OFFICE.

EDWIN T. GREENFIELD, OF NEW YORK, N. Y.

## MECHANISM FOR DRAWING AND COVERING TUBES.

SPECIFICATION forming part of Letters Patent No. 548,637, dated October 29, 1895.

Application filed December 17, 1894. Serial No. 532,119. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have made a new and useful invention in Mechanism for Drawing and Covering Tubes, of which the following is a specification.

My invention relates particularly to improvements in apparatus designed for use in connection with mechanism for drawing and simultaneously covering paper or analogous tubes with a coating of metal in accordance with the method of operation described and claimed in a prior patent granted to me on the 23d day of February, 1892, and numbered 469,662, and will be fully understood by referring to the accompanying drawings, in which—

Figures 1 and 2 are respectively side elevational and plan view illustrating my improved apparatus complete and as used in the practice of the method of covering tubes with metal, as described and claimed in the aforesaid patent. Fig. 3 is a transverse sectional view taken on the broken line 3 3, Fig. 1, and as seen looking at that figure of the drawings from the left toward the right in the direction of the arrows thereon. Fig. 4 is a perspective view of one of the movable gripping-jaws together with its pivotal connections to one of the links of the sprocket-chain which carries said jaws and with friction-rolls journaled thereon; and Fig. 5 is a transverse sectional view taken through Fig. 4.

In the practice of the method of covering tubes with metal, as disclosed in my prior patent above referred to, use is made of a gripping device which grips the covered tube and draws it forward a definite length and is again restored to the starting-point 16, thus making the process of drawing intermittent.

It was with a view of continuously drawing and simultaneously covering tubes with metal that the present invention was devised, thereby greatly increasing the capacity of the entire apparatus, as will be fully understood in connection with the description of the mechanism which will now be referred to in detail, all like letters of reference wherever

used in all of the figures of the drawings representing like parts.

F represents the frame of the machine, which is preferably of metal, and is sustained upon legs or standards which may be bolted or secured to the floor in any well-known manner.

D represents the covering-die, similar in all respects to that disclosed in my prior patent above referred to, *t* being the tube to be covered and *m* the sheet or strip of metal as it is drawn into the die, *t'* representing the metal-covered tube as it passes out of the die.

S S' and S<sup>2</sup> S<sup>3</sup> are two pairs of sprocket-wheels journaled upon shafts *s s'* and *s<sup>2</sup> s<sup>3</sup>* in the body of the frame.

G and G' are gear-wheels meshing with each other and carried, respectively, by the shafts *s* and *s'*.

P' is a driving-pinion meshing with the gear-wheel G' and carried by a shaft *p*, journaled also in the frame F, and P is a band-pulley adapted to be connected by a belt in the usual manner to any constant source of driven power, as a steam-engine, electric motor, or the like.

C C' constitute the successive links of two sprocket-chains, the former of which is carried by the sprocket-wheels S and S<sup>2</sup>, while the latter is carried by the sprocket-wheels S' and S<sup>3</sup>.

J and J' are gripping-jaws carried by alternate links of the sprocket-chains C and C', said jaws being each pivotally secured to one of the links by trunnions *r r*, side lugs or ears *c c'*, and transverse pins *c<sup>2</sup> c<sup>2</sup>*. (See Figs. 4 and 5.)

R and R' are friction-rolls journaled upon the trunnions *r r* and held in place thereon by washers *w w*, secured to the outer ends of the trunnions *r r* by screws *r' r'*. (See Fig. 5).

T' T' are rigid or fixed tracks on the inner faces of the frame located in a plane parallel with the axis of the tube *t t'*, which is to be drawn and covered, and T T are corresponding tracks parallel thereto and integral with a head-block, adjustably secured and having vertical sliding movement between the sides of the frame through the agency of a screw-bolt *n* and set-nut *n'*, the head of said screw-



bolt having a bearing on the under surface of a strong curved steel spring  $B'$ , the opposite ends of which spring are detachably secured through the agency of hooked ends beneath cross bars or rods  $b$ , pivotally secured to the sides of the frame by bolts  $B$ , (see Figs. 1 and 2,) the arrangement being such that the tracks  $T$  may be removed or adjusted, as to their vertical height, at will, thereby regulating the pressure upon the gripping-jaws  $J$ . Between these tracks  $T$  and  $T'$  the gripping-jaws  $J$  are adapted to advance, while the friction-rolls  $R$  simultaneously roll upon said tracks in opposite directions as they are thus advanced, as will be described more particularly in connection with the description of the mode of operation.  $g$  is a metallic arch secured to the frame above the yielding spring  $B'$  by screws and acting as a sliding surface for the under side of the upper sprocket-chain, as clearly shown in Fig. 1.

$d'$  and  $d^2$  are protecting-hoods secured to the frame by lateral extensions and bolts  $d$  and having an opening between them through which the metal-covered tube  $t$  passes as it is drawn forward, the upper hood  $d'$  being additionally secured to the frame by a yoke  $k$ , as clearly shown in Figs. 1 and 2.

The operation of the apparatus is as follows: A short section of the tube  $t$  having been drawn through the die  $D$  and the metallic covering  $t'$  encased thereon in the manner described in my prior patent, so that said completed section will be gripped between the first pair of gripping-jaws  $J$  and the necessary tension having been put upon the movable tracks  $T$  by the set-nut and bolt  $n'$  and  $n$  and strong flat spring  $B'$ , the machine is put in motion through the agency of the pulley  $P$  and any source of driven power, so that the gear-wheels  $G$  rotate in the direction of the arrows, as shown in Fig. 1. Under this condition of affairs the sprocket-wheels  $S$  and  $S'$  cause the sprocket-chains to advance and the gripping-jaws  $J$  to successively grip and move the covered tube  $t'$  forward in the direction of the straight arrow on the left of the drawings, the necessary gripping action being attained by the agency of the friction-rolls  $R$  as they pass between the two pairs of tracks  $T$ . It is apparent, therefore, that as the sprocket-chains continue to advance the gripping-jaws are caused to successively come into play and give to the covered tube  $t'$  continuous motion so long as the power is continuously applied at the pulley  $P$ .

Although I have described my invention as having an especial adaptability to the covering of tubes with metal, I desire it understood that it has many uses in the arts and may have an application wherever it is desired to give continuous motion in one direction to a body to be moved—as, for instance, in the drawing of sheet metal, the drawing of wire, the tightening of telegraph and other line

wires, the raising and lowering of the anchors of vessels, the paying out or drawing in of cables in the laying of ocean-cables, or, in fact, anywhere in the arts where such a device may have an analogous use—it only being necessary to adapt the conformation of the faces of the gripping-jaws  $J$  and  $J'$  to suit or adapt themselves to the material to be moved or drawn.

To make a single illustration in the application of the invention to the drawing of sheet metal, the inner faces of the jaws  $J$  should be plane or parallel surfaces, while in the application of the same to the drawing of bodies having rectangular or other shapes it is obvious that they should be changed accordingly, and also that where the necessities of the case might demand it, as in the raising or lowering of cables, it might be well to provide the inner surfaces of said jaws with teeth or analogous frictional bearings. My claims, therefore, hereinafter made are to be construed as covering the invention generically in all of its uses.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. Mechanism for continuously imparting motion to a tube or analogous body consisting of a series of gripping jaws pivotally connected directly to one or more sprocket chains geared to sprocket wheels having mechanical connection with a continuously acting source of power.
2. Mechanism for continuously drawing tube wire or like articles in the same direction consisting of a series of pairs of gripping jaws pivotally connected directly to and carried by two sprocket chains moved by pairs of sprocket wheels geared in turn to a continuously driven motor.
3. Mechanism for covering a tube or solid body with a coating or casing of sheet-metal, consisting of dies adapted to form from the sheet-metal a tube with a lock-seam, in combination with continuously moving gripping mechanism consisting of jaws pivotally connected to one or more sprocket chains carried by sprocket wheels, which sprocket wheels in turn are connected to a stationary source of driven power, said jaws being so arranged as to successively grip and give to the tube and its metallic covering continuous forward motion.
4. Mechanism for continuously drawing tube wire or analogous articles in the same direction consisting of two series of gripping jaws pivotally connected directly to and carried by sprocket chains and adapted to be moved by sprocket wheels geared to a source of motive power, in combination with means for varying the gripping relations between the jaws.
5. Mechanism for continuously drawing tube wire or analogous articles in the same direction consisting of gripping jaws pivotally secured to sprocket chains carried each



by a pair of sprocket wheels geared to a source  
of motive power, said jaws being provided  
each with friction rolls adapted to run be-  
tween tracks, one pair of said tracks being  
5 provided with means for adjusting them rela-  
tively to the other pair.

In testimony whereof I have hereunto sub-

scribed my name this 5th day of December,  
1894.

EDWIN T. GREENFIELD.

Witnesses:

C. J. KINTNER,  
GEO. F. TRUELL.