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No. 849,858. PATENTED APR. 9, 1907.

W. SCHWARZ.

METALLIC HOSE WINDING MACHINE.

APPLICATION FILED JAN. 30, 1905.

2 SHEETS—SHEET 1.

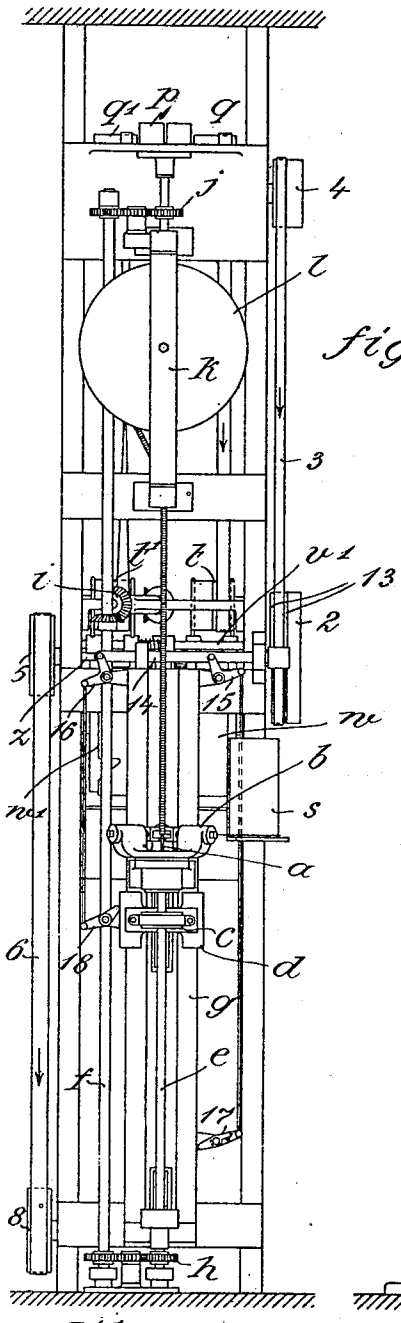


fig. 1.

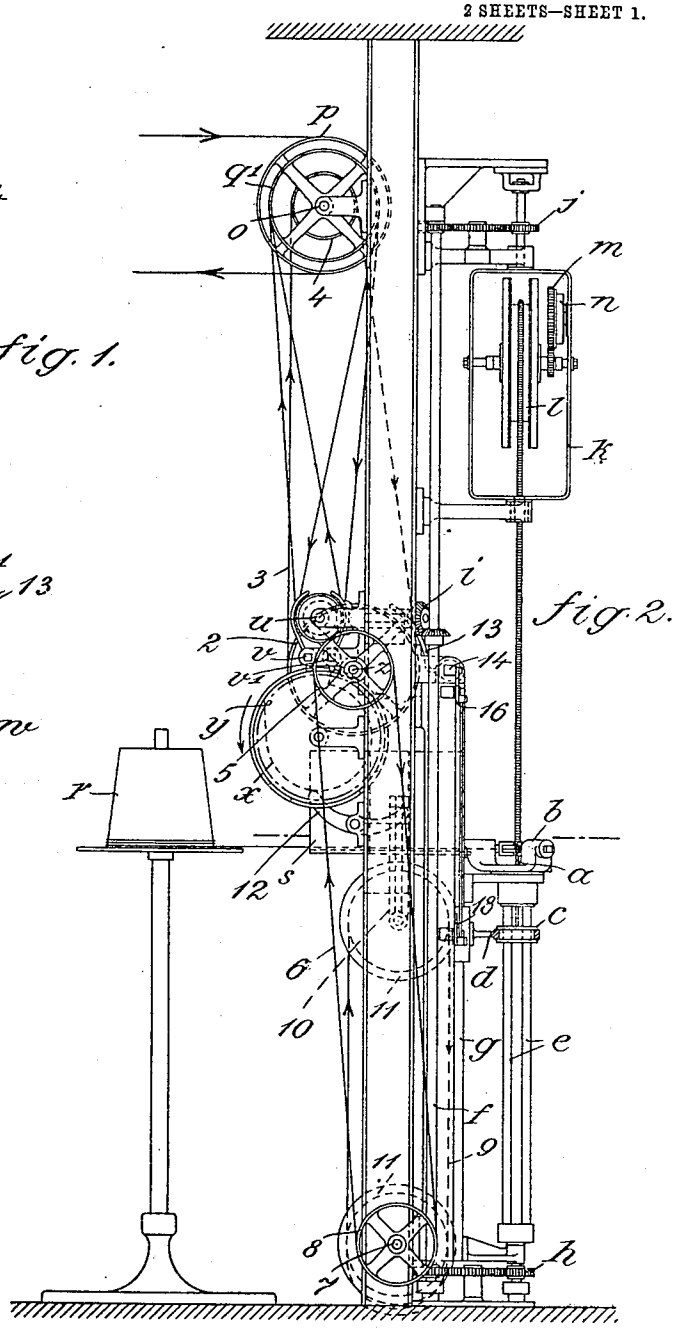


fig. 2.

Witnesses.

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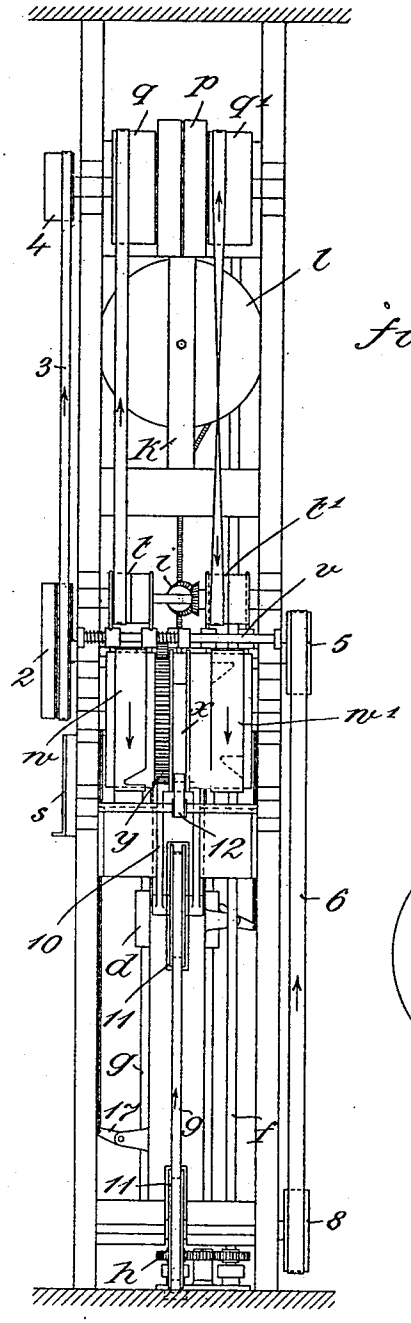
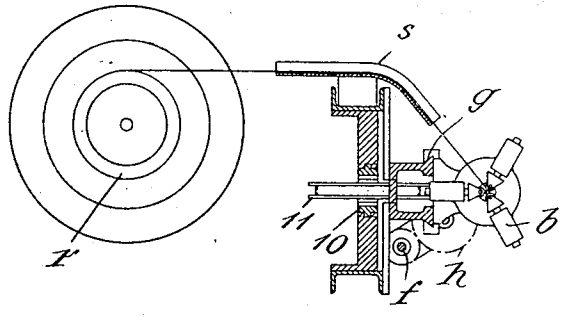


fig. 3.

fig. 4.



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UNITED STATES PATENT OFFICE.

WILHELM SCHWARZ, OF PFORZHEIM, GERMANY, ASSIGNOR TO HEINRICH WITZENMANN, OF PFORZHEIM, GERMANY.

METALLIC-HOSE-WINDING MACHINE.

No. 849,858. Specification of Letters Patent. Patented April 9, 1907.

Application filed January 30, 1905. Serial No. 243,447.

To all whom it may concern:

Be it known that I, WILHELM SCHWARZ, engineer, a subject of the Grand Duke of Baden, residing at Zähringer Allee, Pforzheim, Baden, German Empire, have invented new and useful Improvements in Metallic-Hose-Winding Machines, of which the following is a specification.

According to my invention a special driving-gear is employed, which remains idle during the actual working of the machine, but which, on completion of a definite length of hose, is brought into operation by a part connected with the winding-spindle, whereby a reversing-gear is actuated, which first stops the machine and then reverses it. In this manner the spindle is retracted and withdrawn from the finished length of hose.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation, Fig. 2 a side elevation, Fig. 3 a rear elevation, and Fig. 4 a horizontal section, of the machine.

The band of given cross-section, which is to be wound to form a hose, is taken from the reel *r* and passes over a suitable guide *s* to the winding-spindle *a*, onto which it is pressed by the rollers of the winding-head *b* on rotation of the said spindle. The bottom of the latter is secured to a disk *c*, which rotates in a vertically-traveling slide *d* and can be turned by two vertical rods *e*, passing through the disk *c*, which disk can reciprocate on the rods. The slide *d* travels on the vertical guide-bars *g*, and its weight is equalized by a suitable counterweight. (Not shown in the drawings.) On rotation of the disk *c* by the rods *e* the spindle *a* revolves likewise, and through the rolling or winding up of the band at an angle corresponding to the width thereof the spindle is drawn upward by the hose in the course of formation. The rods *e* are secured at both ends to a central pin, the bottom pin being rotated by the toothed gearing *h*, driven by the vertical shaft *f*. At the top end of the latter is a similar toothed gearing *j*, connecting the spindle with the winding apparatus, which thus rotates uniformly with the spindle *a*, rendering distortion or twisting of the finished hose impossible. This winding apparatus consists of a drum *l*, mounted in horizontal bearings in a frame *k*, turning on a vertical axis. By reason of toothed gearing *m* and a barrel *n*, containing a spring, the drum *l* has the tendency always to turn in the direction necessary for winding up the hose. The size and strength of the spring in the barrel *n* are so selected that on completion of the hose the tension of the spring is practically exhausted. In winding the hose off the drum *l* the barrel *n* is wound up again. The shaft *f* may be driven from the countershaft *o*, which in its turn is driven by the pulley *p* and carries also two other belt-pulleys *q* and *q'*, which, by means of open and crossed belts, transmit the motion to the fast and loose pulleys *t t'*, mounted on the shaft *u*. The rotations of the latter are transmitted to the vertical shaft *f* by means of bevel-gearings.

By suitable shifting of the belts of the pulleys *q t* and *q' t'* the winding apparatus can be stopped in its advance motion and then caused to rotate in the reverse direction and then this procedure reversed again. For this purpose the belt-forks are mounted on bars *v v'*, of prismatic cross-section, slid horizontally by grooved cams *w w'*, which are only turned when a change of motion is desired. The cams are driven by means of toothed gearing *y*, driven by the shaft *z*, on the one end of which are mounted a fast and a loose pulley 2, driven by a belt 3, passing around a pulley 4, mounted on the shaft *o*. At the other end of the shaft *z* is a pulley 5, which by means of the belt 6 periodically drives the pulley 8, mounted on the shaft 7 at the bottom of the machine. The slide *d*, already referred to, is secured to a belt 9, the bottom part of which passes over a pulley 11, mounted on the shaft 7, while the top part passes over a pulley 11, mounted in a vertically-movable frame 10. Ordinarily the belt 9 is so loose that the slide *d* can be readily drawn upward by the spindle *a*. The frame 10, however, is acted upon by a lever 12, one end of which engages in a groove or recess in the cam *x*, connected to the cam *w'*, whereby on rotation of the cam *x* the lever lifts the frame 10, and thus stretches the belt 9. The fork 13 for the belt 3 is mounted on a horizontal bar 14, connected by bell-lever gear 15 16 with the counterweighted reversing-levers 17 18, which project into the path of the slide *d*.

Normally during working the belt 9 is loose, so that the slide *d* can move freely in the upward direction and the cams *w w'* and

shaft *z* remain at rest. When the slide *d* attains its highest position, in which the spindle *a* is fully wound, it strikes against the lever 18, which by means of the bell-lever 16 moves the bar 14 in such manner that the fork 13 throws the belt 3 from the loose onto the fast pulley 2. In this manner the cam-disks *w w'* are set in rotation, whereby the belt-shifting rods *v v'* are actuated and the gear *q t q' t'* thus reversed. The winding apparatus will thus first stop, whereupon the reverse motion commences. The pulleys 5 8 and the lower pulley 11 rotate on the belt 3, slipping onto the fast pulley 2; but the belt 9 itself does not at first rotate, since the lever 12 has not yet left the groove in the cam *x*, so that the upper pulley 11 still occupies its lowermost position. On rotation of the cam-disks *w w'* in the moment in which they bring about reversal of the machine the raised part of the cam *x* arrives at the lever 12, so that the latter is caused to swing out and lift the frame 10. The result of this is that the upper pulley 11 is raised and the belt 9 stretched. Owing to the friction, the belt will now be driven by the lower pulley 11 and the slide *d* drawn downward, so that the spindle *a* will be drawn out of the hose, loosened through the backward rotation. On completion of this operation the cam-disks *w w'* will have turned so far that they again draw back the rods *v v'*, whereby the machine is again stopped and then driven in the forward direction. During the downward motion the slide *d* will have engaged the lever 17 from above and so turned it that actuation of the bell-lever 15 cannot take place. On the subsequent upward motion of the slide, by reason of forward driving of the machine, the slide strikes the lever 17 from below, so that the latter now draws upon the bell-lever 15 and the belt 3 is again brought onto the loose pulley 2. The reversing mechanisms thus come to rest again and the machine now works in the forward direction.

The above-described arrangement has the advantage that the machine can be built vertically, as shown. Prior metallic-hose-winding machines could only be constructed on the horizontal system, the disadvantage of which is that the machines require a great amount of space. The new machine, on the contrary, occupies but very little room despite its high capacity. This is a point of much importance in large factories, where a number of such machines are set up one beside the other. Another advantage is that a larger number of machines than hitherto can be placed under the charge of a single attendant.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a metallic-hose-winding machine having a winding-spindle, in combination, a shaft; two pairs of fast and loose belt-pulleys mounted thereon; belt-shifting gear for the said pulleys; two cams for actuating the said belt-shifting gear; means, normally idle, actuating the said cams; and means connected with the winding-spindle bringing the said cam-actuating means into operation on completion of a length of hose, whereby the cams are actuated and shift the one belt onto the loose pulley of the one pulley pair, and the other belt onto the fast pulley of the other pulley pair, thus first stopping the machine and then reversing its motion, substantially as described.

2. In a metallic-hose-making machine having a winding-spindle, in combination, a shaft; two pairs of fast and loose belt-pulleys mounted thereon; belt-shifting gear for the said pulleys; two cams for actuating the said belt-shifting gear; a shaft, normally idle, actuating the cams; fast and loose pulleys mounted thereon; a traveling device carrying the winding-spindle; a pivotal lever extending into the path of travel of the said device; a belt-shifting gear for the fast and loose pulleys of the cam-actuating shaft; and lever mechanism connecting the said pivotal lever with the said latter belt-shifting gear; whereby on the spindle-carrying device striking the said pivotal lever, the said cam-actuating shaft is brought into operation and actuates the cams for the purpose of stopping and then reversing the motion of the machine, substantially as described.

3. In a metallic-hose-making machine having a winding-spindle, in combination, a shaft; two pairs of fast and loose belt-pulleys mounted thereon; belt-shifting gear for the said pulleys; two cams for actuating the said belt-shifting gear; a shaft, normally idle, actuating the cams; fast and loose pulleys mounted thereon; a traveling device carrying the winding-spindle; two pivotal levers extending into the path of travel of the said device on opposite sides thereof; a belt-shifting gear for the fast and loose pulleys of the said cam-actuating shaft; and two sets of lever mechanism connecting the said pivotal levers with the said latter belt-shifting gear; whereby on the spindle-carrying device striking the one said pivotal lever, the said cam-actuating shaft is brought into operation, and on striking the other said pivotal lever brings the said shaft out of operation substantially as and for the purpose described.

4. In a metallic-hose-making machine having a winding-spindle, in combination, a shaft; two pairs of fast and loose belt-pulleys mounted thereon; belt-shifting gear for the said pulleys; two cams for actuating the said belt-shifting gear; a shaft, normally idle, actuating the cams; fast and loose pulleys mounted thereon; a traveling device carrying the winding-spindle; two pivotal levers extending into the path of travel of the said

device on opposite sides thereof; a belt-shifting gear for the fast and loose pulleys of the said cam-actuating shaft; lever mechanisms connecting each of the said pivotal levers with the said latter belt-shifting gear; a belt attached to the said spindle-carrying device; two pulleys carrying the said belt; means actuated by the said cam-actuating shaft for separating the two said latter pulleys on reversal of the machine; and means for driving the one of the said latter pulleys; whereby the belt of the spindle-carrying device is caused to operate the spindle-carrying device, substantially as described.

5. In a metallic-hose-making machine having a winding-spindle, in combination, a shaft; two pairs of fast and loose belt-pulleys mounted thereon; belt-shifting gear for the said pulleys; two cams for actuating the said belt-shifting gear; a shaft, normally idle, actuating the cams; fast and loose pulleys mounted thereon; a traveling device carrying the winding-spindle; two pivotal levers extending into the path of travel of the said device on opposite sides thereof; a belt-shifting gear for the fast and loose pulleys of the said cam-actuating shaft; lever mechanisms connecting the said pivotal levers with the said latter belt-shifting gear; a belt attached to the said spindle-carrying device; two pulleys carrying the said belt; a vertically-sliding bracket carrying one of the said latter pulleys, a pivotal lever for lifting the same; a cam driven by the said cam-actuating shaft for operating the said latter pivotal lever; and means for transmitting to the other of the said latter pulleys the motion of the said cam-actuating shaft, substantially as described.

In witness whereof I have hereunto signed my name, this 17th day of January, 1905, in the presence of two subscribing witnesses.

WILHELM SCHWARZ.

Witnesses:
AG. KOLLE,
ERNST ENTENMARE.