

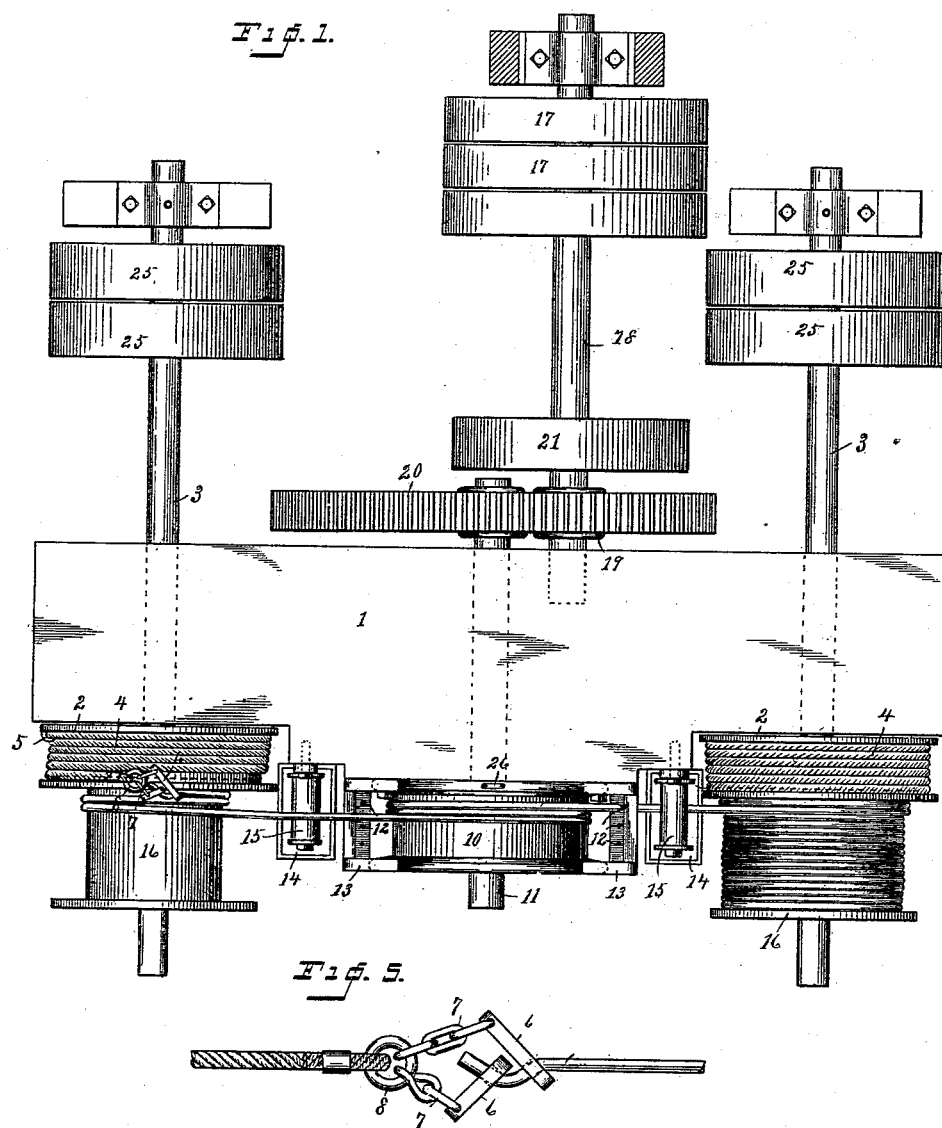
(No Model.)

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C. S. MORSE.  
MACHINE FOR DRAWING WIRE.

No. 420,165.

Patented Jan. 28, 1890.



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Arley S. Munson.

INVENTOR

Charles S. Morse  
By J. M. Wooster  
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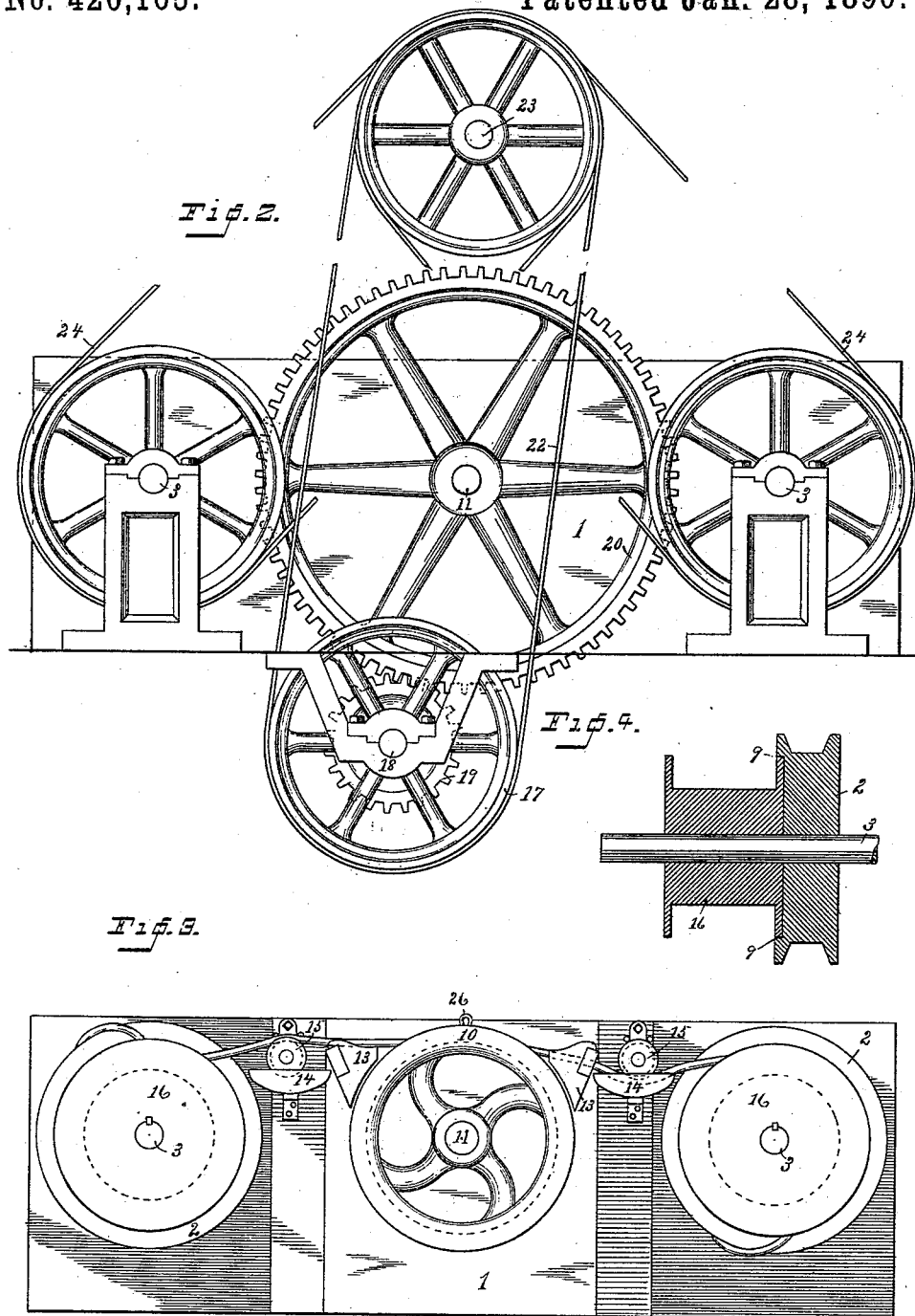
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# UNITED STATES PATENT OFFICE.

CHARLES S. MORSE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE  
ALUMINUM BRASS AND BRONZE COMPANY, OF SAME PLACE.

## MACHINE FOR DRAWING WIRE.

SPECIFICATION forming part of Letters Patent No. 420,165, dated January 28, 1890.

Application filed August 28, 1889. Serial No. 322,191. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES S. MORSE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Drawing Wire; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to produce a novel machine for drawing wire which shall be simple and compact, and which shall be adapted to produce thousand-pound reels of wire in a single piece that is free from joints. It is very important for many purposes, notably for electrical conductors, to get the wire in as long lengths as possible. Heretofore long lengths of wire—for example, thousand-pound reels—have been made by joining the ends of a number of shorter lengths. The joints, however, no matter how they may be made, are seriously objectionable in electrical conductors. It is of course well understood that the ordinary wire used for electrical conductors is made upon the wire-drawing benches forming part of the equipment of all brass and copper mills. These drawing-benches fully met the requirements of the trade until the recent demand for long lengths of copper wire for electrical conductors sprung up.

My invention enables me to produce wire in as long lengths as can be handled; and it consists in the special construction and combination of parts, which I will now describe, referring by numbers to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved drawing-machine complete; Fig. 2, a rear end elevation showing also the upper counter-shaft; Fig. 3, a front end elevation; Fig. 4, a cross-section of one of the drums, illustrating the manner in which one of the heads of the reel is socketed therein; and Fig. 5 is a detail view on an enlarged scale, illustrating the gripping device by which the end of the wire is held.

1 denotes the frame-work of the machine,

which may be of any suitable or preferred form, the special shape thereof being of no consequence whatever, so far as the principles of my invention are concerned, it being simply necessary to provide solid, heavy frame-work, as the machine is a large one and the parts are heavy.

The essential elements of the machine are drums 2 on opposite sides of the machine, carried by shafts 3, which I term "drawing-in" or "starting" drums. These drums are rigidly secured to their respective shafts and are of sufficient width to accommodate several coils of a wire rope or chain 4, said coils lying close together and the inner ends thereof being connected to the respective drums in any suitable manner, as by means of an eye 5. At the outer end of each of the wire ropes is a gripping device consisting, essentially, of two bars 6, each provided with an opening, through which the end of the wire is passed, and each flexibly connected to the end of the wire rope in any suitable manner—as, for example, by links 7 and a ring 8. It will of course be understood that any suitable flexible drawing-in device may be substituted for the wire rope or chain referred to. In the outer face of each of these drums is a socket 9, the purpose of which I will presently explain. Intermediate between drums 2 is a drum 10, carried by a shaft 11, which I term the "drawing-drum." On opposite sides of this drum are series of dies 12, which may be of any suitable or preferred construction, and are held by carriers 13, rigidly secured to the frame-work, and just outside of each series of dies is a trough 14 for oil, each trough having fixed over it a roller 15, under which the wire is passed in the act of drawing, and over which it is passed in the act of winding. (See opposite sides of Fig. 3.)

16 denotes reels, ordinarily made of wood and of suitable size to carry the desired amount of wire, these reels being the ones upon which the wire is shipped for market. In use the inner heads of the reels just enter sockets 9 in drums 2, so that they are fully protected in winding. Motion is imparted to shafts 3 and 11 in any suitable manner. In the present instance the main shaft (not shown) is supposed to be under the

floor and to communicate motion by belts (not shown) running over pulleys 17 on shaft 18, the inner pulley being fast and the two outer ones loose, and one of the belts being straight and the other crossed, so as to provide for turning the machine in either direction. At the inner end of shaft 18 is a pinion 19, which meshes with a gear 20 on shaft 11, communicating motion thereto.

21 is a pulley on shaft 18, which communicates motion by means of a belt 22 (see Fig. 2) to an upper counter-shaft 23. Belts 24, running over pulleys on the upper counter-shaft, communicate motion to shafts 3 by means of pulleys 25 on said shafts, it being understood, of course, that one of said pulleys is tight and the other loose, and that the belts are necessarily crossed, so as to cause shafts 3 to rotate in the same direction as shaft 11, which is of course necessary in the act of drawing, reeling, and unreeling a length of wire.

The operation of the entire machine is as follows: As seen in Fig. 1, the length of wire upon the right reel is being drawn through one of the right dies by the drawing-drum and is being wound on the reel at the left. In starting, the operation would be as follows: Suppose that a full reel of wire to be drawn is placed upon the right shaft 3. The operator would first take hold of the left gripping device and connect it in any suitable manner with the drawing-drum—as, for instance, by catching the ring of the gripping device over the hook 26 in the periphery of the drawing-drum. The drawing-drum would then be rotated toward the right until as many coils of the left wire rope was wound about the winding-drum as it was desired to have coils of wire wound about said drum in the act of drawing. Having placed sufficient coils of the wire rope about the drawing-drum, as shown in the drawings, the end of the wire, which requires, of course, to be suitably reduced, so that it will pass through the die, is connected to the gripping device. Any suitable device may be used for this purpose, although I preferably use the one illustrated in the drawings, which consists, essentially, of bars, through which the wire is passed, and links connected to the bars and to the end of the wire rope. It will be seen that as tension is placed upon the wire rope the two bars will be caused to grip the end of the wire firmly, so that it is impossible for it to slip out, the end of the wire being bent slightly, as shown in Fig. 5. Having engaged the end of the wire, which has been previously passed through the die, with the gripping device, the machine is ready for operation. The left starting-drum and the winding-drum are then rotated toward the left, leaving the right starting-drum to be turned in the same direction as the wire is drawn therefrom, it being of course understood that when wire is being drawn from either reel the belt running to the shaft which carries that

reel is passing over the loose pulley thereon, leaving the shaft perfectly free. I have not shown a brake for the reels, although a brake is frequently required for certain grades of wire, any ordinary simple brake being adapted to serve the purpose. As soon as the machine is started toward the left, the first operation is to wind the left wire rope upon the left starting-drum, as clearly shown in Fig. 1. As the wire rope is drawn off from the drawing-drum, it follows that the wire from the coil must be drawn through the die and as many coils thereof wound about the drawing-drum as there had been coils of the wire rope previously wound about it, thus making it impossible for the wire to slip during the operation of drawing. It will be noticed that the special construction of the gripping device is such that it will curve about the periphery of the drawing-drum or either of the starting-drums. When all of the wire rope has been rewound upon the left starting-drum, it will sometimes be found desirable to let a single coil of wire wind about it also. This, however, depends entirely upon the judgment of the operator, who is simply required to turn the wire down upon the reel and start it to winding thereon, as indicated at the left in Fig. 1. From this time onward the machine takes care of itself until the entire length of wire upon the right reel has been drawn through the die and wound upon the left reel, it being understood, of course, that the drawing action upon the wire is performed entirely by the drawing-drum, about which the wire is passed a sufficient number of times so that it cannot possibly slip thereon. It will be noticed that no fastening devices are required to secure the reels to shafts 3, the wire simply running off from the starting-drums and upon the reels. This is an important feature, as it saves considerable time and trouble in use and saves expense in building the machine. This machine in practice is adapted to take wire in the form of inch rods and to reduce it to any required diameter. In drawing from right to left, as in Fig. 1, the wire before entering the die is passed under the right roller 15 and through the oil in trough 14. After leaving the drawing-roller it passes over the left die and over the left roller 15, and is then wound upon the left reel, as clearly shown. When the entire length of wire upon the right reel has been unwound therefrom, the right wire rope 4 will follow it until the bars 6 of the right gripping device have passed through the oil-trough and are in contact with the face of the right die. As the inner end of the outer bar is drawn in contact with the face of the die, the bar is forced inward, engages the other bar, and forces that inward also, until both bars release their hold upon the end of the wire and allow it to be drawn through the die. The features of the gripping device which allow it to curve about the drum and to release the wire when the end of the piece is reached are

of considerable value in practice, as they avoid all irregular winding of the wire in use and render the action of the machine certain, so that little attention is required;

5 and, furthermore, they enable me to draw the wire clear down to the end of the piece, thus avoiding waste at the end. The operation of reducing a piece of wire to the desired size consists then simply in passing the entire  
10 length of wire backward and forward through a new die each time from one reel to the other, the drawing-drum acting to pull it through the die. As soon as the entire length of wire has been wound upon the left drum,  
15 the right gripping device is connected to hook 26, and a number of coils of the right wire rope wound about the drawing-drum. The end of the wire, having been properly reduced in any suitable manner, is then passed  
20 through the oil-trough, under roller 15, and through one of the dies at the left, and is then connected to the right gripping device and the machine started in the opposite direction to wind the entire length of wire upon  
25 the right reel, the wire this time passing over the right die and over the right roller 15.

It will of course be understood that the details of construction may be varied to an almost unlimited extent without departing  
30 from the principles of my invention.

I claim—

1. The combination, in a wire-drawing machine, of two shafts adapted to carry reels, means, substantially as described and shown,  
35 for rotating said shafts alternately, an oil-trough and a die through which the wire passes, and an intermediate drawing-drum around which the wire is passed a number of times, and which acts to draw the wire from a  
40 reel upon one of the shafts through the oil-trough and die, after which it is wound upon the other shaft.

2. The combination, with shafts 3, adapted to carry reels and having drums 2 rigidly  
45 secured thereto, suitable means for rotating said shafts alternately, and wire ropes adapted to be wound on said drums, the inner ends of said ropes being connected to the drums, of a suitable die and an intermediate drawing-  
50 drum, around which the wire to be drawn is passed, the end thereof being connected to one of the wire ropes, said winding-drum acting to draw the wire from one reel through the die, after which it is wound upon the other  
55 reel.

3. In a machine of the class described, the combination, with a starting-drum 2, having a socket in its outer face, a shaft for said drum, means for rotating said shaft, and a  
60 wire rope connected thereto and adapted to be wound thereon, of a die and a drawing-drum having a hook to which the wire rope is connected to wind the latter about the drum when turned in one direction, and which  
65 acts, when rotated in the opposite direction and the wire connected to the wire rope, to

draw the wire through the die, the wire rope being rewound upon the drum and the drawn wire being wound upon the reel.

4. In a wire-drawing machine, the combination, with an intermediate drawing-drum  
70 and a die, of a drawing-in or starting device consisting of a rotating drum, a wire rope, the inner end of which is connected to said drum, and the outer end of which is provided  
75 with a gripping device to engage the wire to be drawn.

5. The combination of an intermediate drawing-roller and a die with a shaft 2, means for imparting rotation thereto, a starting-drum  
80 rigidly secured to said shaft, a wire rope, one end of which is connected to said drum and the other provided with a gripping device, the outer face of said drum being provided with a socket 9, adapted to receive the head  
85 of a reel, so that after the wire has been gripped and the wire rope wound upon the drum the wire as it is drawn will be wound upon the reel.

6. In a wire-drawing machine, a gripping  
90 device consisting of a pair of bars, one lying outside of the other and each provided with transverse openings, through which the wire is passed, and links connected to the outer ends of said bars, and a suitable drawing-in  
95 device.

7. The combination, with two shafts adapted to carry reels and having drums secured thereto and wire ropes upon said drums, one end of each being connected to its respective  
100 drum and the other provided with a gripping device, of an intermediate winding-drum and dies and oil-troughs on opposite sides thereof, so that a length of wire may be reduced to size by drawing it backward and forward  
105 through the dies from one reel to the other, the reel upon one shaft acting to wind the wire as it is unwound from the other.

8. In a wire-drawing machine, the combination, with a drawing-drum and oil-troughs  
110 and series of dies on opposite sides thereof, of shafts on opposite sides of said drum, each of which is adapted to carry a reel, so that wire may be reduced to size by drawing backward and forward through the dies from one reel  
115 to the other.

9. The combination, with a drawing-drum and oil-troughs and series of dies on opposite sides thereof, of shafts on opposite sides of said drum, each of which carries a drum 2, having a recess in its face adapted to receive the head of a reel, and a wire rope, one end of which is connected to its drum and the other provided with a gripping device, all operating as described, and for the purpose set forth.  
125 In testimony whereof I affix my signature in presence of two witnesses.

CHARLES S. MORSE.

Witnesses:

A. M. WOOSTER,  
ARLEY I. MUNSON.