(No Model.) 2 Sheets—Sheet 1.

A. H. LIMONT.

MACHINE FOR DRAWING WIRE.

No. 420,303. Patented Jan. 28, 1890.

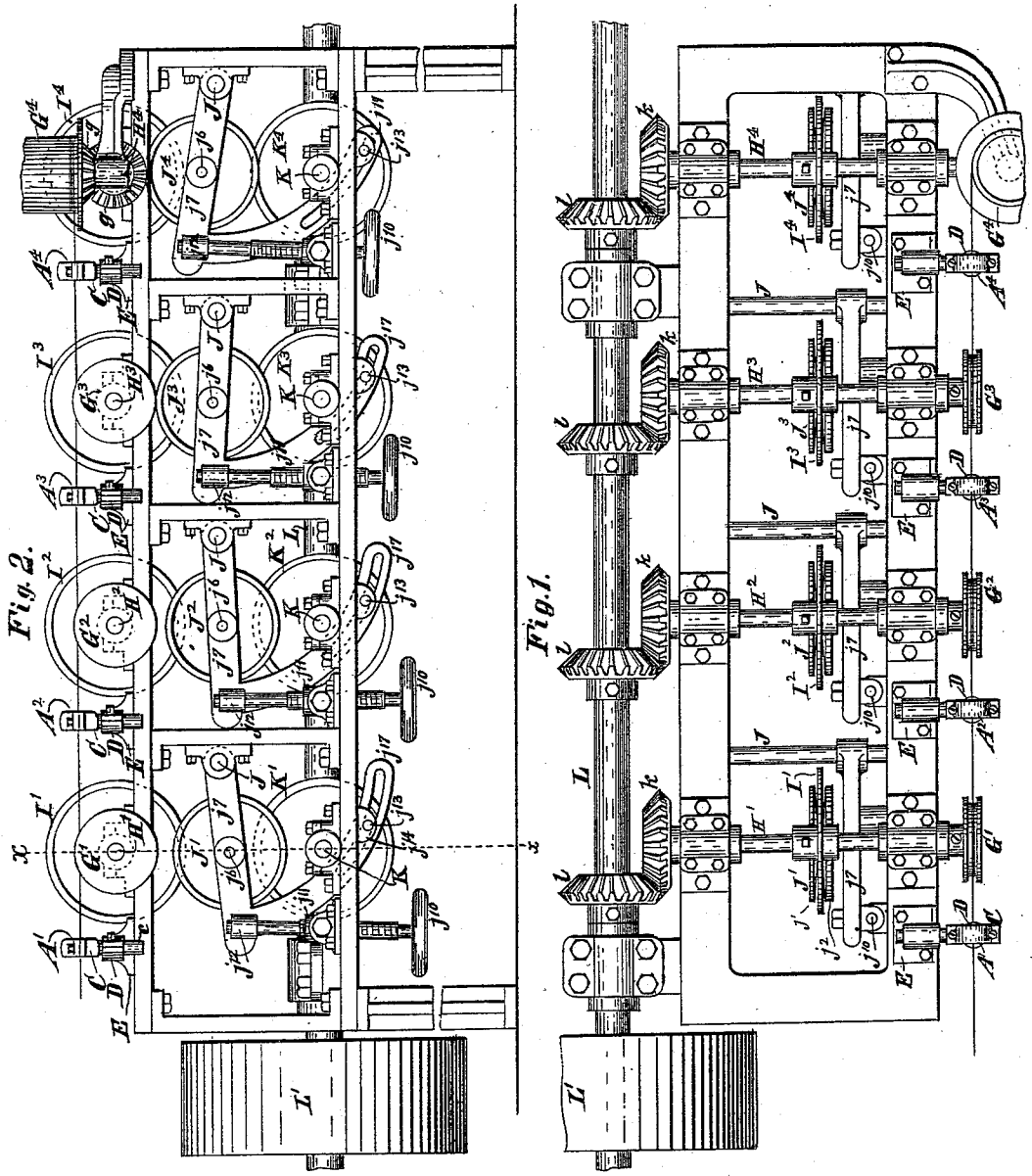


Fig. 2.

Fig. 1.

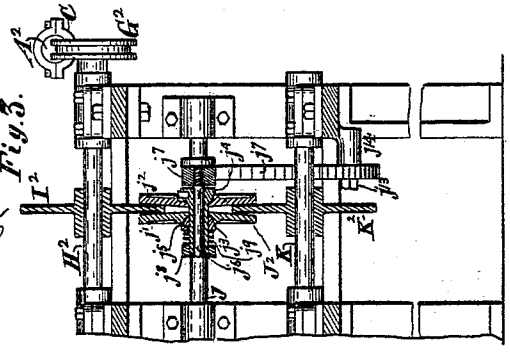


Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

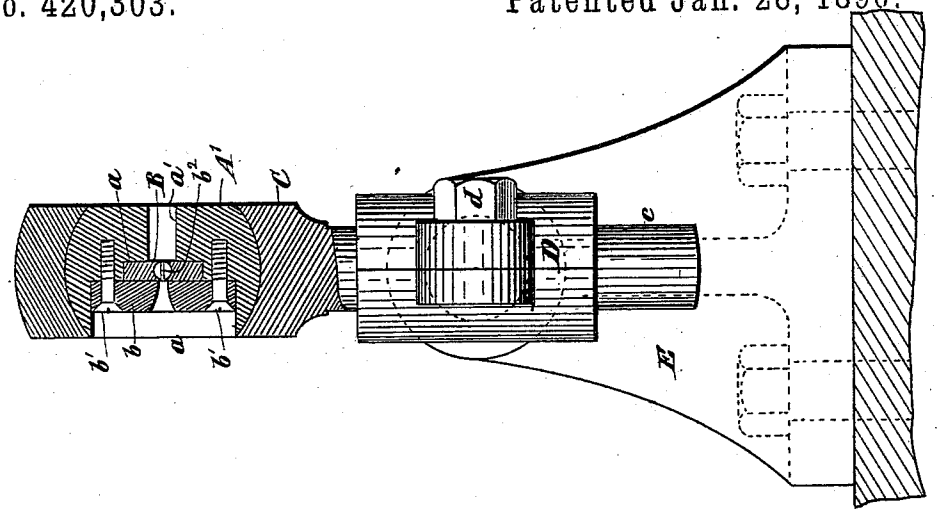
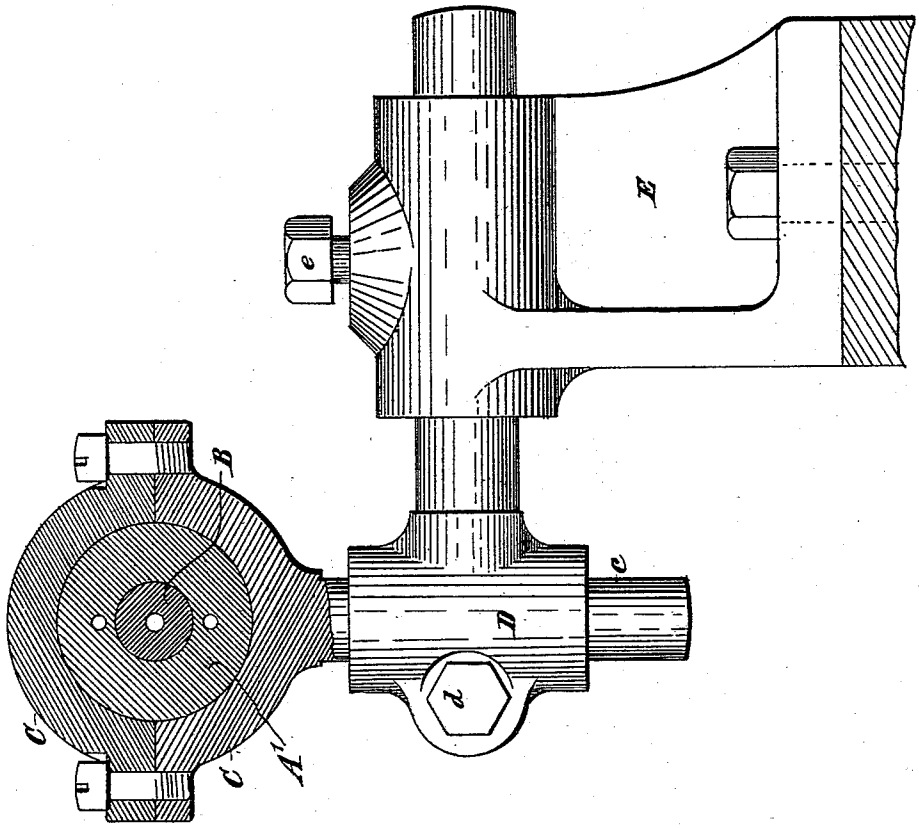


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALEXANDER H. LIMONT, OF WATERBURY, CONNECTICUT, ASSIGNOR TO HOLMES, BOOTH & HAYDENS, OF NEW YORK, N. Y.

MACHINE FOR DRAWING WIRE.

SPECIFICATION forming part of Letters Patent No. 420,303, dated January 28, 1890.

Application filed September 20, 1889. Serial No. 324,488. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER H. LIMONT, of Waterbury, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Machines for Drawing Wire, of which the following is a specification.

My improvement relates to the drawing of wire. Heretofore wire has been drawn successively through a number of dies by means of feeding apparatus serving to impart to the wire at different points in its length different speeds to compensate for the increase in the length resulting from the reduction in size occurring in the drawing.

My present improvement consists in novel combinations of parts in a machine adapted for drawing in the manner just described.

I will describe a machine for drawing wire embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a plan or top view of a machine embodying my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical transverse section taken at the plane of the dotted line *x x*, Fig. 2. Fig. 4 is a vertical transverse section of a die-holder and its supports on an enlarged scale. Fig. 5 is a vertical section taken transversely of the machine and illustrating a die-holder and its supports.

Similar letters of reference designate corresponding parts in all the figures.

A' A^2 A^3 A^4 designate die-holders. There will be one for each drawing-die. The number of these used in the machine is immaterial and may be varied at will. I have shown four simply because they will suffice for the purpose of illustrating my invention.

B designates the drawing-dies. These drawing-dies may be of the usual or any other suitable construction. The die-holders are shown as having on one side a cavity *a* for the reception of the dies and a central opening *a'*, communicating with said cavity *a* and located opposite the aperture of the drawing-die. The dies are represented as secured within the cavities *a* by caps *b*, extending across them within the cavities *a* and fastened in place by screws *b'*. In the present instance the dies B are shown as having diamonds b^2, and opposite the aperture within the diamonds the caps have holes for the passage of the wire to be drawn. These holes in the caps are shown as funnel-shaped.

The die-holders are of circular form. Their peripheries are curved in the direction of the length of the apertures in the dies, or, in other words, from the front to the rear side, and the curve is such as to be approximately concentric with the centers of the dies. In other words, they are segments of balls or spheres.

The die-holders are shown as supported in brackets C, having shanks which in the present instance extend vertically. These brackets have circular openings, and from the front to the rear the surfaces of these openings are curved to correspond with the curve of the die-holders and form with them ball-and-socket joints. The die-holders may therefore oscillate to assume positions at different angles in these brackets on centers corresponding to the centers of the dies. The object of this is to make the dies adjust themselves to the best position for the direction in which the wire passes into and from them.

The brackets C are shown as made in two sections secured together by bolts to facilitate the insertion and removal of the die-holders. These brackets will preferably have cylindrical shanks *c*, so that they may be rotated on the axes of the shanks to assume different angles. Moreover, the shanks are of such length as that they may be adjusted vertically in the part which receives them, so as to provide for elevating and lowering the dies bodily. I have shown the brackets C as having their shanks supported in brackets D, which in the present instance have horizontally-extending shanks. The bodies of the brackets D are of split or bifurcate construction, and the split portions or arms have combined with them screws *d*, whereby these bodies may be made to relax their hold upon the shanks *c* of the brackets C, which enable the positions of the brackets C to be changed.

The brackets D will preferably be connected adjustably with their supports. In the present instance these supports consist of stands E, erected upon the bed-framing of

the machine, and these stands are provided with sockets, in which the shanks of the brackets D extend. Set-screws *e*, fitted in tapped holes in the stands E and extending into the sockets, so as to be impinged against the shanks of the brackets D, serve to secure the latter in position. If, as is preferred, the shanks of the brackets D and their sockets in the stands E are made cylindrical, the shanks may be not merely adjusted longitudinally, but may be rotated to swing the brackets D off to one side or the other.

With each of the drawing-dies is combined a feeding device. The necessity for this arises from the fact that the wire being elongated as it is reduced in size needs to be fed at different speeds throughout different portions of its length where the increase in its length occurs, so as to compensate for the elongation. In the present instance I have shown drums $G' G^2 G^3 G^4$ as forming the feeding devices. It will be seen that one of these drums is arranged beyond or at the rear side of each drawing-die. The wire is intended to be fed by frictional contact with these drums. A proper frictional contact may be secured by rolling or turning the wire one or more times around each drum.

The drums $G' G^2 G^3$ are shown as affixed to shafts $H' H^2 H^3$, which are shown as supported in bearings upon the side frames of the machine. The drum G^4 is shown as occupying a vertical position and as geared by bevel gear-wheels *g* with a horizontal shaft H^4, which is similar to the shafts $H' H^2 H^3$ and supported in the same manner. Mounted on these shafts $H' H^2 H^3 H^4$ are friction-wheels $I' I^2 I^3 I^4$. Each of these friction-wheels is shown as consisting of a disk secured to the corresponding shaft $H' H^2 H^3 H^4$.

$J' J^2 J^3 J^4$ designate friction-wheels employed for transmitting motion to the friction-wheels $I' I^2 I^3 I^4$. These wheels $J' J^2 J^3 J^4$ severally consist of a pair of disks $j' j^2$, having opposite faces inclined outwardly or toward their peripheries and mounted upon hemispherical hubs $j^3 j^4$. The hub j^4 forms part of a sleeve j^5, which is free to rotate and move lengthwise of a shaft or stud j^6. The hub j^3 is mounted upon the sleeve j^5, and is capable of sliding in the direction of the length of the latter. The shaft or stud j^6 is supported by an arm j^7 by being screwed at one end into the same. It is not intended that the shaft or stud j^6 shall rotate. At the end of the sleeve j^5 which is most distant from the arm j^7 a collar j^8 is affixed to it by being screwed thereon or in any other suitable manner, and around the sleeve between this collar j^8 and the hub j^3 is a helical spring j^9. The two disks $j' j^2$ of each of the friction-wheels $J' J^2 J^3 J^4$ embrace the corresponding one of the wheels $I' I^2 I^3 I^4$. The spring j^9 tends to move the disks j' toward the disk j^2, and, as the sleeve supporting both the disks can move lengthwise of the shaft or stud j^6, it is clear that the spring j^9 causes the disks $j' j^2$ to tightly grasp the corresponding wheel $I' I^2 I^3 I^4$. Owing to the construction of the hubs $j^3 j^4$ of hemispherical form the disks $j' j^2$ may oscillate, so that their opposite faces will assume different angles relatively to each other. The arms j^7 are supported by horizontal shafts J, mounted in bearings in the bed-framing of the machine; hence these arms are free to swing upwardly and downwardly for the purpose of elevating or lowering the wheels $J' J^2 J^3 J^4$. When any one of the wheels $J' J^2 J^3 J^4$ is elevated, it will at a different distance from its axis coact with the rim of the corresponding wheel $I' I^2 I^3 I^4$, and according as the point of engagement varies in distance from the axis so will the speed transmitted to the corresponding wheel $I' I^2 I^3 I^4$ vary.

I have shown screws j^{10} for elevating and lowering the arms j^7. These screws are shown as engaging with nuts j^{11}, secured to the bed-framing of the machine, and as having their upper ends engaged with sockets j^{12}, which are intended to have a swiveling connection with the arms.

The arms j^7 may be provided with extensions j^{17}, having the forms of arcs, which are concentric with the shafts J, and provided with longitudinal slots which receive screws j^{13}, engaging with hubs or portions j^{14}, forming part of the bed-framing. These screws will serve to secure the arms in position.

$K' K^2 K^3 K^4$ designate friction-wheels affixed to horizontal shafts K, journaled in brackets secured to the bed-framing of the machine. These friction-wheels engage with the friction-wheels $J' J^2 J^3 J^4$, entering between the pairs of disks composing the latter below the shafts or studs j^6, by which said disks are supported. When any one of the wheels $J' J^2 J^3 J^4$ is elevated, it will be moved away from the axis of the corresponding wheel $K' K^2 K^3 K^4$ and toward the axis of the corresponding wheel $I' I^2 I^3 I^4$. It will then engage with a portion of the corresponding wheel $K' K^2 K^3 K^4$ of larger diameter than before, and a portion of a smaller diameter in itself will engage with the corresponding wheel $I' I^2 I^3 I^4$, so that the speed or motion transmitted to the corresponding wheel $I' I^2 I^3 I^4$ will vary, not only because it will receive motion from the disks at a different portion of their diameter, but also because the disks will be rotated at a different speed by the corresponding wheel $K' K^2 K^3 K^4$. The lowering of any one of the wheels $K' K^3 K^3 K^4$ will produce the opposite result.

The shafts K are provided with bevel gear-wheels *k*, which engage with bevel gear-wheels *l*, affixed to a shaft L, here shown as extending lengthwise of the machine, and provided with a pulley L', whereby it may be rotated to effect the rotation of the shafts K, and through them variably the feeding devices or drums $G' G^2 G^3 G^4$.

Owing to the provision for variably driving the feeding devices or drums $G' G^2 G^3 G^4$, the

wire may be moved forward at different speeds at different portions of its length, and the variation of its speed at different portions of its length may be made commensurate to its elongation occurring at different points.

I may employ any suitable devices for lubricating the wire by means of water or oil or otherwise at different points in its progress. I have not illustrated such devices, because I lay no claim to them.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for drawing wire, the combination, with a number of drawing-dies, feeding devices for feeding the wire at points beyond the several dies, shafts operating the feeding devices, and a driving-shaft for imparting motion to the shafts operating the feeding devices, of sets of friction-wheels intermediate of the driving-shafts and the shafts operating the feeding devices, one of the friction-wheels of each pair being composed of two expansible and contractible parts, which enable the other to coact with it at different distances from its axis, substantially as specified.

2. In a machine for drawing wire, the combination, with a number of drawing-dies, feeding-drums for feeding the wire at points beyond the several dies, shafts operating the feeding devices, and a driving-shaft for imparting motion to the shafts operating the feeding-drums, of sets of friction-wheels intermediate of the driving-shaft and the shafts operating the feeding-drums, one of the friction-wheels of each pair being composed of two expansible and contractible parts, which enable the other to coact with it at different distances from its axis, substantially as specified.

3. In a machine for drawing wire, the combination of a number of drawing-dies, feeding devices for feeding the wire at points beyond the several dies, shafts $H' H^2 H^3 H^4$, operating the feeding devices, a driving-shaft for imparting motion to the shafts operating the feeding devices, and sets of friction-wheels $I' I^2 I^3 I^4$, $J' J^2 J^3 J^4$, and $K' K^2 K^3 K^4$ intermediate of the driving-shaft and the shafts $H' H^2 H^3 H^4$, the wheels $J' J^2 J^3 J^4$ being severally composed of two disks having opposite angular faces and mounted to slide on their supports, substantially as specified.

4. In a machine for drawing wire, the combination, with a number of drawing-dies, feeding devices for feeding the wire at points beyond the several dies, shafts operating the feeding devices, a driving-shaft, a number of shafts corresponding to the number of feeding devices and deriving motion from the driving-shaft, and gearing for transmitting motion from the last-named shafts to shafts supported so as to have a bodily movement, of pairs of friction-wheels intermediate of the adjustable shafts and the shafts operating the feeding devices, one of the friction-wheels of each pair being composed of two expansible and contractible parts to enable the other to coact with it at different distances from its axis, and one of said friction-wheels of each pair being supported upon one of the said adjustable shafts, substantially as specified.

5. In a machine for drawing wire, the combination of a number of drawing-dies, a corresponding number of feeding devices, shafts $H' H^2 H^3 H^4$, for operating the feeding devices, pairs of friction-wheels $I' I^2 I^3 I^4$ and $J' J^2 J^3 J^4$, shafts carrying the friction-wheels $J' J^2 J^3 J^4$, shafts K, geared to transmit motion to the wheels $J' J^2 J^3 J^4$, and a driving-shaft for the shafts K, substantially as specified.

6. In a machine for drawing wire, the combination of a number of drawing-dies, a corresponding number of feeding devices, shafts $H' H^2 H^3 H^4$, for operating the feeding devices, friction-wheels $I' I^2 I^3 I^4$, pairs of friction-wheels $J' J^2 J^3 J^4$, shafts carrying the friction-wheels $J' J^2 J^3 J^4$, and levers or arms supporting these shafts, substantially as specified.

7. In a machine for drawing wire, the combination of a number of drawing-dies, a corresponding number of feeding devices, shafts $H' H^2 H^3 H^4$, for operating the feeding devices, friction-wheels $I' I^2 I^3 I^4$, pairs of friction-wheels $J' J^2 J^3 J^4$, shafts carrying the friction-wheels $J' J^2 J^3 J^4$, levers or arms supporting these shafts, and fasteners for securing these levers or arms in different positions, substantially as specified.

8. In a machine for drawing wire, the combination, with a number of drawing-dies and a corresponding number of independent feeding devices, of the die-holders having their peripheries curved from front to rear concentrically, substantially as specified.

9. In a machine for drawing wire, the combination, with a number of drawing-dies and a corresponding number of independent feeding devices, of the die-holders having their peripheries curved from front to rear and being supported in vertically-adjustable brackets, substantially as specified.

10. In a machine for drawing wire, the combination, with a number of drawing-dies and a corresponding number of independent feeding devices, of the die-holders having their peripheries curved from front to rear and being supported in vertically and horizontally adjustable brackets, substantially as specified.

11. In a machine for drawing wire, the combination, with a number of drawing-dies and a corresponding number of independent feeding devices, of the die-holders having their peripheries curved from front to rear and being supported in oscillating brackets.

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Witnesses:
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S. O. EDMONDS.