No. 618,396. Patented Jan. 31, 1899.

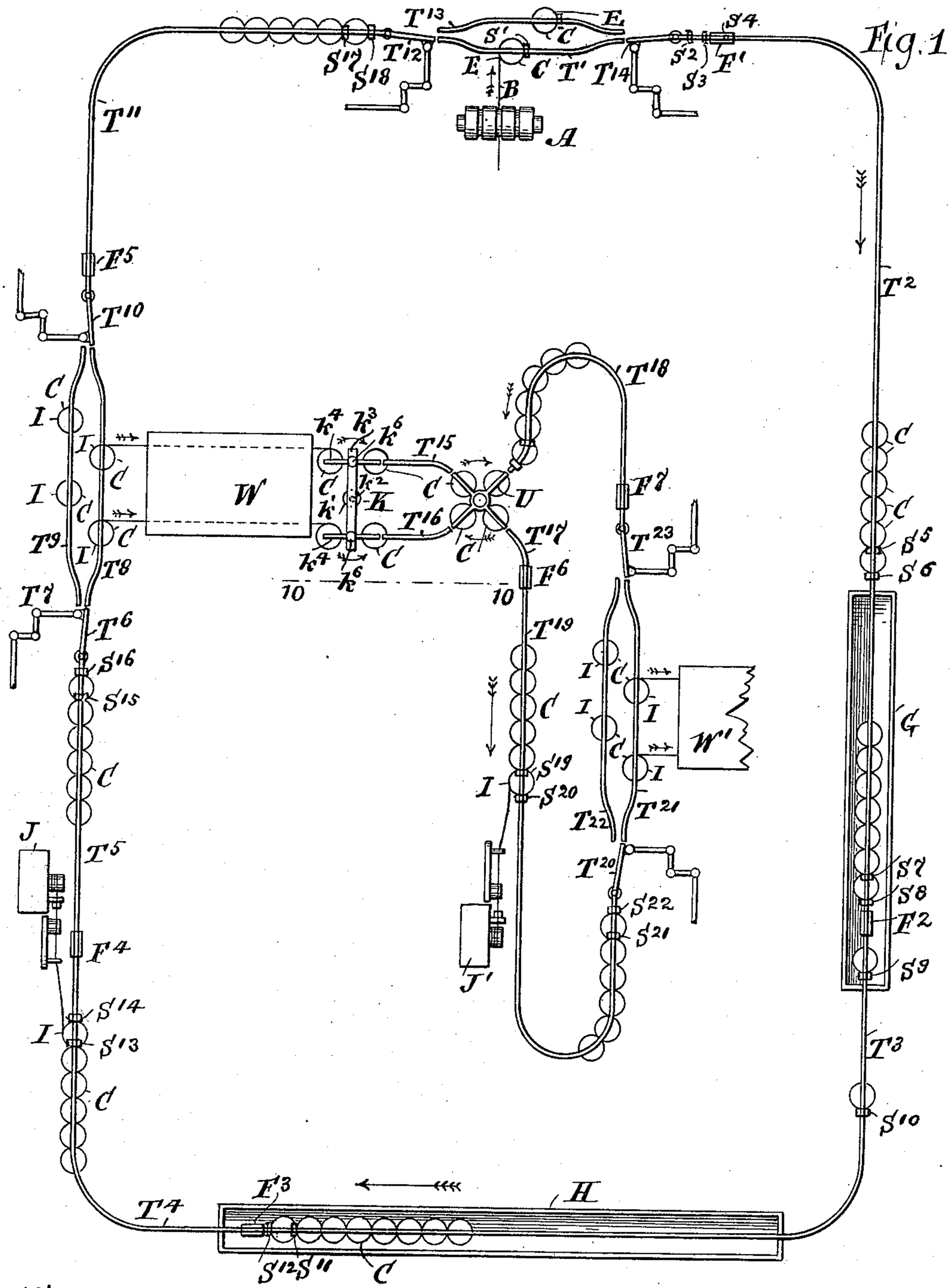
C. A. COWLES.

WIRE MANUFACTURING MACHINERY.

(Application filed June 26, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1



Witnesses
Ernest Hopkinson
D. F. Davies.

Inventor
Charles A. Cowles
by Edwin H. Brown
his attorney

No. 618,396. Patented Jan. 31, 1899.

C. A. COWLES.

WIRE MANUFACTURING MACHINERY.

(Application filed June 26, 1897.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 4

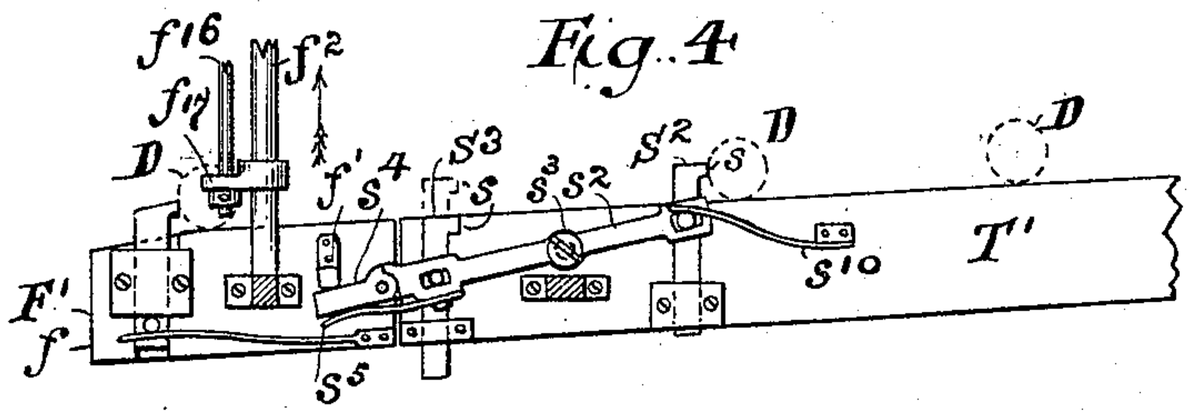


Fig. 2

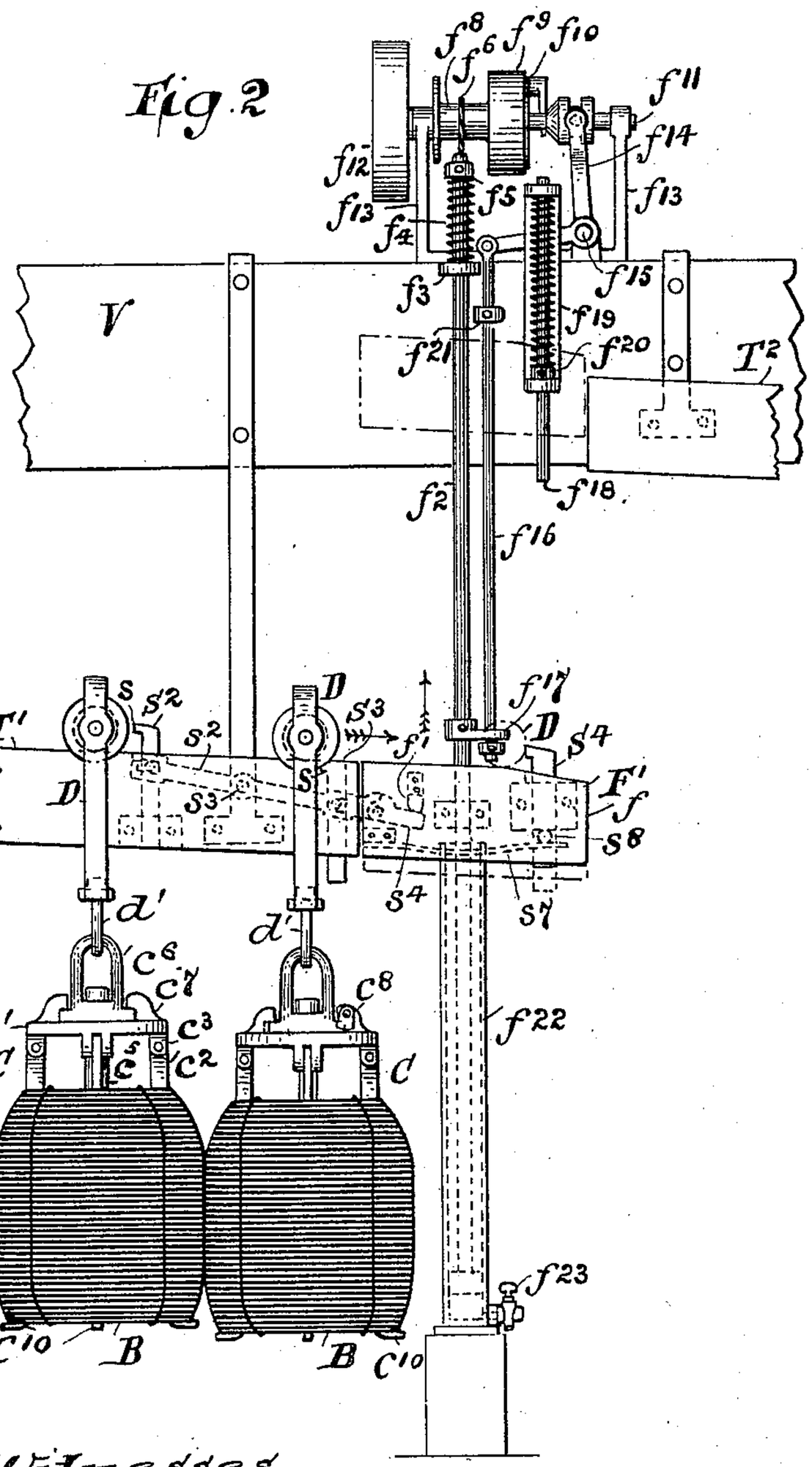
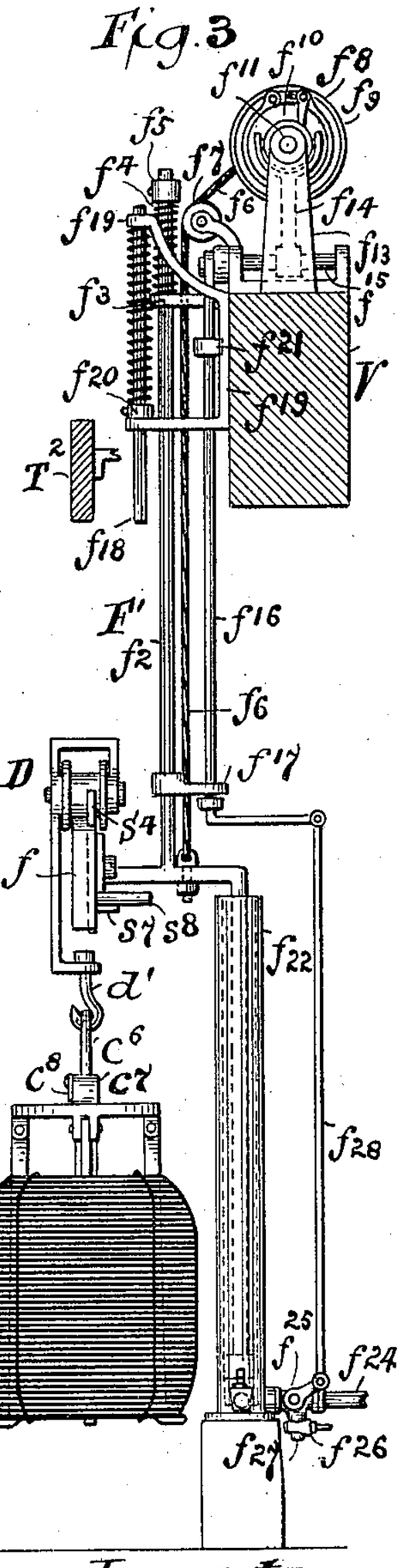


Fig. 3



Witnesses
Ernest Hopkinson
D. H. Davies.

Inventor
Charles A. Cowles
by Edwin H. Brown
his attorney

No. 618,396. Patented Jan. 31, 1899.

C. A. COWLES.

WIRE MANUFACTURING MACHINERY.

(Application filed June 26, 1897.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 5

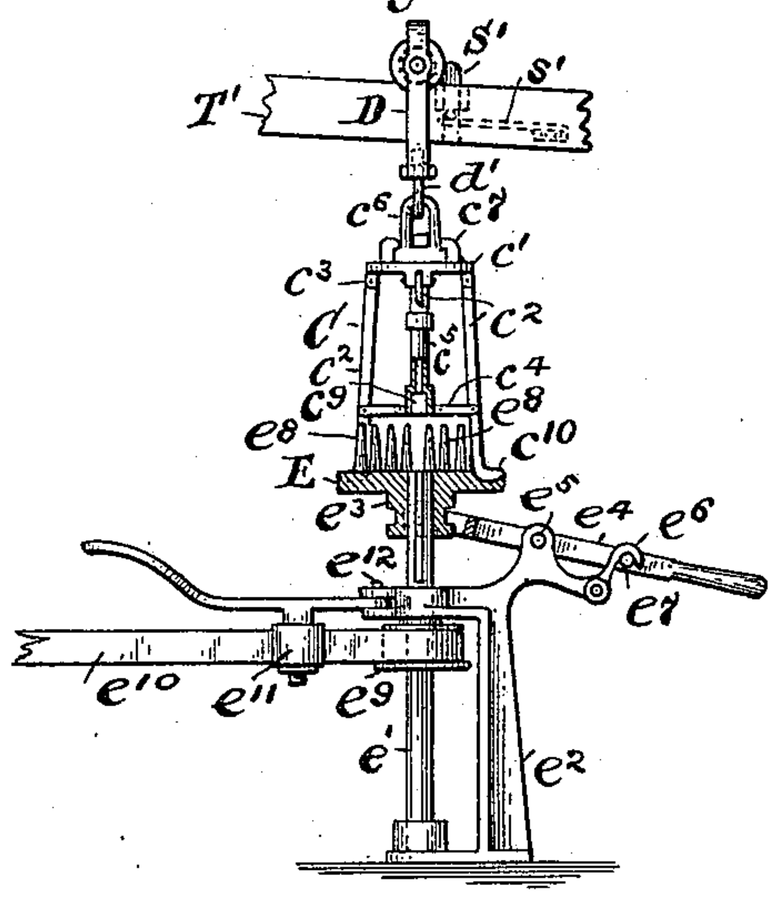


Fig. 9

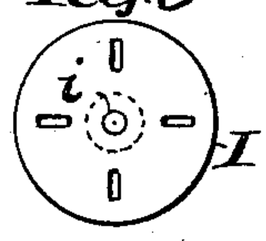


Fig. 8

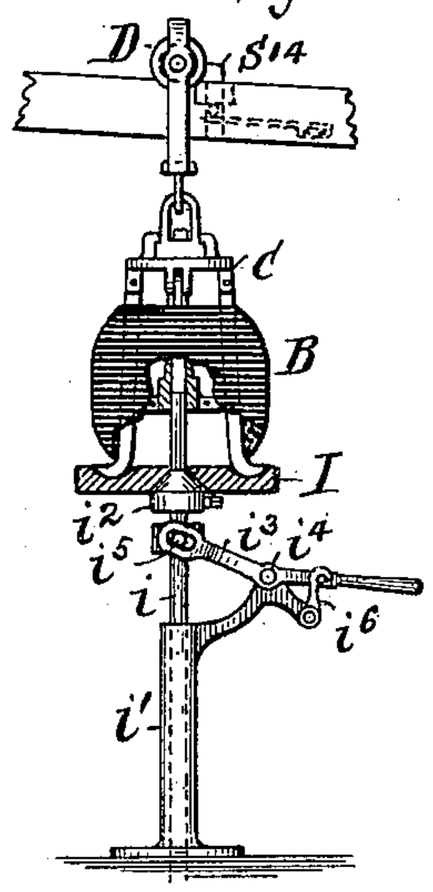


Fig. 6

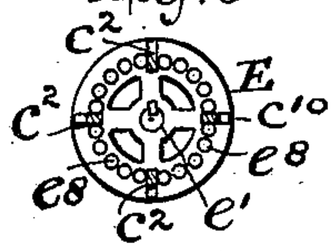


Fig. 7

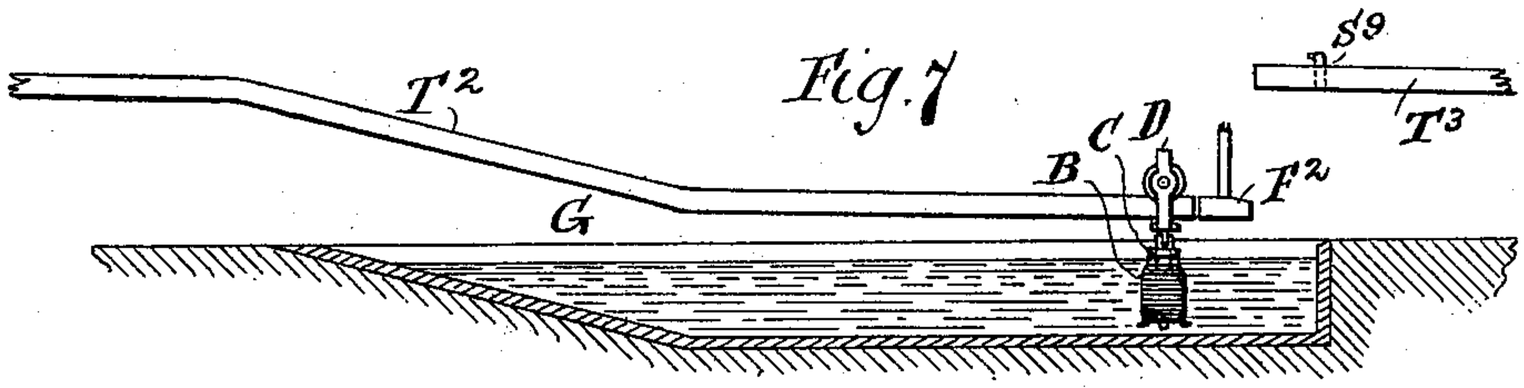
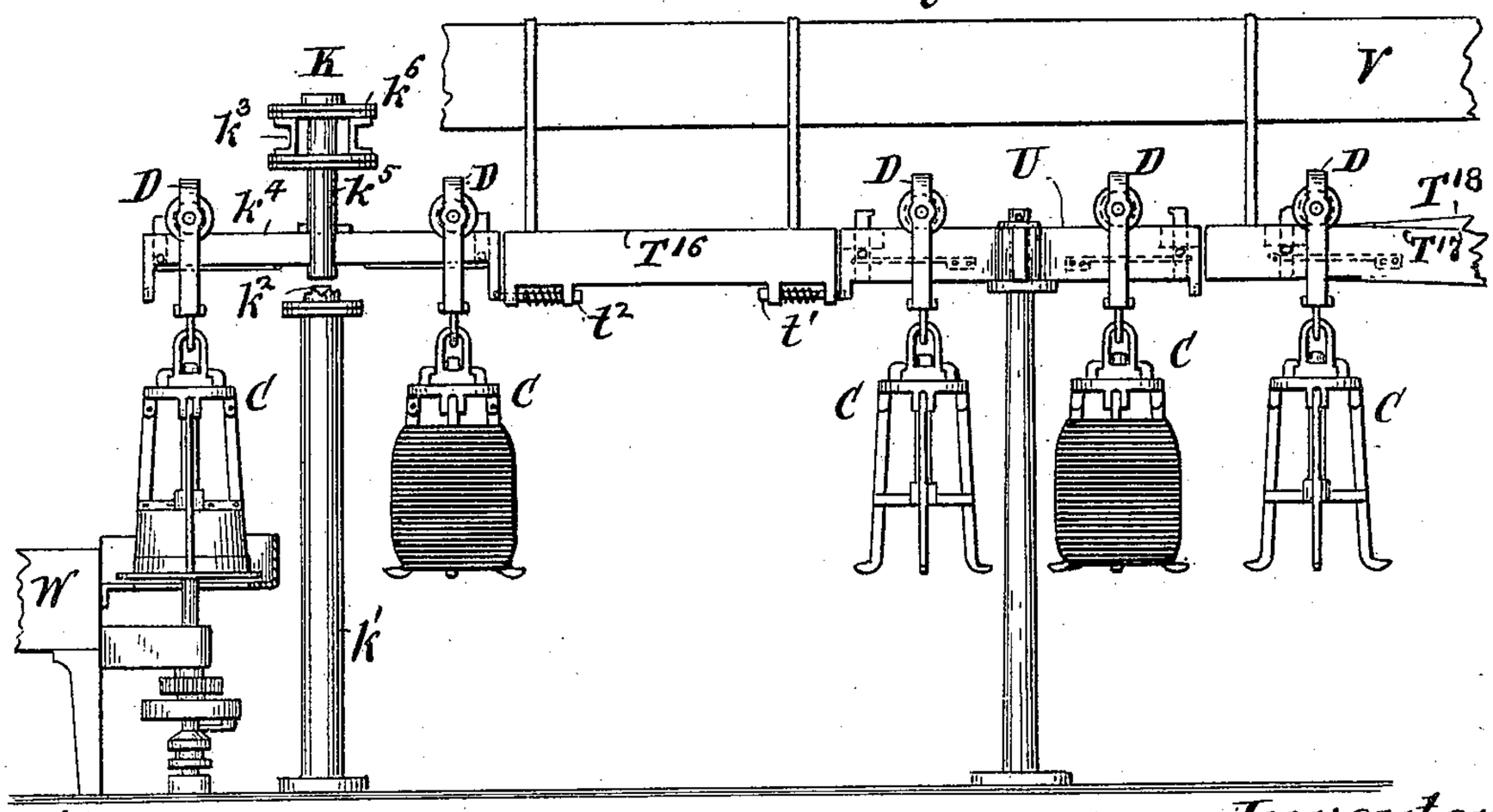


Fig. 10



Witnesses
Ernest Hopkinson
D. A. Davies.

Inventor
Charles A. Cowles
by Edwin H. Brown
his attorney

UNITED STATES PATENT OFFICE.

CHARLES A. COWLES, OF ANSONIA, CONNECTICUT.

WIRE-MANUFACTURING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 618,396, dated January 31, 1899.

Application filed June 26, 1897. Serial No. 642,377. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. COWLES, of Ansonia, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Manufacturing Wire, of which the following is a specification.

I will describe my improvement in detail and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a diagrammatic plan view of apparatus embodying my improvement. Fig. 2 is an elevation of an elevator and certain appurtenant parts. Fig. 3 is an elevation of the parts shown in Fig. 2, but in a plane at right angles to that of said Fig. 2. Fig. 3 also shows some additional parts constituting a modification. Fig. 4 is a rear elevation of parts shown in front elevation in Fig. 2. Fig. 5 is a sectional elevation of a reel designed to receive "coarse-wire" rod, so called because not die-drawn, formed from an ingot. It also shows parts which are to operate with said reel. Fig. 6 is a top view of a reel-support shown also in Fig. 5. Fig. 7 is a sectional elevation of an acid-trough or a hot-water trough and parts for conveying a reel of wire into the same. Fig. 8 is a sectional elevation of a reel and track along which the same may travel, and a support which may be elevated to engage with the bottom of the reel whenever it is desired to unwind wire from the reel—as, for instance, when the wire is to be threaded into dies for drawing or when it is to be unwound from the reel in the process of drawing it down to a finer gage. Fig. 9 is a top view of the support shown in Fig. 8. Fig. 10 is an elevation taken parallel to the dotted line 10 10, Fig. 1.

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

A designates a rolling-mill of any suitable construction.

B designates coarse wire proceeding from the last pass. It is wound upon a reel C, (shown in Fig. 5,) comprising a head c', having legs c^2, pivotally connected to lugs c^3, depending from the head. Near the lower end these legs have rods c^4, pivotally connected to them, the inner of said rods being pivotally connected to a central rod c^5, which is fitted so as to be capable of sliding longitudinally through the head c', its upper end being passed through the base of a swivel-eye c^6 and provided with a head for retaining it in place. The swivel-eye c^6 may be engaged with a hook d', comprised in a trolley D and having a swiveling connection with the trolley, so that it may rotate. This trolley fits a track T', that is downwardly inclined to the right in Fig. 1, this inclination being shown in Fig. 5.

The base of the swivel-eye c^6 is protruded so as to engage with hook-shaped lugs c^7, formed integral with or attached to the top of the head c'. By rotating the swivel-eye in one way it may be engaged with the lugs c^7, so that the central rod c^5 will be incapable of moving longitudinally through the head c'. By turning the eye in the reverse way it may, however, be disengaged from the said lugs, and then the rod c^5 will be capable of moving longitudinally through the head c'. While the rod c^5 is secured against longitudinal movement through the head c', the rods c^4 will serve as braces to hold the legs c^2 in their outermost positions, as they are represented in Fig. 5. Then the reel is in operative condition for receiving and holding wire. It may be collapsed by disengaging the eye c^6 from the lugs c^7, for then the rod c^5 will slide upward through the head c', so as to draw the rods c^4 upward, and consequently swing the legs c^2 inward. Any suitable catch for precluding the eye c^6 from accidentally turning relatively to the lugs c^7 may be provided, if desired. In Fig. 2 a suitable catch c^8 is represented.

The lower end of the central rod c^5 may be made hollow and provided at the lower extremity with a socket c^9. The purpose of such a socket will be made plain hereinafter. The lower ends of the legs c^2 are turned outward to form feet c^{10}, and these are adapted to rest in recesses formed in the upper surface of a support E, which is here (Fig. 5) shown as having engagement by means of a spline with an upright rotary shaft e', journaled in bearings in a frame e^2. The support E is shown as having a hub e^3, that is provided with a circumferential groove into which pro-

ject pins from bifurcate arms formed upon a lever e^4, that is fulcrumed by means of a pin e^5 to the frame e^2.

When a reel C has been moved to a position over the support E, the latter may be raised by means of the lever e^4, so as to engage with the feet c^{10} of the reel in order that rotary motion may be imparted to the reel. After the adjustment of the lever e^4 into the necessary position for raising the support E into engagement with the reel C a hook e^6, pivoted to the frame e^2, may be engaged with a pin e^7 upon the lever to maintain it in this adjustment.

The support e is provided on its upper surface with a number of pins e^8, arranged in a circle, which forms a skeleton cylinder upwardly tapered and externally convex at all points. This frame may include the legs c^2 of the reel c. A convenient way to produce this convexity is to make the pins round, and the upwardly taper of the cylinder may be conveniently secured by tapering the pins themselves upwardly. Owing to these features of construction they will not prevent the lowering of the support after wire shall have been wound around the reel. Their purpose is to take the strain of the coarse-wire rod while it is being wound upon the reel, so as not to subject the reel to this great strain during the beginning of the winding.

Any suitable means may be provided for rotating the shaft e'. As here shown, a belt-pulley e^9 is affixed to said shaft and receives a belt e^{10}. This belt will only serve to rotate the shaft e' when tightened upon the pulley e^9 by means of a belt-tightener e^{11}, consisting of a pulley mounted upon a lever which is fulcrumed by means of a pin e^{12} to the frame e^2.

Wire having been wound upon a reel C while engaged with a support E is, after the disengagement of the support E, carried by the trolley D along the downwardly-inclined track T'. In order to permit it to move along the track T', the attendant will have to remove a stop S', which detained the trolley D during the winding of the wire upon the reel C. This stop, as here shown, consists of a bolt which may project upwardly through the track or be depressed so that its upper surface will be coincident with the top of the track. A spring s' normally elevates it. It may be lowered by either electrical or mechanical means—as, for instance, a cord descending to within reach of an attendant.

By descending the track T' the trolley D will reach an elevator F'. (Shown in Figs. 2, 3, and 4.) Trolleys D, carrying reels C, may pass one after another as fast as desired and may accumulate at the elevator F'. Only one will be able to pass to the elevator at a time. Each one is arrested by means of a stop S^2, which may be like the stop S' and similarly fitted to the track T'. The release of the stop S^2 will elevate a stop S^3, that may be similar to the stops S' S^2 and similarly fitted to the track T'. The stops S^2 S^3 are connected together by a lever s^2, fulcrumed to the track T' by means of a pin s^3, the connection being made in such manner that when one stop is elevated the other will be depressed. Obviously whenever the stop S^2 is depressed a trolley will be permitted to pass beyond it; but as the stop S^3 will then be raised it will arrest the trolley.

The elevator F' comprises a support or car f, which is made in the shape of a piece of track, so that a trolley may run upon it from an adjacent track and from it onto the track to which it is moved. Whenever the elevator support or car f is in position to receive a trolley from the track T' the stop S^3 will be depressed and the stop S^2 raised. This is the relation of the parts represented in Fig. 2. The lever s^2 has an end s^4, which is hinged to the lever by what is known as a "knuckle-joint," or, in other words, so that it may be depressed relatively to the lever, but not swung upward independently thereof. A spring s^5, extending from the main portion of the lever under the hinged end s^4, sustains the hinged end in line with the main portion of the lever, and this spring is so stiff that any downward motion imparted to the hinged end will be transmitted equally to the main part of the lever, unless the lever is restrained from further downward movement, whereupon the hinged end will be moved downward without imparting any movement to the lever. The downward movement of the lever will be limited by a lug s, formed upon the upper end of the stop S^3. A downward motion is imparted to the lever by means of a push-piece f', connected to the elevator support or car f.

As here shown, a rod f^2 extends upwardly from the elevator shaft or car f and passes through a guide f^3, affixed to a beam V, upon which a track T^2 is supported. Above the guide f^3 a spring f^4 surrounds the rod f^2, an adjustable collar f^5 being affixed to the rod above the spring. A cord f^6 is fastened to the lower part of the rod f^2 and passes thence upwardly from a guide-pulley f^7 to a windlass f^8, which comprises one part, f^9, of a clutch f^9 f^{10}, the other part, f^{10}, of said clutch being affixed to rotate with a shaft f^{11}, upon which the windlass is loosely mounted. The shaft f^{11} is constantly rotated by means of a belt applied to a pulley f^{12}, that is affixed to said shaft. Any suitable means may be employed for supporting the shaft—as, for instance, brackets f^{13}. The part f^{10} of the clutch, although engaged to rotate with the shaft f^{11}, is free to move lengthwise of the same for the purpose of rendering the clutch operative or inoperative. As here shown, it is adjustable lengthwise of the shaft f^{11} by means of a lever f^{14} fulcrumed, to one of the brackets f^{13} by means of a pin f^{15}, and connected with a rod f^{16}, that passes down through a collar f^{17}, affixed to the rod f^2 and operating as a tappet.

When the elevator support or car f descends sufficiently far, the collar f^{17} will act as a tappet upon a collar affixed to the lower

end of the rod f^{16}, and it will thereby cause the lever f^{14} to render the clutch f^9 f^{10} operative, whereby the rotary motion of the shaft f^{11} will be transmitted to the windlass f^8 and the cord f^6 will be wound up. Thus the elevator support or car f will be raised to a position indicated by dotted lines in Fig. 2, from which a trolley carried by it may descend to the track T^2.

Assuming the elevator support or car f to be in line with the track T′ at the time of receiving a trolley D, the weight of the trolley will cause a sliding downward movement of the elevator support or car, as indicated by dotted lines in Fig. 2. As during this time the windlass is not supporting the elevator support or car, but is being supported by the spring f^4, resting upon the guide f^3, the spring f^4 permits of the movement of the car just described. This will occur without affecting the main portion of the lever s^2, because of the hinged end s^4 of said lever. This motion of the elevator support or car transmitted through the rod f^2 to the tappet-collar f^{17} will start the windlass and cause the trolley to be elevated.

It will have been observed that the elevator support or car is provided with a stop S^4. This will be like the other stops and raised by a spring s^7, attached to the elevator support or car. When the elevator support or car is raised sufficiently, a pin s^8, extending laterally from the stop S^4, will come in contact with a rod f^{18}, fitted to slide in a bracket f^{19}, attached to the beam V, a spring being coiled around said rod between the upper part of the bracket and a collar f^{20}, affixed to said rod. The stop S^4 will contact with the rod f^{18} before the elevator support or car reaches the level of the track T^2, and thereupon said stop will be depressed and the trolley will run against the end of the track T^2. Consequently as soon as the elevator support or car reaches the level of the track T^2 the trolley will be free to run upon the latter and will pass onto it almost instantaneously. This movement onto the track may be accelerated by giving the adjacent end of the elevator support or car a greater inclination.

The continued upward movement of the elevator support or car will cause the tappet-collar f^{17} to strike a collar f^{21}, affixed to the rod f^{16}, and thereupon the clutch f^9 f^{10} will be rendered inoperative and the windlass will be permitted to lower the elevator support or car. The downward movement of the elevator support or car will be retarded by a dash-pot or equivalent device f^{22}. The rapidity of descent may be regulated by a cock f^{23}.

Whenever the elevator support or car is raised, a spring s^{10} rocks the lever s^2 into such a position that it will depress the stop S^2 and raise the stop S^3 for the purpose of allowing another trolley to pass to a position whence it may be delivered to the elevator support or car after the descent of the latter.

I have not described in detail the form of clutch f^9 f^{10}, as any suitable clutch may be used.

If desired, I may dispense with the windlass and its appurtenances and instead of that employ a compressed-air engine as a substitute for the dash-pot f^{22}. In such case I will connect with it a supply-pipe f^{24} and control the same by means of a three-way cock f^{25}, using a regulating-cock f^{26} for the outlet-nozzle f^{27}, through which air in the engine is discharged. The three-way cock is connected by means of a rod f^{28}, which is connected with the rod f^{16}. The depression of the elevator support or car upon receiving a trolley will effect the opening of the three-way cock f^{25}, so as to permit of the entrance of compressed air into the engine. Thus the elevator will be caused to raise the elevator support or car and trolley. At the proper time the tappet-collar f^{17} will strike the upper collar f^{21} and reverse the three-way cock f^{25}, so as to cut off the supply of compressed air and discharge the contents of the engine into the atmosphere.

The track T^2 extends to a position over an acid-trough G, which may be arranged in the floor. It will be seen by reference to Fig. 7 that the track takes a somewhat sudden dip above the trough. Trolleys traveling along the track will carry reels. Any number of reels of wire may thus be carried into the trough. Any acid suitable for removing rust and cleaning the wire generally may be used. Hand-operated stops S^5 S^6, like the stop S′, may be arranged in this portion of the track to control the delivery of the reels of wire.

An elevator F^2 is arranged adjacent to the track T^2 for carrying up the trolleys and reels of wire one at a time to a track T^3. The elevator may be substantially like the elevator F′, already described, except that instead of being started automatically it may be started by hand, if desired. If the trough G is made sufficiently long, this elevator may be in all respects like the elevator F′, and the stops S^7 S^8 may be constructed and combined together and with the elevator F^2 in the same manner that the stops S^2 S^3 are constructed and combined with each other and the elevator F′.

The track T^3, near the end which receives the trolleys, is provided with a hand-operated stop S^9. By this means each trolley may be so detained as to properly drain off the acid into the trough. When a trolley has been permitted to pass the stop S^9, it will travel along the track T^3 until it reaches another hand-operated stop S^{10}. Here the wire may be showered with water to wash off the acid. By manipulating the stop S^{10} the trolley may be permitted to run along the track T^3 until it is carried into a hot-water trough H, which may in general construction be like the trough G. Any number of trolleys with reels may pass through this trough at the same time; but it will not be necessary for any one of them to dwell.

The track T^3, above the trough H, is provided with two stops S^{11} S^{12}, which will be

preferably operated by the same mechanism as I have shown and described in connection with the stops S^2 S^3.

At the end of the track T^3 is an elevator F^3, which may be constructed and may operate like the elevator F′. It will deliver trolleys carrying reels to a track T^4. Along the track T^4 the trolleys travel until arrested by stops S^{13} S^{14}, which may be manually operated to release trolleys one at a time. While detained by the stop S^{14} a reel may be supported by a table I, supported by a rod *i*, having a sliding connection in a tubular bracket *i′*. (See particularly Figs. 8 and 9.) The table has in its upper surface recesses for the feet of the reel, so that the reel will interlock with the table. The table is not affixed to the rod *i*, but is pivotally connected therewith, being supported upon a conical collar i^2, which is secured by a set-screw or otherwise to the rod in any desired position. The reel may be the same reel C as previously described and the upper end of the rod *i* enters the socket c^5 of the reel.

A lever arrangement similar to the one described in connection with Fig. 5 may be used for adjusting the table I vertically and holding it in its operative position. As here shown, i^3 is a lever, and i^4 a fulcrum, extending from the bracket *i′*. The lever engages with a pin i^5, extending from the rod *i*, and the bracket *i′* has a hook i^6 for engaging the lever. The weight of the reel may be more or less imposed upon the collar i^2 by adjusting the latter vertically upward along the rod *i* and securing it there, as thus more or less weight will be taken from the trolley. The friction generated while the table turns upon the collar may therefore be varied to properly resist the unwinding of the reel. The wire is only intended to be partially unwound from a reel detained by the stop S^{14}, the purpose being simply to unwind enough to thread upon it the dies which are to be employed in a machine for drawing down the wire to a smaller size. A machine J for threading the wire through the dies is shown adjacent to the elevator F^4.

When the wire has been sufficiently unwound, the table I will be lowered and the stop S^{14} depressed, so as to permit the reel, with its trolley, to move onward until it reaches an elevator F^4. This elevator may be automatic, like the elevator F′, already described. Thus each trolley and reel will be delivered to a track T^5. Upon this track trolleys with reels may accumulate and be released one at a time by means of stops S^{15} S^{16}.

Beyond the stop S^{16} is a switch T^6, operated by a lever arrangement T^7, and capable of being adjusted into line with either of two tracks T^8 T^9. Upon the track T^8 two trolleys, with their reels, may be supported while the wire is unwound from the reels to pass through a wire-drawing machine W. If the trolleys are directed to the track T^9, they will be retained until the wire shall have been taken from the reels upon track T^8, whereupon the next wire may be taken from reels supported from the track T^9. The reels while the wire is being taken from them for the wire-drawing machine W will be supported by a table I and appurtenances, as shown in Fig. 8.

The empty reels pass, with their trolleys, from the tracks T^8 T^9 onto a switch T^{10} and thence to an elevator F^5, which may be like the elevator F′, and serves to deliver the empty reels, with their trolleys, upon a track T^{11}, where they will be kept in storage by means of stops S^{17} S^{18}. They may be released one at a time onto a switch T^{12} and delivered thence either onto the track T′ or onto a track T^{13}, the latter being for the purpose of supporting a reel while it takes wire from the rolls A, a reel first being used for this purpose upon the track T′ and then another being used upon the track T^{13}, and so on. A switch T^{14} takes the reels from the tracks T′ T^{13} to the elevator F′.

The wire delivered from the wire-drawing machine W is taken by reels C, supported by an elevator K of the kind shown in an application filed by me on the 23d day of February, 1897. This elevator will, preferably, be a hydraulic elevator. As shown in Fig. 10, it has a cylinder *k′*, a piston or plunger k^2, working vertically in the same, a cross-beam k^3, affixed to the plunger k^2, and two beams k^4, suspended by rods k^5, which are pivotally connected by turn-tables k^6 with the beam k^3. As soon as the reel is filled with wire the elevator K will be raised and the beams k^4 will be rotated to transfer the filled reels to a position in alinement with tracks T^{15} T^{16} and empty reels to a position opposite the wire-drawing machine. It will be seen that the trolleys supporting these reels may travel lengthwise of the beams k^4.

The tracks T^{15} T^{16} extend to a turn-table U, having four track-sections in a cruciform arrangement and adapted to sustain four trolleys with their reels. This may be turned by hand to take filled reels from the tracks T^{15} T^{16} and deliver them to a track T^{17} and also to receive empty reels from a track T^{18} and deliver them to the tracks T^{15} T^{16}.

Bolts t' t^2 will serve to lock the beams k^4 in line with the tracks T^{15} T^{16} and also lock the turn-table U, so that its arms will be in line with the tracks T^{15} T^{16} and with the tracks T^{17} T^{18}. The track T^{17} leads to an elevator F^6, which may be like the elevator F′. It delivers trolleys one at a time to a track T^{19}, where trolleys with their reels filled with wire may accumulate for storage. They will be delivered under control of stops S^{19} S^{20}. The stop S^{20} will detain one at a time in position to be supported by the table I and appurtenances, as shown in Fig. 8, until sufficient wire has been withdrawn for threading it by means of a machine J, through dies for a second reducing-machine.

After having been threaded the trolleys,

with their reels, may accumulate upon the track T^{19} farther on and there be controlled by stops S^{21} S^{22}. Beyond the stop S^{22} is a switch T^{20}, operating in connection with tracks T^{21} T^{22}, which may receive the reels in positions where they will be supported by tables and their appurtenances, as shown in Fig. 8, while their wire is passed from them through a second wire-drawing machine W′, where it is further reduced in diameter.

The empty reels may be taken from the tracks T^{21} T^{22} by a switch T^{23} to an elevator F^7, which may be like the elevator F′, and will deliver the trolleys, with their empty reels, one at a time to the track T^{18}. It will of course have been understood that the tracks have a continuous incline in the direction in which the trolleys have to travel.

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

1. An apparatus for conveying material to different places where it is to be treated, consisting of a track, a support arranged upon said track and extending below the same, means for operating upon said material, and a device arranged adjacent to said track for moving the support vertically to the means which are to operate upon the material, substantially as specified.

2. In an apparatus for conveying material to different places where it is to be treated, consisting of a track, a support arranged on said track and extending below the same, and carrying the material to be treated, said track being inclined toward the place whither the support is desired to be moved, means for operating upon the material carried by the support, and a device arranged adjacent to said track for moving the support vertically to the means for operating upon said material, and also in order that it may be started onward in its course, substantially as specified.

3. An apparatus for moving material to places where it is to be treated, consisting of tracks, a support arranged to travel upon said tracks, upon which the material may be arranged, means for operating on said material, said tracks being inclined for lowering the support to the means, and an elevator located at the inclined end of said tracks for raising said support from the machine to tracks, or directly from some tracks to other tracks, substantially as specified.

4. An apparatus for conveying material to different points to be treated consisting of tracks, a support for traveling on said tracks and carrying the material and a device adjacent to said tracks for raising said support from one track to another, said device comprising a section of track on which said supports might travel, substantially as described.

5. In an apparatus for moving wire to places where it is to be treated, the combination of reels, trolleys with which said reels have a swivel connection, tracks along which said trolleys may be caused to travel, elevators for lowering and raising said trolleys and reels intermediate of different tracks, substantially as specified.

6. In an apparatus for moving wire to places where it is to be treated, the combination of reels, trolleys with which said reels have a swivel connection, a track along which said trolleys may be caused to travel, and rotary supports with which said reels at their lower ends may be engaged, substantially as specified.

7. In an apparatus for moving wire to places where it is to be treated, the combination of reels, trolleys with which said reels have a swivel connection, a track along which said trolleys may be caused to travel, rotary supports with which said reels at their lower ends may be engaged, and means combined with said rotary supports, so that at the will of an attendant the said supports and the reels may be rotated while the trolleys are still upon the tracks, substantially as specified.

8. In an apparatus for moving wire to places where it is to be treated, the combination of reels, trolleys with which said reels have a swivel connection, a track along which said trolleys may be caused to travel, and rotary supports with which said reels at their lower ends may be engaged, said rotary supports having a number of pins for taking the strain of the wire first wound upon the reel, substantially as specified.

9. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may travel, and a tank into which the wire will be carried when the said supports travel along the said track, substantially as specified.

10. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a main track along which said supports may travel, a switch at one end of said track, and duplicate or storage tracks, into line with either of which said switch may be set for the purpose of establishing communication between it and the main track, substantially as specified.

11. In an apparatus for moving wire to places where it is to be treated, the combination of reels for the wire, trolleys with which said reels have a swivel connection, a track along which said trolleys may be caused to travel, and a wire-drawing machine arranged adjacent to a part of said track, so that it may take wire from the reels while the trolleys supporting such reels are upon said track, substantially as specified.

12. In an apparatus for moving wire to places where it is to be treated, the combination of reels for the wire, trolleys with which said reels have a swivel connection, a track along which said trolleys may be caused to travel, a stop on said track for arresting one of the trolleys and its reel, and a machine arranged adjacent to said stop and track for taking the wire from a reel and threading it through dies, substantially as specified.

13. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may be caused to travel, stops, and means whereby the stops are connected in such a manner that when one is raised another will be depressed, so that one of a number of trolleys may be allowed to pass at a time along the track, substantially as specified.

14. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may be caused to travel, stops S^2, S^3, a lever s^2, a spring s^{10} and an elevator F', substantially as specified.

15. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may be caused to travel, stops S^2, S^3, and a lever s^2 having a yielding nose-piece s^4, s^5, substantially as specified.

16. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, tracks along which said supports may be caused to travel, and a turn-table, as U, to enable said supports to be transferred from one track to another, substantially as specified.

17. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, tracks along which said supports may be caused to travel, and a combined elevator and turn-table, substantially as specified.

18. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, tracks along which said supports may be caused to travel, and a combined elevator and turn-table consisting of a main bar and two cross-bars for sustaining the said supports, substantially as specified.

19. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may be caused to travel, an elevator having a carriage or part normally in alinement with said track, and comprising hoisting mechanism consisting of a rotary shaft, a loosely-mounted windlass and a clutch, and means whereby the windlass will be clutched to the shaft whenever the said carriage or part of the elevator receives one of the said supports for material to be treated, substantially as specified.

20. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may be caused to travel, an elevator having a carriage or part normally in alinement with said track, and comprising hoisting mechanism consisting of a rotary shaft, a loosely-mounted windlass and a clutch, and means comprising a rod and tappets whereby the windlass will be clutched to the shaft whenever the said carriage or part of the elevator receives one of the said supports for material to be treated, substantially as specified.

21. In an apparatus for moving wire to places where it is to be treated, the combination of supports for the wire, a track along which said supports may travel, an elevator having a carriage or part normally sustained in a yielding manner in alinement with said track, and comprising hoisting mechanism consisting of a rotary shaft, a loosely-mounted windlass and a clutch, and means whereby the windlass will be clutched to the shaft whenever the said carriage or part of the elevator receives one of the said supports for material to be treated, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES A. COWLES.

Witnesses:
ERNEST HOPKINSON,
ANTHONY GREF.