No. 852,337. PATENTED APR. 30, 1907.

J. S. F. MARKS.

PIPE WINDING MACHINE.

APPLICATION FILED APR. 13, 1906.

2 SHEETS—SHEET 1.

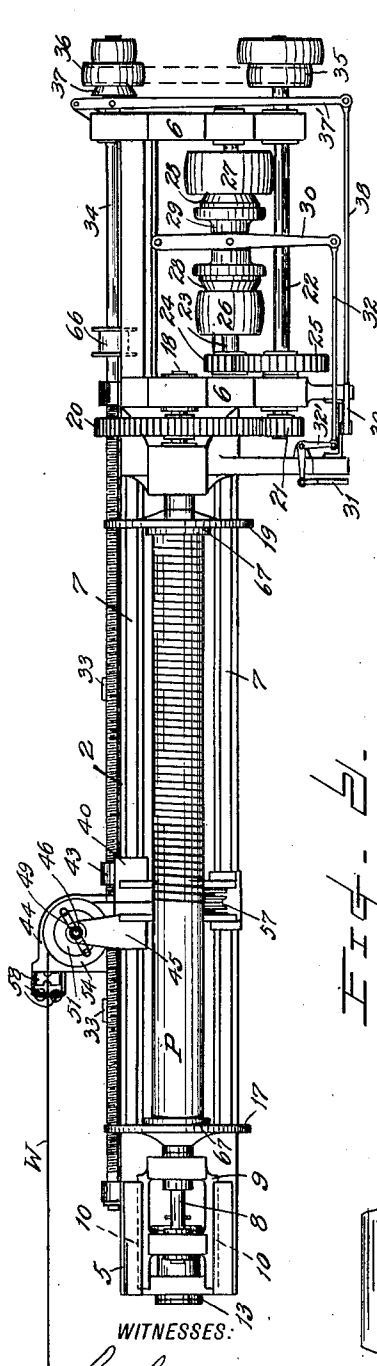


FIG. 1.

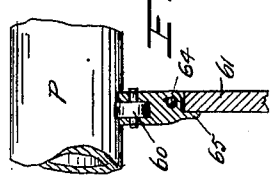


FIG. 3.

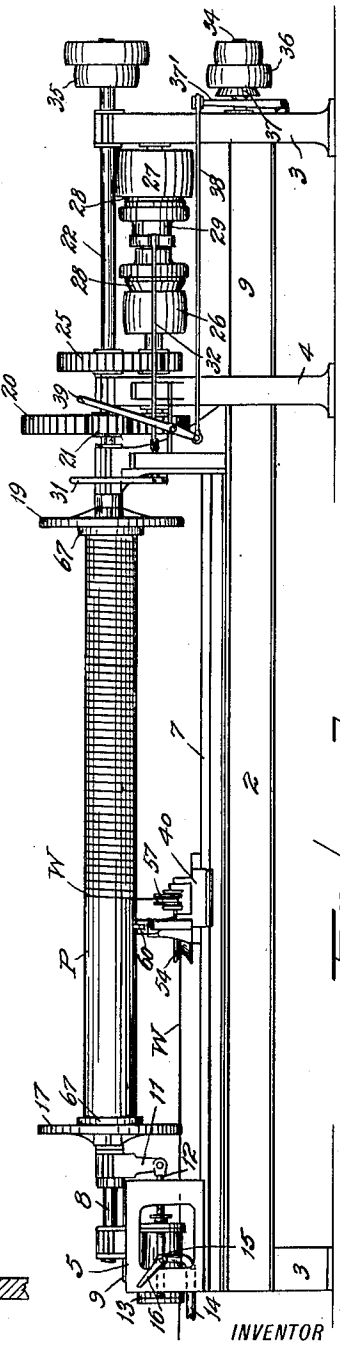


FIG. 2.

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2 SHEETS—SHEET 2.

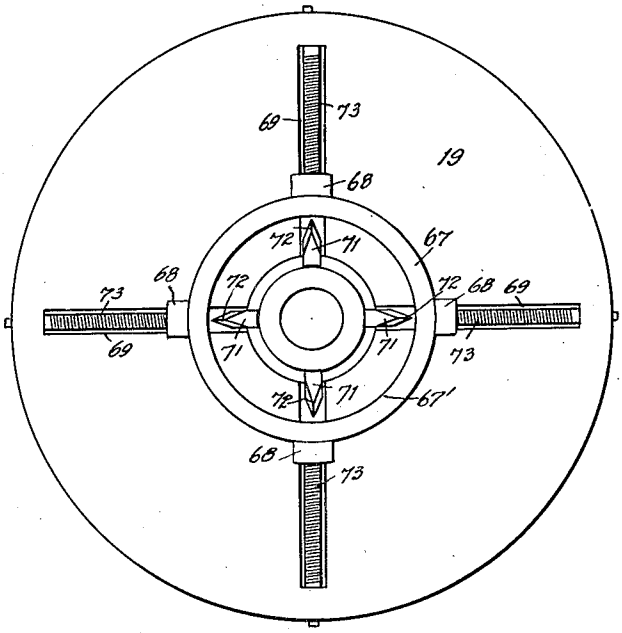


Fig. 5.

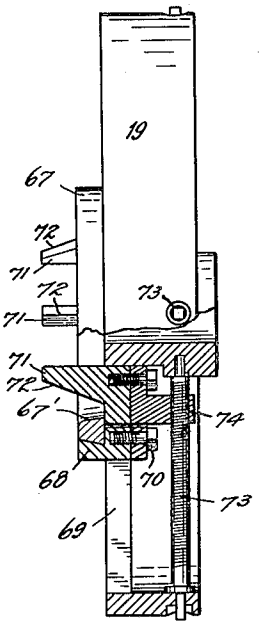


Fig. 6.

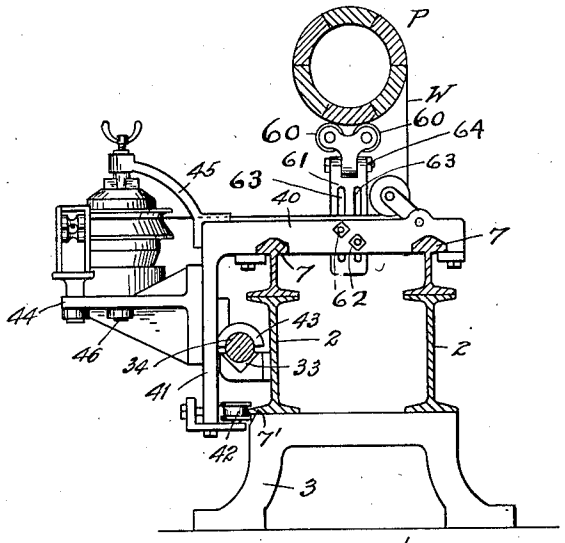


Fig. 3.

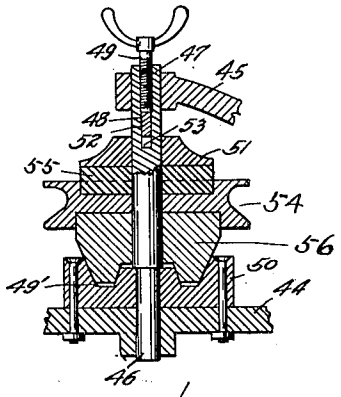


Fig. 4.

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PIPE-WINDING MACHINE.

No. 852,337. Specification of Letters Patent. Patented April 30, 1907.

Application filed April 13, 1906. Serial No. 311,493.

To all whom it may concern:

Be it known that I, JOHN S. F. MARKS, a citizen of the United States, residing at Olympia, in the county of Thurston and State of Washington, have invented certain new and useful Improvements in Pipe-Winding Machines, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a front elevation of a machine embodying my invention; Fig. 2, a plan view of the same; Fig. 3, a cross-sectional view; Fig. 4, a detail cross-sectional view of the wire leading spool and tension devices therefor; Fig. 5, an end view of the face plate shown detached; Fig. 6, a side view of the same shown partly in section; and Fig. 7 is a fragmentary cross-sectional view of the pipe steady-rest.

This invention relates to machines employed for winding wire-banding about stave pipes; and its object is to produce an efficient machine of this class whereby the winding of pipes is accomplished in a more reliable manner and with greater despatch than is attainable with any other machine known to me.

In said drawings, the reference numeral 2 represents longitudinally disposed girder members of the machine frame which are rigidly connected at their opposite ends to suitable supports 3 and 4 and also to intermediately disposed supports, where required.

Rigidly connected to the respective opposite ends of the said members are a tail-stock 5 and a head-frame 6 with track-rails or ways 7 therebetween. A mandrel 8 is rotatably mounted in a frame 9 which is slidable lengthwise of the tail-stock in guide ways 10 therein provided and has a depending arm 11 which is operatively connected to the protruding end of a piston rod 12 of a power cylinder 13 secured to the stock. This cylinder is of the ordinary type having inlet and exhaust passages communicating by a pipe 14 with a source of fluid supply and the power medium is controlled and directed by a valve 15 provided with an operating handle 16. The office of these power devices is to advance or recede the said mandrel and the face-plate 17 thereon to engage or disengage the adjacent end of a pipe P in a quick and reliable manner.

Provided in the head-frame is a mandrel 18 carrying a face plate 19 and a gear wheel 20, which is driven by a pinion 21 mounted upon a shaft 22 and the latter is driven from another shaft 23 through their respective gear wheels 24 and 25. The shaft 23 has mounted loosely thereon pulleys 26 and 27 which are rotated at different speeds by belts from a counter shaft, as is ordinary, and may be rotated in the same or different directions. Said pulleys are recessed in their opposing faces to form frictional elements adapted to be severally engaged by the registering conical ends 28 of an intermediately arranged member 29 splined to the shaft 27 and moved into engagement with either of the aforesaid pulleys by a shifting lever 30 which, for convenience, is connected to an operating lever 31 by reach rod 32 and bell crank 32′. Journaled in bearings 33 at the rear of the machine is a longitudinally arranged screw-shaft 34 which may be driven either from the mill shafting direct or from one of the above-named shafts of the machine, as 22. For this purpose a belt pulley 35 is fixedly mounted upon the latter and a normally loose one, 36, on the screw-shaft and is engageable therewith by providing a slidable clutch element 37 on the screw shaft adapted to engage with the pulley 36. The action of the clutch is attained by suitable mechanism comprising a shifting lever 37′, reach rods 38 and handle lever 39, disposed within easy reach of the operator.

Mounted upon the machine ways 7 is a carriage 40 having at the rear a downwardly extending member 41 carrying a wheel 42 adapted to travel against the flange 7′ of the adjacent track rail to afford support to the carriage. The carriage is operatively connected to the screw shaft by a saddle piece 43 having its under concave face screw-threaded to form a half-nut capable of passing unobstructedly over the intermediate half-bearings 33 as illustrated in Fig. 3. Extending rearwardly of the carriage is a shelf 44 and a bracket-arm 45 supporting a post 46 having an axially disposed screw-threaded aperture 47 extending from the top to a slot 48 and is provided with an adjusting screw 49.

50 is a bed block firmly secured to said shelf and provided in its upper surface with

an annular recess 49′ concentric to the post axis.

51 is a cap-block slidably fitted to the post and made non-rotatable by a gib 52 protruding from said slot 48 and seated in a groove 53 provided in the upper surface of the cap-block. Rotatable upon the post between the two said blocks is a spool 54 having its upper and under sides recessed for the reception of removable blocks 55 and 56 which form with the registering cap and bed block frictional devices to regulate, through the manipulation of said adjusting screw, the resistance to rotation of the spool to provide the desired tension upon the banding wire W which passes thereabout.

57 is a guide pulley through which the wire is properly directed in winding, and 58 represents grooved rolls through which the wire is led to the tension spool 54, both the guide pulley and rolls being affixed to suitable supports upon the carriage.

A steady-rest, see Figs. 3 and 7, is provided upon the carriage to prevent the bending of the pipe due to the strain arising from the high tension under which the wire is wound. This steady-rest consists of anti-friction rolls 60 adapted to bear against the periphery of the pipe being wound and, to accommodate their positions to various sizes thereof, they are rotatably connected to a support 61 which is adjustable vertically of and secured to said carriage by fastening bolts 62 passed through elongated apertures 63. The support is made in two parts pivotally connected by a bolt 64 to form a hinge joint which is foldable in the direction toward the head end of the machine by the provision of a lug 65 on one of the parts contacting with the other part, see Fig. 7. The purpose of thus hinging the said parts is to allow the rolls being tilted clear of the pipe, after the latter has been wound, so that the carriage can be receded preparatory to the winding of another pipe. To facilitate such return movement of the carriage a driving belt leading from a power shaft having a high rate of speed can be used to rotate the screw-shaft correspondingly and in a reverse direction to that required in the feed. Said belt passes about a pulley 66 which may be of the clutch variety or fixedly connected to the screw-shaft and under the latter condition the belt would be normally loose upon the pulley and engaged therewith by the employment of a tightener pulley, as is common. The manner of securing pipes in position between and to the said face plates is to employ a ring 67 upon each such plate and having a tapering inner periphery 67′, see Fig. 6, to make a socket for the respective end of the pipe and which would be held in place, concentrically of the plate axis, by chucks 68 slidable radially in slots 69 and secured in engaged positions by screws 70.

In the head-face plate 19 dogs 71 are used to engage with the pipe interiorly and have V-shaped edges 72 which are caused to penetrate into the pipe shell by means of the radially arranged screws 73 which pass through nuts 74 integral with the respective dogs. It is apparent that the dogs will engage with any size of pipe and can be moved in or out accordingly and, likewise, that rings, as aforesaid, can be substituted to meet the changed requirements.

The operation of the invention, it is believed, will be understood from the foregoing explanation.

Among the advantages of the invention, I will say that with its employment, one man can control the operation of the machine; the pipe is quickly clamped or disengaged from the head-face plate dogging devices by means of the power thrusting devices connecting with the tail-plate; the bite of the dogs which secure the head end of the pipe to the power driven mandrel is positive, a pipe can be wound with great rapidity and under an extreme tension, if desired; the devices for imparting and maintaining the strain can be nicely regulated (notice the take-up and rubbing appliances shown in Fig. 4); and in the foldable steady-rest support.

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

1. A pipe winding machine consisting of the machine-frame having ways, a tail-stock, a head-frame, a mandrel carrying a face-plate for the tail-stock and also for the head-frame, devices for connecting the face-plates to the ends of a pipe, a screw shaft, disengageable means to drive the screw shaft, a carriage upon the frame-ways and adapted to be slidably moved by said screw-shaft, a spool rotatably mounted upon said carriage, and frictional devices for adjustably retarding the rotation of said spool.

2. A pipe winding machine consisting of the machine-frame having ways, a tail-stock, a head-frame, a mandrel carrying a face-plate for the tail-stock and also for the head-frame, devices for connecting the face-plates to the ends of a pipe, a screw-shaft, disengageable means to drive the screw shaft, a carriage upon the frame-ways and adapted to be slidably moved by said screw shaft, a spool rotatably mounted upon said carriage, frictional devices for adjustably retarding the rotation of said spool, and a steady rest adjustably connected with said carriage.

3. A pipe winding machine consisting of the machine-frame having ways, a tail-stock, a head-frame, a mandrel carrying a face plate for the tail-stock and also for the head-frame, devices for connecting the face-plates to the ends of a pipe, a screw shaft, disengageable means to drive the screw shaft, a carriage upon the frame-ways and adapted

to be slidably moved by said screw shaft, a spool rotatably mounted upon said carriage, frictional devices for adjustably retarding the rotation of said spool, and a steady rest adjustably connected with said carriage by a hinged support.

4. A pipe winding machine consisting of the machine-frame having ways, a tail-stock, a head-frame, a mandrel carrying a face-plate for the tail-stock and also for the head-frame, devices for connecting the face plates to the ends of a pipe, a screw shaft, disengageable means to drive the screw shaft, a carriage upon the frame-ways and adapted to be slidably moved by said screw-shaft, a spool rotatably mounted upon said carriage, and frictional devices for adjustably retarding the rotation of said spool, and a steady rest adjustably connected with said carriage by a hinged support.

5. In a pipe winding machine, the combination of the machine-frame having ways, a tail-stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

6. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate, a screw shaft journaled in bearings of the machine frame, driving connections for said screw-shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, adjustable friction devices engaging the spool, and a pipe steady-rest connected with the carriage by a hinged support.

7. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate and comprising a plurality of radially adjustable dogs adapted to be interiorly engaged with the end of a pipe, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

8. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, a detachable socket ring for each of said face-plates, chucking devices for the head face-plate, a screw shaft journaled in bearings of the machine-frame, driving connections for said screw-shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

9. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, means for operatively engaging or disengaging said driving connections, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, adjustable friction devices engaging the spool, and a pipe steady-rest connected with the carriage by a hinged support.

10. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate and comprising a plurality of radially adjustable dogs adapted to be interiorly engaged with the end of a pipe, a screw shaft journaled in bearings of the machine frame, driving connections for said screw-shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, adjustable friction devices engaging the spool, and a pipe steady-rest connected with the carriage by a hinged support.

11. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, chucking devices for the head face-plate and comprising a plurality of radially adjustable dogs adapted to be interiorly engaged with the end of a pipe, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, means for operatively engaging or disengaging said driving connections, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

12. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, a detachable socket ring for each of said

face-plates, chucking devices for the head face-plate, a shaft journaled in the head frame, a shaft intermediate the last named mandrel and the other shaft and in geared connection with both, a slidable clutch member upon the first named shaft adapted to be engaged with either of two pulleys which are likewise mounted upon this shaft, means to effect such engagement with the pulleys, said pulleys, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, adjustable friction devices engaging the spool, and a pipe steady-rest connected with the carriage by a hinged support.

13. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head frame, a mandrel carrying a head face-plate journaled in the head frame, a detachable socket ring for each of said face-plates, chucking devices for the head face-plate, a shaft journaled in the head frame, a shaft intermediate the last named mandrel and the other shaft and in geared connection with both, a slidable clutch member upon the first named shaft adapted to be engaged with either of two pulleys which are likewise mounted upon this shaft, means to effect such engagement with the pulleys, said pulleys, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, means for operatively engaging or disengaging said driving connections, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

14. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a mandrel carrying a tail face-plate, a head-frame, a mandrel carrying a head face-plate journaled in the head frame, a detachable socket ring for each of said face-plates, chucking devices for the head face-plate and comprising a plurality of radially adjustable dogs adapted to be interiorly engaged with the end of a pipe, a shaft journaled in the head frame, a shaft intermediate the last named mandrel and the other shaft and in geared connection with both, a slidable clutch member upon the first named shaft adapted to be engaged with either of two pulleys which are likewise mounted upon this shaft, means to effect such engagement with the pulleys, said pulleys, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, and adjustable friction devices engaging the spool.

15. In a pipe winding machine, the combination of the machine-frame having ways, a tail stock, a slidable frame upon said tail stock, power devices for moving the slidable frame, a mandrel carrying a tail face-plate journaled in said sliding frame, a head frame, a mandrel carrying a head face-plate journaled in the head frame, a detachable socket ring for each of said face-plates, chucking devices for the head face-plate and comprising a plurality of radially adjustable dogs adapted to be interiorly engaged with the end of a pipe, a shaft journaled in the head frame, a shaft intermediate the last named mandrel and the other shaft and in geared connection with both, a slidable clutch member upon the first named shaft adapted to be engaged with either of two pulleys which are likewise mounted upon this shaft, means to effect such engagement with the pulleys, said pulleys, a screw shaft journaled in bearings of the machine frame, driving connections for said screw shaft, means for operatively engaging or disengaging said driving connections, a carriage slidably mounted on the said ways and operatively connected with said screw shaft, a spool upon the carriage, adjustable friction devices engaging the spool, and a pipe steady-rest connected with the carriage by a hinged support.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. F. MARKS.

Witnesses:
W. E. HAMPTON,
PIERRE BARNES.