March 29, 1927. 1,622,432

D. FINLEY

PIPE WRAPPING MACHINE

Filed May 17, 1926 4 Sheets-Sheet 1

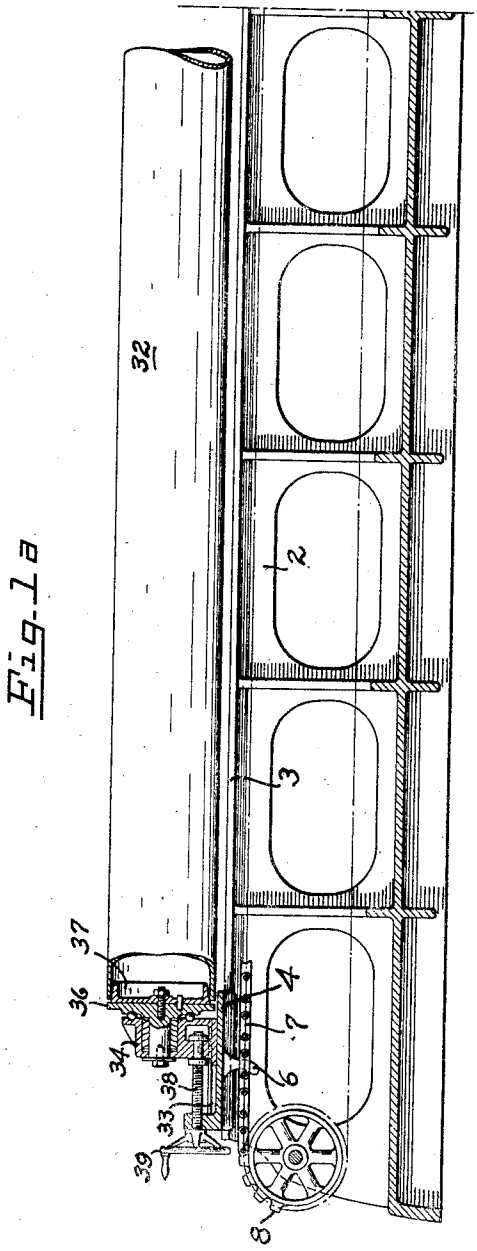


Fig. 1a

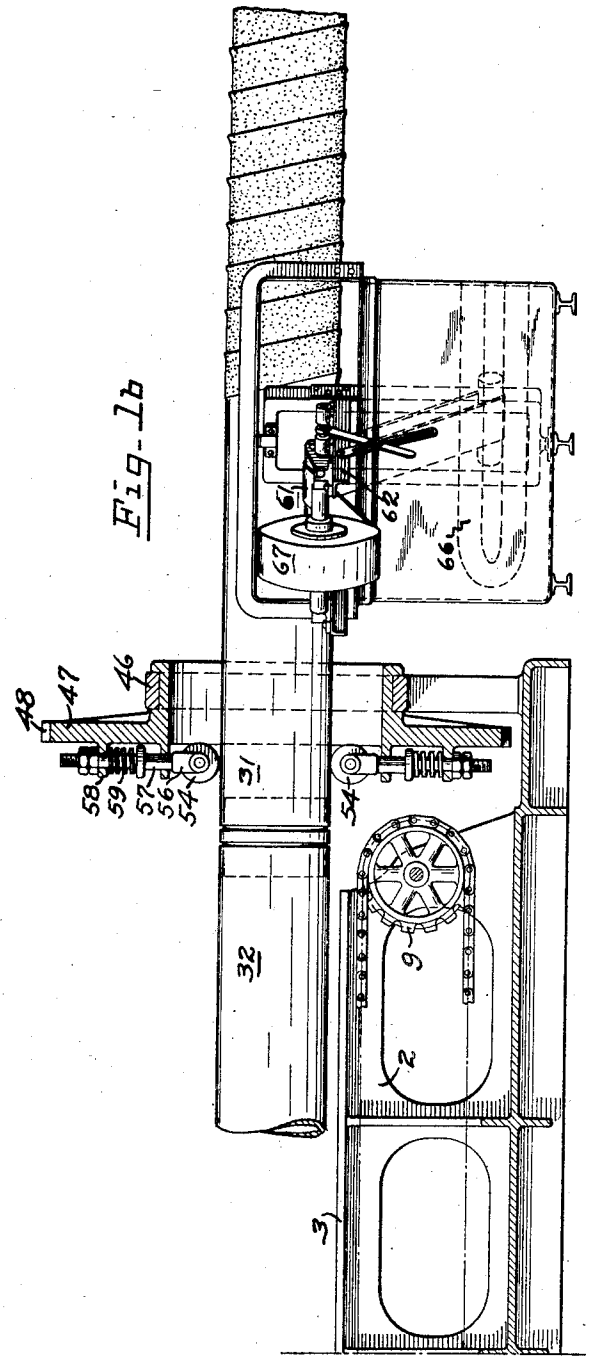
INVENTOR
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Filed May 17, 1926 4 Sheets-Sheet 2



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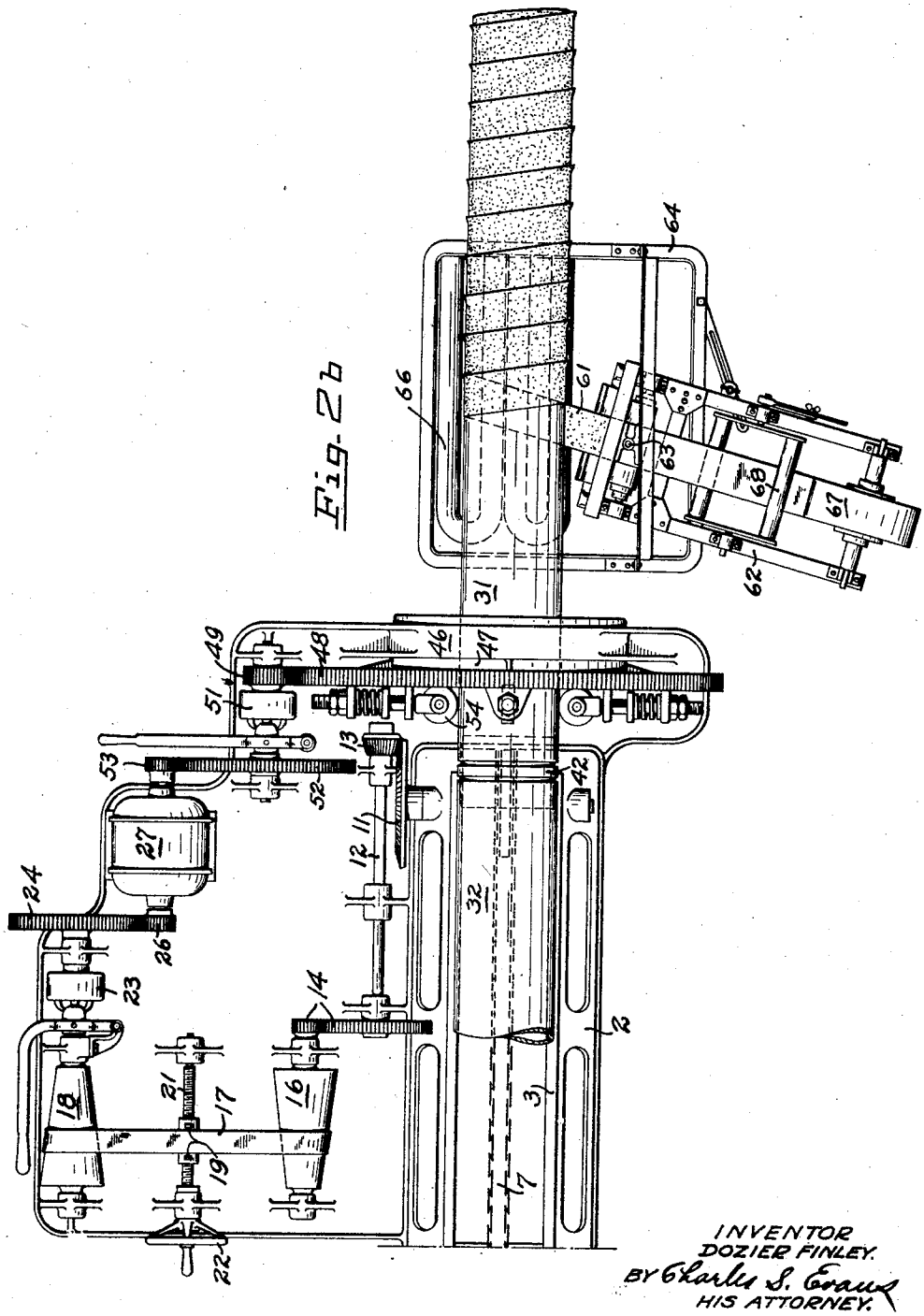
March 29, 1927. 1,622,432

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Fig. 2b



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March 29, 1927. D. FINLEY 1,622,432

PIPE WRAPPING MACHINE

Filed May 17, 1926 4 Sheets-Sheet 4

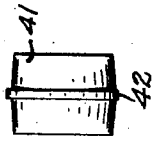


Fig. 3

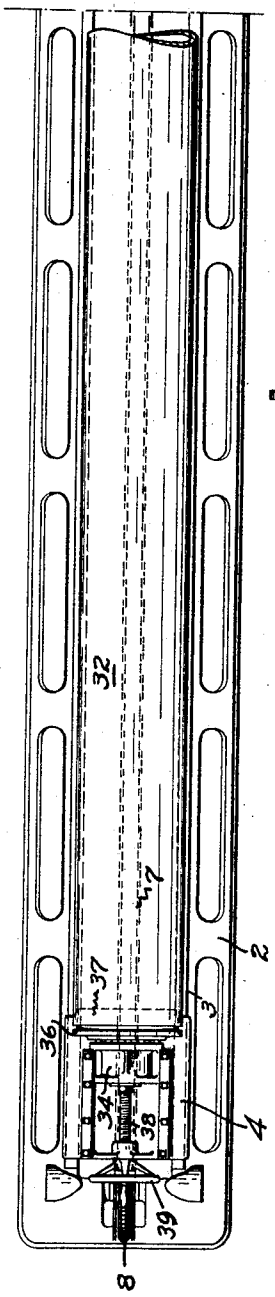


Fig. 2a

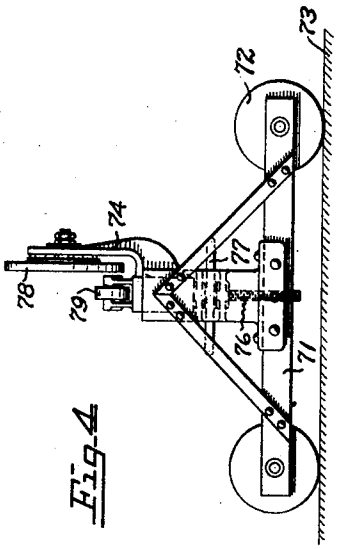


Fig. 4

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Patented Mar. 29, 1927. 1,622,432

UNITED STATES PATENT OFFICE.

DOZIER FINLEY, OF BERKELEY, CALIFORNIA, ASSIGNOR TO THE PARAFFINE COMPANIES, INC., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF DELAWARE.

PIPE-WRAPPING MACHINE.

Application filed May 17, 1926. Serial No. 109,540.

My invention relates to devices for winding strips of covering material upon cylindrical or other bodies and especially to pipe wrapping machines.

One of the objects of the invention is the provision of a pipe wrapping machine which may readily be set up and operated in the open under the rather rigorous conditions attending such work.

Another object of the invention is the provision of a pipe wrapping machine of simple and rugged construction and particularly suitable for handling large pipe.

My invention possesses other objects and features of advantage some of which with the foregoing will be set forth in the following description of my invention. It is to be understood that I do not limit myself to the showing made by the said description and the drawings illustrating the same, as I may adopt variant forms of the invention within the scope of the claims.

Referring to the drawings:

Figure 1 is divided into two parts, 1^a, and 1^b, and shows a side elevation of the complete machine. Figure 1^a is an elevation of a part of the machine showing the pusher head partly in section. Figure 1^b is an elevation of a part of the machine showing the rotor head and the means for feeding and saturating the winding material.

Figure 2 is also divided into two parts, 2^a and 2^b, which respectively show plan views of the structure shown in Figures 1^a and 1^b.

Figure 3 is a view in elevation of the coupling plug, for connecting successive lengths of pipe during the process of wrapping.

Figure 4 is a side elevation of a dolly used to support the wrapped pipe as it emerges from the machine.

In terms of broad inclusion my invention comprises a machine for winding upon a pipe a strip of material saturated or coated with a suitable waterproof material, thus giving the pipe a durable, protective sheathing. The end of the strip which is passed thru a saturant material is applied at an angle to the pipe, and the pipe is then rotated and at the same time fed forwardly in an axial direction so that the strip is drawn thru the coating material and upon the pipe in a spiral wrapping.

The pipe is supported in the machine by the rotor head and by the pusher head. The rotor head is constructed so that the pipe may pass thru it in an axial direction, but will rotate with the rotor head, the function of which is solely that of turning the pipe. Axial movement of the pipe is imparted by the pusher head and these two movements, that is, axial and rotary, are so proportioned that the resultant movement of the pipe will draw the wrapping material thereon in a helix. The pitch of the helix is of course determined by the ratio between these two speeds, and this is adjustable in accordance with the width of the wrapping strip, the size of the pipe and the character of the wrapping, that is, whether flush joint, lap joint or double wrapping is desired.

A prime mover of any suitable type is arranged near the rotor head and connected thereto by means of suitable driving gear. The prime mover is also connected to driving means for the pusher head and in this connection is included speed changing devices so as to permit a proper correlation of the speed of rotation of the rotor head and the axial speed of the pusher head. In the present embodiment of my invention I prefer to drive the pusher head by means of an endless chain.

In terms of greater detail my machine comprises a supporting frame 2 of any suitable material, and providing a track 3 on which the carriage 4 is adapted to travel. Extending from the under side of the carriage is a lug or finger 6 adapted to engage in the links of the upper reach of the endless chain 7. The chain is carried over suitable sprocket wheels 8 and 9 arranged respectively at the rear and forward ends of the frame 2. At the forward end of the frame the sprocket wheel 9 is fixed for rotation with the gear 11 driven from the shaft 12 by the pinion 13. Gears 14 connect the shaft 12 with the cone pulley 16 forming part of a speed variation device and which is connected by the belt 17 with the other cone pulley 18. The position of the belt 17 on the cone pulleys and therefore the ratio of speed of the pulleys is de-

termined by the shifter arm 19 adjustable by the threaded spindle 21 controlled by the hand wheel 22. The pulley 18 is connected by the clutch 23 with the gear 24 in mesh with the pinion 26 on the shaft of the motor 27. Thus rotation of the motor is effective thru the transmission devices just explained to move the carriage 4 longitudinally along the track, that is, axially of the pipe to be wrapped.

In the drawings, I have shown two lengths of pipe in the machine, one length 31 partially wrapped and the other length 32 just after being placed in the machine, and with the machine ready to resume wrapping. Means are provided on the carriage for supporting the rear end of the pipe 32 and permitting it freely to revolve. The upper face of the carriage is provided with ways 33 in which is slidably mounted a head stock 34 providing a bearing in which the face plate 36 is journalled, by means including preferably a ball thrust bearing. The face plate 36 is provided with a changeable conical flange 37 which forms a stud over which the pipe may be engaged. Different sizes of flanges are provided so that different sizes of pipe may be mounted on the face plate.

The head stock 34 is movable on the carriage by means of the threaded spindle 38 and the hand wheel 39.

Means are also provided for temporarily coupling the end of one pipe to the next succeeding one. This device is shown in Figure 3 and comprises a plug having a conical seat 41 on each side with a flange 42 in the center. When a length of pipe has been moved so far as it will go in the machine, one of the coupling plugs is seated in the rear end of the pipe and a new length of pipe placed in the machine, the forward end on the plug and the rear end on the face plate 36. It will be understood that this may readily be accomplished and the two lengths of pipe firmly joined by manipulation of the head stock 34.

Means are also provided for rotating the pipe as it is moved axially by the pusher head. Journalled in the bearing 46 at the forward end of the machine is a rotor ring 47 having gear teeth 48 formed on the periphery thereof. The rotor ring is in mesh with the driving pinion 49 connected by the clutch 51 and the gear 52 to the driving pinion 53 on the opposite end of the motor shaft from the pinion 26. In order that rotation of the rotor ring may also rotate the pipe which passes thru it, I provide a plurality of rollers 54 journalled in yokes 56. Each yoke is provided with a square shank 57 slidably mounted in brackets 58 projecting from the side of the rotor ring. A spring 59 interposed between one of the brackets and the square shank resiliently presses the roller inwardly. It will be noted that the plane of rotation of the roller lies in the axis of rotation of the rotor ring, so that movement of the pipe in an axial direction thru the rotor ring is permitted, while at the same time the pipe is fixed for rotation with the rotor ring. Transverse slippage of the rollers on the pipe surface is prevented by knurling the face of the roller or by other suitable means. It will be observed that on account of the resilient mounting of the rollers free passage of the pipe thru the rotor ring is permitted even though laps, rivets, or injury to the pipe may produce projections from its true cylindrical surface.

Means are also provided for feeding a strip 61 of wrapping material to the pipe, and for applying to the strip a cementitious waterproof material preferably of a bituminous nature. In my copending application, Serial Number 17,483, filed March 23, 1925, I have shown and described a similar device for feeding and saturating a wrapping strip. In the copending application of Leland S. Rosener, Serial Number 728,551, filed July 28, 1924, is also shown a device for this purpose. It is not therefore necessary to describe this mechanism in detail, but in general terms such feeding device comprises a frame 62 mounted for pivotal movement about the vertical axis 63 and disposed on the tank 64 which is adapted to hold the bituminous material which is heated and kept in a fluid condition by means of a suitable burner or burners within the flues 66. A supply roll 67 of wrapping material is mounted on the frame and is led over suitable guide and tension rolls 68 down into the fluid in the tank and then upwardly to the pipe.

In using my machine, a piece of pipe is inserted within the rollers 54 of the rotor ring, with the forward end of the pipe in convenient position opposite the frame holding the wrapping material. The clutch 51 may then be disengaged so that the rotor ring does not rotate and the pusher head, comprising the carriage and face plate, run up so as to permit the mounting of the rear end of the pipe upon the flange 37. The strip of wrapping material is then started by hand, the pipe if necessary being rotated slowly without axial movement by disconnecting the clutch 23 and engaging the clutch 51. Both clutches are then engaged and the machine started, the assumed setting of the speed variation device 16—17—18 and the angularity of adjustment of the frame 62 being corrected if necessary to insure the smooth laying on of the wrapping strip.

As the pusher head reaches the forward end of the frame, the engaged portion of the endless chain passes around the forward sprocket 9 and disengages from the lug 6 on the carriage so that the forward movement

of the pusher head ceases. The clutch 51 should also be disengaged at this point and the machine is now ready for the return of the pusher head to first position and the insertion of a new length of pipe. The return of the pusher head to the rear end of the frame may be accomplished by any suitable type of conveying equipment such as an inclined roller table or a conveyor belt and preferably there are several of the pusher heads available to permit one being in use while at least one other is being returned or is in a position ready for use.

Means are also provided for supporting the wrapped pipe as it emerges from the machine. Such supporting means may be of any suitable type of dolly, but I prefer to use a frame 71 mounted on wheels 72 adapted to run on a smooth trackway 73 formed of planks laid out on the ground ahead of the machine. A post 74 is vertically adjustable in the frame by means of the threaded spindle 76 and the hand wheel 77, and on the top of the post a face plate 78 is arranged on a suitable thrust bearing. Preferably rollers 79 are also mounted on the post below the face plate so as to take the weight of the pipe. The dolly is placed under the end of the pipe, with the pipe resting on the rollers and abutting against the face plate, and as the pipe emerges from the machine, the dolly rolls along the trackway 73.

I claim:

1. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, means for propelling the carriage along the track, a rotor ring, means for rotating the ring, and means on said ring for fixing the object for rotation with the ring while permitting the object to pass thru the ring in an axial direction.

2. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, means for propelling the carriage along the track, a rotor ring, means for rotating the ring, means on said ring for fixing the object for rotation with the ring while permitting the object to pass thru the ring in an axial direction, and means for adjusting to a predetermined ratio the rotary speed of the ring and the speed of movement of the carriage.

3. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, means for propelling the carriage along the track, a rotor ring, means for rotating the ring, means on said ring for fixing the object for rotation with the ring while permitting the object to pass thru the ring in an axial direction, and means for feeding a strip of wrapping material to said object.

4. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, means for propelling the carriage along the track, a rotor ring, means for rotating the ring, means on said ring for fixing the object for rotation with the ring while permitting the object to pass thru the ring in an axial direction, a body of fluid, and means for feeding a strip of wrapping material thru said fluid to said object.

5. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, an endless chain adjacent the track for propelling the carriage along the track, a rotor ring, means for rotating the ring, and means on said ring for fixing the object for rotation with the ring while permitting it axial motion thru the ring.

6. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, an endless chain adjacent the track for propelling the carriage along the track, a rotor ring, means for rotating the ring, means on said ring for fixing the object for rotation with the ring while permitting it axial motion thru the ring, and means for adjusting the ratio between the rotary speed of the ring and the speed of the chain.

7. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, an endless chain adjacent the track for propelling the carriage along the track, and means for rotating the object.

8. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, an endless chain adjacent the track for propelling the carriage along the track, means independent of the chuck for rotating the object, and means for adjusting the ratio between the rotary speed of the object and the speed of the chain.

9. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, a chain for propelling the carriage along the track, means for moving the chain, and means independent of the chuck for rotating the object.

10. In a machine for wrapping objects, a carriage, a track on which the carriage is movable, a chuck on the carriage for supporting one end of the object, a chain for

propelling the carriage along the track, means for moving the chain, and means for rotating the object.

11. In a machine for wrapping objects, a frame, a rotor ring journalled in said frame, means for rotating the ring, means on said ring for fixing the object for rotation with the ring while permitting the object to pass thru the ring in an axial direction, and means independent of the ring for moving the object in an axial direction.

In testimony whereof, I have hereunto set my hand.

DOZIER FINLEY.