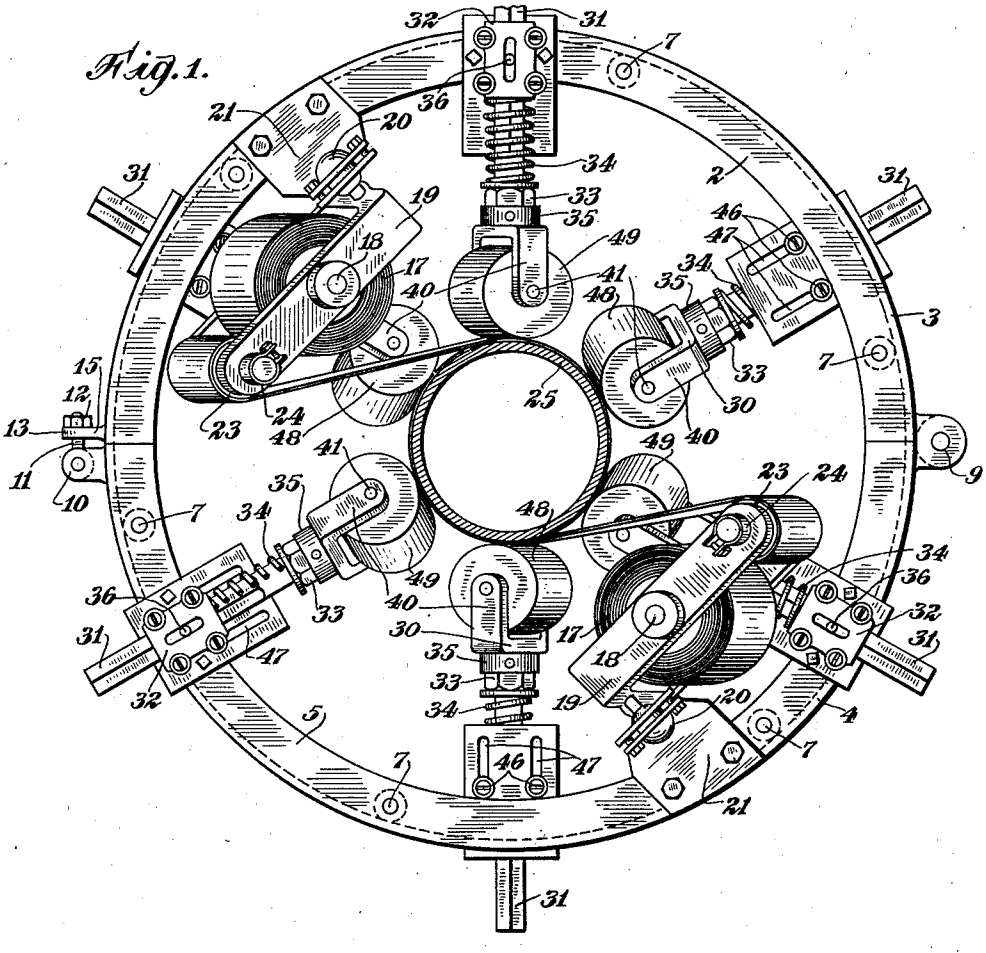
Feb. 16, 1937. E. L. ROLFS ET AL 2,070,925

PIPE WRAPPING MACHINE

Filed July 22, 1932 3 Sheets-Sheet 1

Fig. 1.



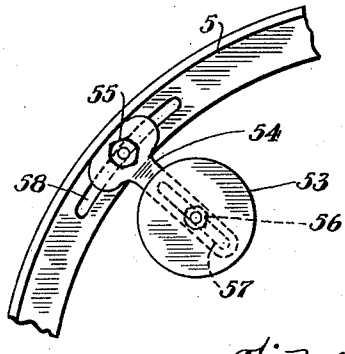


Fig. 4.

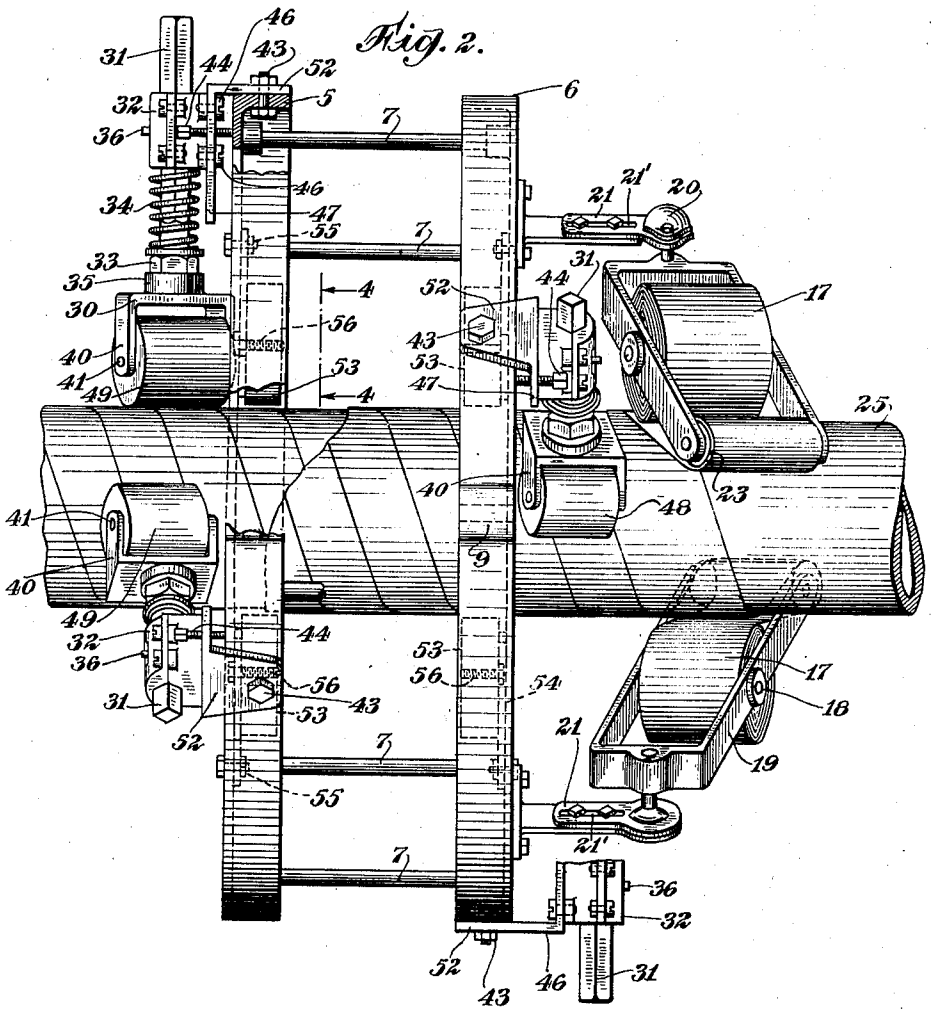
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Fig. 2.



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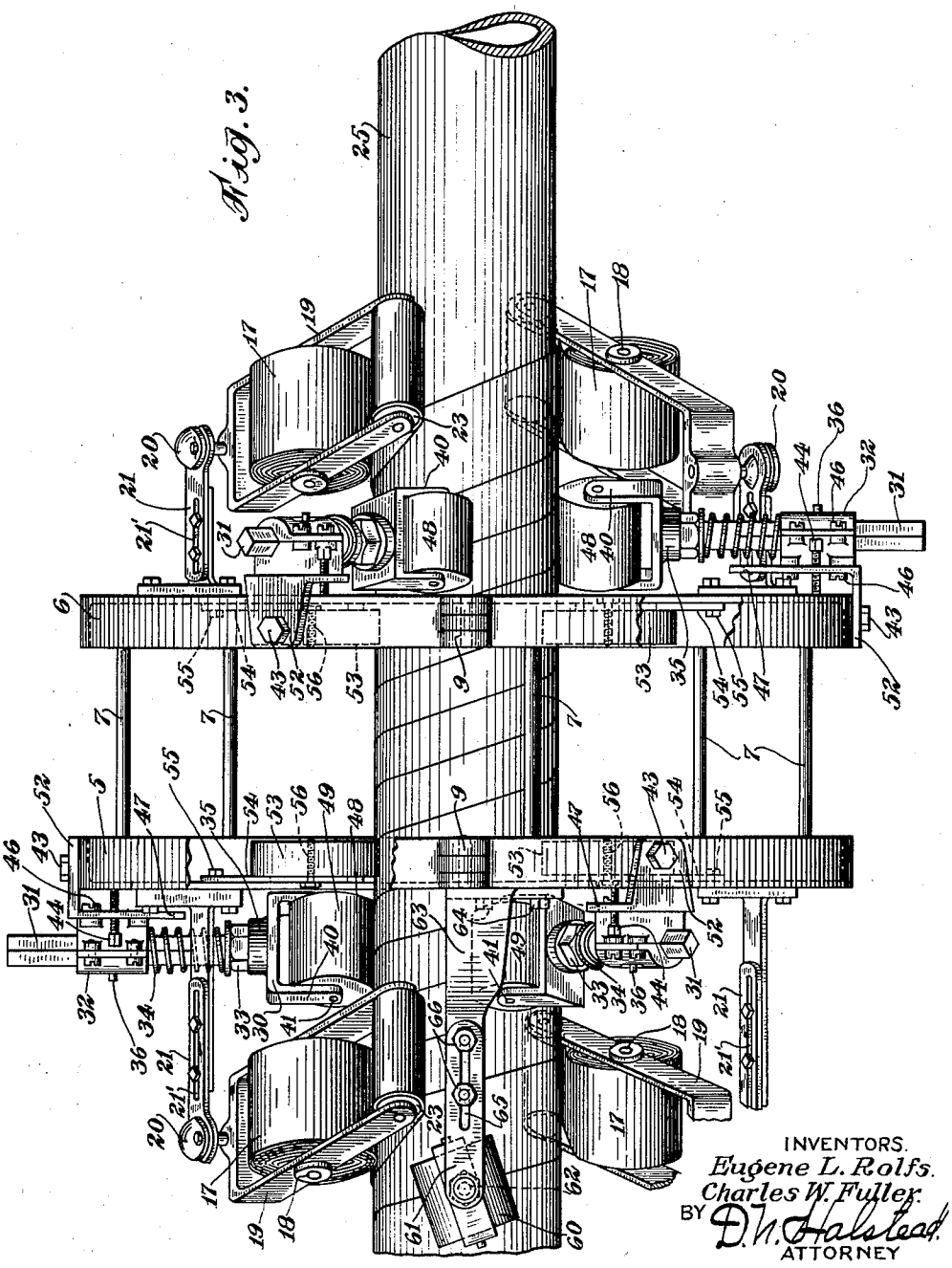
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PIPE WRAPPING MACHINE

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Fig. 3.



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2,070,925

PIPE WRAPPING MACHINE

Eugene L. Rolfs, Clayton, Mo., and Charles W. Fuller, Houston, Tex., assignors to Johns-Manville Corporation, New York, N. Y., a corporation of New York

Application July 22, 1932, Serial No. 624,024

7 Claims. (Cl. 242—11)

Our invention relates to devices for wrapping pipe with a web of protective material such as felt, paper or the like. It is adapted particularly for wrapping pipe preparatory for laying said pipe in ditches, as in pipe line work in oil fields; water or gas mains in cities, and similar situations.

To properly protect the pipe from rust and electrolytic action it is customary to coat the pipe with some corrosion-resisting compound such as asphalt and to then wrap the felt or paper spirally about the pipe and finally paint the pipe thus wrapped with another coating. Machines have previously been devised for this purpose, but such machines are costly and are not conveniently transported over rough ground. It is an object of our invention to provide a light and easily portable device for wrapping a web or webs of protective material about the pipe.

It is also desired to provide a device which is supported upon the pipe itself and is counterbalanced and easily rotated on the pipe to accomplish the wrapping operation.

A further object of the invention is to provide a device which is adapted to apply one or more layers of wrapping material to a pipe, each layer being applied in an overlapped manner with the webs of each succeeding layer covering the laps or joints of the lower layer.

It is another object of the invention to provide a device with means thereon to support and center the device upon the pipe and in which the supporting means also acts to iron or smooth out the wrapping material in position upon the pipe.

We also aim to provide a wrapping device which can be readily operated by hand by a single operator and automatically advanced along the pipe without difficulty.

This application is a continuation in part of application Serial #426,820, filed February 8, 1930, now Patent #1,883,401, October 18, 1932.

The construction of our device and the manner in which it is operated will be understood from the drawings herewith, in which:

Fig. 1 is an end elevation of our improved apparatus shown in operative position upon a section of pipe.

Fig. 2 is a side elevation of the apparatus with the parts in their operative position.

Fig. 3 is a side elevation of the device disclosing a plurality of rolls carried on the forward and rear parts of the device.

Fig. 4 is a detail view on line 4—4 of Fig. 2 in the direction of the arrows, disclosing the supporting arrangement for the counterbalancing weights.

In the operation of protecting pipe by painting and wrapping it is a very difficult matter in the field to apply the wrapping material uniformly upon pipe sections, and particularly upon pipe lines which have already been placed. Various types of machines and mechanisms have been devised to accomplish the painting and wrapping simultaneously or to perform the operations separately. These mechanisms, however, are more or less complicated, and we have therefore devised the present invention, which is very simple and economical in its construction and may be readily transported from place to place and operated by one employe.

The device is best seen in side elevation in Fig. 1 and comprises a frame or support 2, which is made up of two or more circular sections 3 and 4. Each section comprises two spaced members 5 and 6, which are suitably connected by rods or spacing members 7. The sections 3 and 4 are hinged at 9 in any desired manner and on the opposite side are arranged for connection by a latch 10 which includes a bolt 11 and nut 12, which may be adjusted on the bolt to clamp the sections 3 and 4 firmly in position. The bolt 11 is adapted for insertion in a slot 13 formed in a lug 15 which extends from the periphery of one of the sections. It should be noted that the frame is of considerably larger diameter than the pipe which is to be wrapped and is arranged to encircle the pipe. By loosening the nut 12 and unlatching the bolt 11 the frame may be passed about the pipe and the latch again secured.

The frame 2 is adapted to carry one or more rolls 17 of wrapping material. The supporting arrangements for the rolls are substantially the same. The roll in each supporting arangement is mounted upon a shaft 18, which is carried by an auxiliary frame 19, which is in turn supported by an adjustable connection 20, such as a ball and socket joint. The joint 20 is carried upon an arm 21 connected with one of the sections of the frame 2. The arm is extensible by means of slot arrangement 21'. In this manner, by adjustment of the connection 20, the roll 17 may be disposed at any desired angle as regards the pipe which is to be wrapped. One end of the frame 19 carries a guide roll 23 over which the wrapping material is adapted to pass. In devices of this type it is usual to wrap the material spirally about the pipe, and in Fig. 2 of the drawings the rolls of material are shown arranged at proper angles so that the material in each layer will overlap

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the desired amount in order to form a seal upon the pipe. As the frame 2 is rotated about the pipe 25, the wrapping material will be wound on to the pipe, as shown in Fig. 2, in an overlapped relation, and in view of the forward advancement of the machine with the arms 21 adjusted to the proper lengths, the webs of the upper layer will cover the laps or joints of the lower layer.

In the modification of the invention disclosed in Fig. 3, rolls of wrapping material are also supported on the rear end of the frame in such a manner that upon rotation of the frame the wrapping material is applied in an overlapped relation, with the webs in upper layers covering the laps or joints of lower layers, thereby enabling the operator to apply one or a plurality of layers of wrapping material of like or different materials to a pipe at one operation.

The coating operation is preferably performed by swabbing or ragging the paint or coating material upon the pipe ahead of the wrapping machine. This is usually performed by extending a canvas or similar wiper beneath the pipe, and the coating material is poured upon the pipe and evenly distributed on the pipe with the wiper. Employees draw this rag about the pipe in a manner to coat the tar over its entire surface. Immediately after this ragging has been accomplished, the pipe wrapping machine is rotated so that the web of wrapping material is applied to the pipe.

It is desired to have the apparatus travel along the pipe at such a speed that the proper overlap of the spirals will occur. To accomplish this we have provided a plurality of supporting members 30. These members may take any desired form, but we have here illustrated them as comprising a plurality of stems 31, which are non-circular and adapted for sliding movement through bearings 32. An adjustable nut 33 is threaded onto the lower end of each stem and arranged to confine a coil spring 34 between the bearing and the collar 35. This spring normally tends to move the stem 31 inwardly with respect to the frame.

A stop pin 36 is arranged for movement within the slot 37 in the bearing so that the supporting member will not drop inwardly or outwardly when the apparatus is being transported or is not in use. Above the collar 35 the stem is formed with a yoke 40 which carries a pin 41 and a roller 42. This roller may be of any desired width, but we have herein illustrated it as of substantially the same width as the web of wrapping material. These rollers 42 may be made of any suitable material, but it is intended that they may be made of rubber or some resilient substance which will smooth the wrapping material applied at the forward part of the machine. It will be seen from Fig. 1 that the spring 34 tends to force the roller 42 against the periphery of the pipe or the wrapping material which has been placed thereon. In order to suitably support the apparatus and to prevent vibration thereof, as well as to cause it to travel uniformly along the pipe, we have provided two sets of these rollers, the forward set 48, which are carried on the frame section 5, and a rear set 49, which are carried on the frame section 6. The bearing 32 is supported upon a suitable bracket 52, which is connected to the frame members by a bolt 43. It is to be understood that this bracket 52 may be moved about on the bolt 43 in order to adjust the angularity of the roller with respect to the axis of the pipe. By adjustment of the angularity of this roll the pitch or rate of travel of the apparatus with respect to the pipe will be controlled. A set screw 44 is shown as carried by the bracket 52 and adapted to engage against the frame section. Thus, if the bracket is once adjusted, the set screw may be arranged to retain it in the proper position. The bearing 32 is connected with the bracket 52 by means of bolts 46 which are arranged to pass through the slots 47 in the bracket. With this construction the rollers may be adjusted radially of the frame in order to accommodate different sizes of pipe or to allow for excessive movement of the rollers in passing dresser couplings or other obstructions upon the pipe. Where ordinary couplings are encountered, the resiliency of the stem 31, due to its mounting with the spring 34, will allow sufficient movement of the rollers to pass the coupling.

With the rollers mounted as just described, it seems apparent that the wrapping material applied at the forward part of the machine will be pressed firmly and smoothly against the pipe. Referring to Fig. 3, it will be noted that auxiliary ironing rollers 60 are provided for pressing the wrapping material applied from the rear end of the machine to the pipe. These rollers, only one of which is shown, are mounted in yokes 61 adjustably connected by means of bolts 62 to spring arms 63 carried by the member 6 of the frame by bolts 64, the spring arms being extensible by means of slot 65 and clamping bolt arrangement 66. By means of the yoke and clamping bolt arrangement 62, the rollers can be readily placed at the same angularity as the supporting and ironing rollers 48 and 49, thereby eliminating any tendency to drag. These auxiliary pressing rolls may be eliminated whenever desired.

A restraining band or clamp 24 may be provided so that suitable tension may be placed upon the roll 17 or the guide roll 23 in order to prevent the material from unrolling too freely. The forward set of guide rollers 48 tend to iron out or smooth the wrapping material immediately after it has been applied so that any wrinkles or bulges in the material will be removed and the material will slide about the pipe in order to remove them, due to the tension upon the web of the material. The rear rollers 49 are adapted to travel upon the material after several spirals have been applied to the pipe. These rollers are so spaced from the forward rollers 48 that they will travel substantially upon the lap of the wrapping material and cause a sealing of the joint along the spiral.

After the wrapping material has been applied with our improved mechanism, an outer coating of protective material or paint may be applied, if desired, either by a suitable painting mechanism or by ragging, as the first coating was applied ahead of the wrapping apparatus.

The wrapping apparatus we have shown and described is primarily adapted for manual operation. The frame is passed about the pipe to be wrapped and it is thereafter rotated by the operator grasping the rods 7 and rotating the entire frame. The forward rollers 48 and rear rollers 49 will be adjusted with an angularity so that the apparatus will travel along the pipe at the proper rate, and the overlap of the wrapping material when once adjusted will thereafter be uniform.

For the purpose of balancing the machine so that it can be more readily operated, it is provided with weights 53 carried by arms 54, adjustably attached by clamping bolts 55 engaging in circumferential slots in the circular sections of the frame. Referring to Fig. 4, it will be noted

that the weights are adjustably attached to the arms **54** by clamping bolts **56** engaging in slots **57**. By means of the above adjustments, the operator is enabled to procure a very delicate balance of the machine so that it may be operated with a minimum of effort. Referring to Fig. 2 having diametrically disposed wrapping rolls, the weights may be dispensed with, as the rolls tend to balance each other. However, if only one roll of wrapping material is applied, with the other roll and supporting frame detached, there is a tendency to unbalance the frame, which requires increased effort of operation. To overcome this, all the weights may be eliminated with the exception of one weight, which is diametrically disposed to the roll of wrapping material, and by means of the various adjustments disclosed, a normal adjustment for balancing one roll full weight and when exhausted may be procured, so that the machine may be operated with a minimum of effort.

Referring to Fig. 3, disclosing four wrapping rolls, all the weights may be eliminated, and it will be apparent that if the operator desires to apply these rolls, weights may be applied and adjusted at suitable places to maintain a normal balancing of the machine.

There will be no inconvenience in passing the roll of material about the pipe as is now encountered in hand operations. There will be no wrinkles or bulges in the material as it will be ironed about the pipe by the rollers.

Our invention has the advantage of being economical to construct and easy to operate. One man can wrap the material upon the pipe where it takes four men to apply the liquid coating thereto. The web of wrapping material is not only smoothly and evenly wound about the pipe but it is forced firmly against the pipe so that the coating previously applied makes a firm bond between the wrapping and the pipe. Also, by means of the plurality roll-supporting arrangement, a plurality of layers of wrapping material may be applied to effectively cover pipes to protect them under all conditions, the layers being applied in such manner that the webs of upper layers cover the lapping joints of lower layers.

While the device is particularly adapted for hand operation, it is to be understood that it is capable of power operation if so desired where mechanical devices are easily available.

What we claim is:

1. In a pipe-wrapping machine, a frame rotatable on said pipe as an axis, means on the frame bearing on the pipe to support said frame rotatably on the pipe, a roll of wrapping material on one side of said frame, and means on the opposite side of the frame for balancing the frame, said balancing means being circumferentially and radially adjustable.

2. In a pipe-wrapping machine, a frame shaped to surround the pipe, means on the frame to center said frame on said pipe, said centering means acting to move said frame along said pipe as the frame is rotated, a roll of wrapping material on the forward end of said frame, a roll of wrapping material on the rear of said frame, means for balancing the frame, and means for pressing the wrapping material to the pipe, said balancing means being circumferentially and radially adjustable.

3. Pipe-wrapping apparatus adapted to be mounted upon a pipe to be wrapped and of such a size as to be manually operated, and apparatus including a frame, a supply of wrapping material on one side of said frame, a plurality of pipe-engaging members to support said frame on the pipe and cause it to travel therealong and iron the wrapping material after it is applied, and means on the frame opposite the wrapping material for balancing the frame, said means being circumferentially and radially adjustable.

4. In a pipe-wrapping machine, a frame rotatable on a pipe as an axis, rollers on said frame bearing on said pipe, said rollers being set at an angle to the axis of the frame for advancing the frame along the pipe upon rotation of said frame, a roll of wrapping material on the forward end of said frame, a roll of wrapping material on the rear end of said frame, said rollers acting to smooth said wrapping material applied from the forward end of the frame, and auxiliary rollers for smoothing the material applied at the rear of the frame.

5. In a pipe-wrapping machine, a frame rotatable on a pipe as an axis, rollers on said frame bearing on said pipe, said rollers being set at an angle to the axis of the frame for advancing the frame along the pipe upon rotation of said frame, a roll of wrapping material on the forward end of said frame, a roll of wrapping material on the rear end of said frame, said rollers acting to smooth said wrapping material from the forward end of the frame, auxiliary rollers for smoothing the material applied at the rear of the frame, and adjustable weight means for balancing the frame.

6. In a pipe wrapping machine, a frame, pipe engaging members for rotatably supporting said frame on a pipe, a yoke-shaped frame, an adjustable connection between the frames whereby the yoke-shaped frame may be adjusted at any angle desired as regards the pipe, means on said yoke-shaped frame for supporting a roll of wrapping material, means carried by said yoke-shaped frame for directing said wrapping material on to said pipe, a weight, and means connecting said weight to said first named frame whereby it may be adjusted circumferentially and radially of said pipe to counterbalance said yoke-shaped frame in any position of adjustment of the latter.

7. In a pipe wrapping machine, a main frame, pipe engaging members for rotatably supporting said frame on a pipe, a plurality of auxiliary frames, adjustable means for supporting each of said auxiliary frames from the main frame whereby each auxiliary frame may be adjusted at any angle desired as regards the pipe, weight means, and means connecting the said weight means to the main frame for circumferential and radial adjustment relative to said pipe to counterbalance the auxiliary frames in any of the adjusted positions of the latter.

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