May 29, 1956 C. F. MORAIN 2,747,727

PIPE HANDLING APPARATUS

Filed March 10, 1953 3 Sheets-Sheet 1

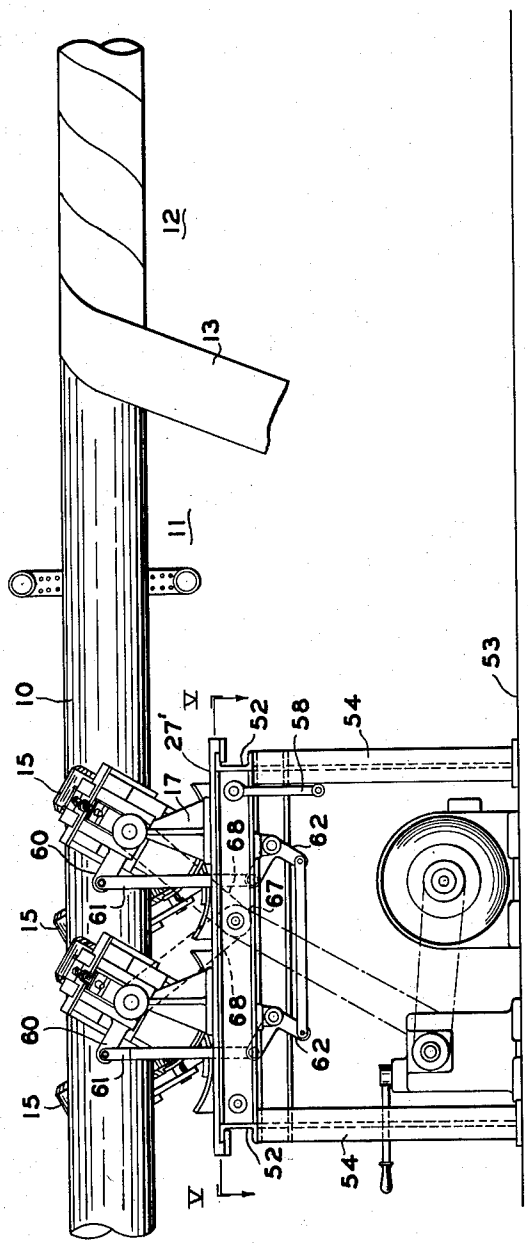


Fig. 1

INVENTOR
CLIFFORD F. MORAIN

BY Francis J. Klempay

ATTORNEY

May 29, 1956 C. F. MORAIN 2,747,727

PIPE HANDLING APPARATUS

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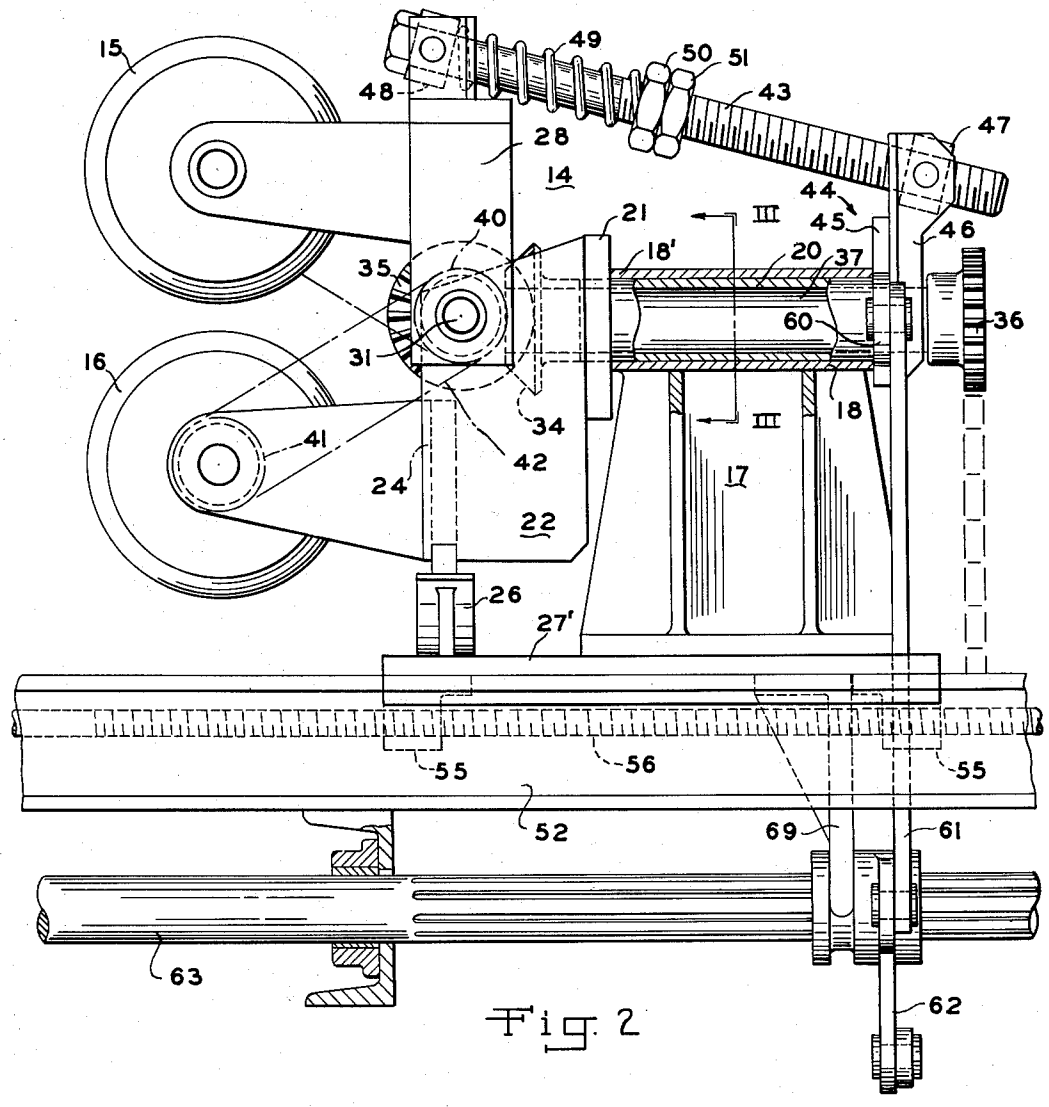


Fig. 2

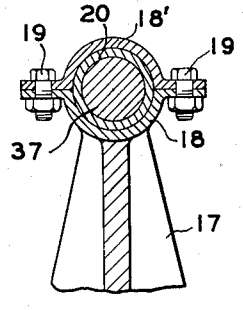


Fig. 3

INVENTOR
CLIFFORD F. MORAIN

BY Francis J. Klempay

ATTORNEY

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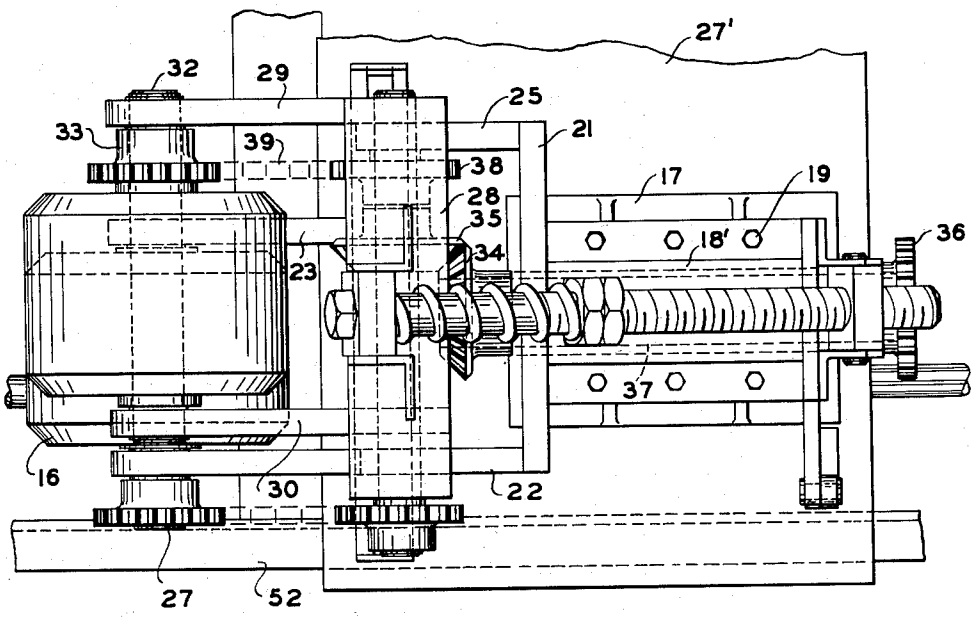


Fig. 4

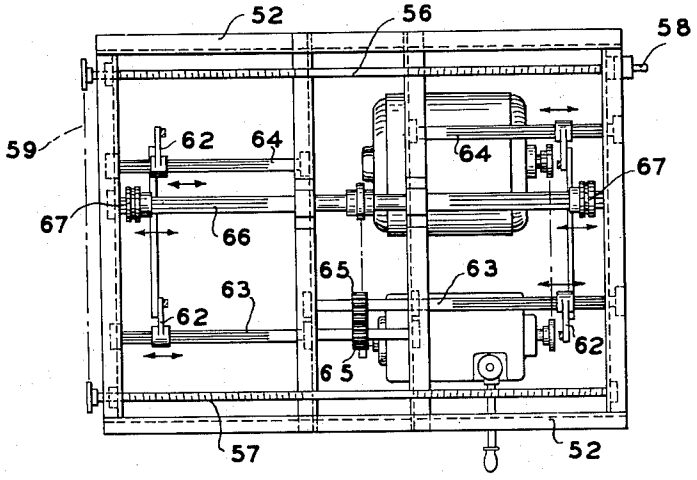


Fig. 5

INVENTOR
CLIFFORD F. MORAIN

BY Francis J. Klempay

ATTORNEY

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PIPE HANDLING APPARATUS

Clifford F. Morain, Youngstown, Ohio

Application March 10, 1953, Serial No. 341,546

11 Claims. (Cl. 203—75)

The present invention relates to pipe handling apparatus, and more particularly to handling and conveying apparatus for use in combination with other apparatus for applying protective coatings and wrappings to lengths or sections of pipe, as is common practice in the construction of underground pipe lines, for example.

In the construction of cross country pipe lines and the like wherein it is contemplated that lengths of metal pipe will be buried underground for a considerable period of time it is common practice to first apply a protective coating of tar or other preservative about the exterior surface of the pipe and to supplement such coating with a layer or wrapping of protective paper. It is conventional in such practice to utilize strip-like lengths of wrapping paper which are wound spirally around the pipe either by simultaneously rotating and longitudinally advancing the pipe with respect to the paper or by actually winding the paper about the pipe while progressing longitudinally therealong, either method being suitable for accomplishing the desired end result.

The present invention is concerned with apparatus for effecting simultaneous rotative and longitudinal advancing movement of lengths or sections of pipe, and has for its ultimate object the provision of apparatus of the above described type which is characterized by improved features of construction resulting in simplification of manufacture and substantial improvement in operating effectiveness.

Thus, as a more specific object, the present invention seeks to provide apparatus for use in conjunction with pipe coating and wrapping apparatus which is simplified in nature while being operative to provide a more accurate and positive drive than has heretofore been obtainable with apparatus of a similar general nature. It will be understood, of course, that in order to effectively apply a strip-like length of paper as a spiral winding about a pipe it is necessary that the pipe be manipulated, both in rotative and longitudinally advancing movement with a fair degree of precision and in substantial uniformity at all times. With prior apparatus this has been accomplished only with some difficulty, and in many instances consistently acceptable results have not been obtained. The present invention substantially obviates these prior difficulties as will hereafter appear.

Another object of the invention resides in the provision of pipe handling apparatus as described and characterized above which may be readily adjusted to accommodate piping of various diameters, within predetermined design limits, so that the same apparatus may be employed in a variety of applications.

The above object further contemplates the provision of pipe handling apparatus which while being adjustable to accommodate pipe of various sizes, may be readily and accurately adjusted so as to maintain the ratio of rotational to longitudinal advancing movement constant under all conditions. Thus, where paper strip of a given size is utilized for wrapping the pipe it is desirable to maintain a predetermined advancing movement for each revolution

of the pipe so that the entire exterior surface is adequately covered, but without uneconomical consumption of the paper wrapping material.

More specifically, the invention contemplates a novel arrangement of a plurality of driving rollers arranged to support and drive the pipe in the manner intended by means of frictional contact with the exterior surface thereof, the ararngement being characterized by improved facilities for adjusting the rollers relative to each other to accommodate piping of various sizes, and for adjusting the angularity of the rollers with respect to the axis of the piping so that the ratio of rotative to longitudinal movement may be maintained constant for various sizes or may be otherwise adjusted if necessary or desirable.

Yet another specific object of the invention is the provision of improved pipe handling apparatus of the general type described comprising a plurality of cooperating sets of driving rollers arranged to engage a pipe length of section at spaced points and including means for interconnecting the various sets of rollers so that adjustment may be effected simultaneously and equally upon each of the sets.

Another object of the invention resides in specific improvements in apparatus of the nature described whereby the apparatus is rendered highly suitable for incorporation into a portable coating and wrapping unit. And to this end the invention seeks to provide apparatus which is simple in nature, easily and economically constructed, and durable and dependable in operation.

The above and other objects and advantages of the invention will become apparent upon full consideration of the following detailed specification and accompanying drawing wherein is illustrated a certain preferred embodiment of the invention.

In the drawing:

Figure 1 is a side elevation of pipe handling apparatus constructed in accordance with the teachings of my invention, the figure further illustrating, by simplified representation, the manner in which the apparatus is employed in combination with pipe coating and wrapping apparatus;

Figure 2 is an enlarged fragmentary view of the apparatus of Figure 1 illustrating certain features of construction of pipe driving rollers and mounting means therefor as contemplated by the invention;

Figure 3 is a fragmentary view taken along line III—III of Figure 2;

Figure 4 is a top plan view of the apparatus illustrated in Figure 2; and

Figure 5 is a broken-away view taken along line V—V of Figure 1.

Referring now to the drawings, and initially to Figure 1 thereof, the numeral 10 represents an elongated section of piping which may comprise, for example, a plurality of standard pipe sections welded in end-to-end relation. In the practice of coating and wrapping elongated pipe section, such as illustrated at 10, the piping is advanced longitudinally from left to right as viewed in Figure 1, while being simultaneously rotated in predetermined relation, and the pipe passes first through a coating device, indicated generally at 11, where tar or other suitable material is applied to the exterior surface of the pipe. After being coated uniformly about its exterior surface the pipe 10 then moves to a wrapping station, indicated generally at 12, where a continuous strip-like length of paper 13 is wound spirally about the pipe, covering its entire surface. In the present illustration the paper 13 may be supplied from a rotatable but otherwise stationary coil, not shown, the paper being inherently applied spirally onto the pipe due to the simultaneous rotative and longitudinal movement thereof as will be understood.

To manipulate the pipe **10** in the manner desired I have provided a plurality of cooperating pairs of driving heads **14**, each comprising a pair of driving rolls **15** and **16**, which driving heads are arranged to have cooperating driving engagement with the exterior surface of the pipe to impart thereto a simultaneous rotary and longitudinal movement to properly propel the same through the coating and wrapping stations **11** and **12**.

As shown in Figure 2, each of the driving heads **14** comprises a rigid support **17** having a horizontally disposed elongated tubular portion **18** at its upper end, the tubular portion comprising a separable upper member **18'** retained in place by a plurality of bolts **19**. Extending through the tubular portion **18**, and adapted to be firmly clamped thereby, is a similar but smaller tubular member **20** which mounts at its left hand or forward end a lower journal bracket for the lower drive roll **16**. The journal bracket comprises a transversely disposed rigid support **21** which may be, for example, welded directly the tubular member **20** and which supports a pair of spaced forwardly extending journal arms **22** and **23**, shown in Figure 4.

In the illustrated embodiment of the invention the arm **22** is secured directly to the end of the transverse support **21**, while the other arm **23** is spaced inwardly of the opposite end of the support **21** and is mounted in forwardy spaced relation thereto by means of a second transverse support **24**. The support **24** is secured at one end to the arm **22** and at the other end to a member **25** secured to and extending forwardly from the opposite extreme end of the transverse support **21**.

In accordance with the teachings of the invention the tubular member **20**, transverse support **21**, journal arms **22** and **23**, and supporting members therefor comprise a rigid assembly. And further in accordance with the invention the support **24** extends substantially below either of the arms **22** or **23** and is provided with an arcuate lower surface having a center of curvature about the axis of the tubular member **20**.

Cooperating with the arcuate lower surface of the support **24** is an arcuate bearing plate **26** which is rigidly secured to a platform **27'** which also rigidly mounts the support **17**. The arrangement is such that the entire journal bracket assembly, including the tubular member **20**, may be rotated within the support **17**, between predetermined limit positions, with the support **24** and bearing plate serving to absorb most of the downward loading forces applied to the driving head **14**.

Rotatably mounted in the journal arms **22** and **23**, by means of a transversely extending shaft **27** is the lower drive roll **16**, which is preferably formed of rubber or other resilient material. As will hereafter become more fully apparent the lower drive roll **16**, along with a like lower drive roll of a cooperating driving head, is utilized to support a pipe section **10** at one area along its longitudinal extent as well as to impart a spiral movement to the same as is desired.

Pivotally mounted to arm **22** and member **25** of the lower journal bracket is an upper journal bracket comprising a downwardly opening U-shaped frame **28** having forwardly extending journal arms **29** and **30** mounted rigidly thereon as shown in Figures 2 and 4. A transversely disposed shaft **31** serves to provide a pivotal connection between the upper and lower journal brackets. And it is in accordance with the teachings of the invention that the shaft **31** is rotatable with respect to both journal brackets otherwise than by the mere pivotal relation of the parts.

Rotatably mounted in the upper journal arms **29** and **30**, by means of a shaft **32** is the upper driving roll **15**, which is substantially identical to the lower roll **16**. It will be observed, however, that the spacing between the upper arms **29** and **30** is somewhat greater than the axial dimension of the upper roll **15**, providing a considerable clearance space between the roll **15** and the supporting

arms therefor. In the present embodiment of the invention I utilize this space to mount a sprocket **33** to be used in driving the roll **15** as will appear.

Referring to Figure 2 it will be noted that the shaft **31** is positioned so that its axis intersects the axis of the tubular member **20**. By this arrangement I may provide driving means for the shaft **31** comprising a shaft **37** journaled in the tubular member **20** and mounting at its forward end a bevel gear **34** adapted to operatively engage with a similar bevel gear **35** keyed to the transverse shaft **31**. The opposite end of the shaft **37** has keyed thereto a suitable sprocket **36** which is arranged to be driven by means to be hereafter described so that driving power may be imparted to the shaft **31** in the manner desired.

Keyed to the shaft **31** opposite the sprocket **33** on the upper roll supporting shaft **32** is a sprocket **38** which is arranged to drive the sprocket **33**, and hence the upper roll **15**, through a suitable chain represented schematically at **39**. Similarly, a sprocket **40** at the opposite end of shaft **31** is arranged to drive a sprocket **41** keyed to the lower roll supporting shaft **27**, a chain **42** providing a driving connection.

As will be observed, the arrangement is such that the rolls **15** and **16** may be driven by rotation of the main driving shaft **37** at sprocket **36**. And since the transverse shaft serves both as a pivotal connection for the upper and lower journal brackets and as a driving member, driving of the rolls **15** and **16** is not affected by relative pivotal movement of rolls.

To support the upper journal bracket in any predetermined pivotal position with respect to the lower journal bracket I provide an arrangement including an elongated threaded bolt **43** which connects the U-shaped bracket **28** and the tubular member **20**. A clevis **44**, comprising a plate **45** and spaced upstanding angle sections **46**, provides a rotatable mounting for a transversely disposed internally threaded pin **47** which engages the threaded portion of the bolt **43** in the manner shown in Figure 2. The head end of the bolt **43** is slidably engaged by a pin **48** which is in turn rotatably mounted with respect to the U-shaped bracket **28**. The arrangement is such that the head of the bolt **43** serves to limit pivotal movement of the upper journal bracket in a counterclockwise direction, while pivotal movement in the opposite direction is permitted by the slidable relationship between the shank of bolt **43** and pin **48**. And it will be observed that the forward limit position of the upper journal bracket may be readily adjusted by rotating the bolt **43** to shorten or lengthen the distance between pins **47** and **48**.

To maintain the member **48** in engagement with the head of bolt **43** I provide a relatively strong spring **49** which bears against the pin **48** and against a nut **50** retained on the threaded portion of the bolt. Nut **50** may be adjusted on the bolt **43**, as will be apparent, so that the spring **49** is urged with more or less resilient force against the pin **48**. And a lock nut **51** is provided so that the nut **50** may be locked in any adjusted position.

Thus it will be observed that the drive rolls **15** and **16** may be set at any predetermined spacing, depending upon the size of the pipe to be handled, and the spring **49** is employed to provide yieldable driving pressure. In addition, spring **49** permits the upper drive roll **15** to be temporarily displaced one way or the other from a normal driving position to compensate for such irregularities as may be present on the surface of the pipe.

In accordance with the teachings of the invention the driving heads **14** are employed in cooperating pairs, one facing the other, so that a length of piping may be passed between the heads in the manner shown in Figure 1. The piping is thus confined by four rolls, all of which assist in driving the pipe. The opposed pair of lower rolls **16** serve to support the weight of the pipe

while the pivotally mounted upper rolls 15 provide resilient confining pressure, all of which insures that the driving motion imparted to the pipe by the rolls will be substantially positive and uniform at all times.

As will be observed in Figure 1, a spiral driving motion may be imparted to the pipe 10 by disposing the cooperating driving at equal but opposite angles with respect to the longitudinal axis of the pipe so that upon rotation of the drive rolls 15 and 16 longitudinal as well as rotational components of motion will be imparted to the pipe. Of course, the width of the paper 13 will determine the amount of forward movement of the pipe which is desired for every revolution thereof, and this may be readily obtained by appropriately adjusting the angularity of the driving heads 14 with respect to the diametrical measurement of the pipe 10.

Referring again to Figures 2 and 3, it will be observed that the angularity of the driving heads 14 may be readily adjusted by loosening bolts 19 and rotating the entire head assembly, including tubular member 20, within the support 17. The arcuate lower surfaces of the forward supports 24 merely slide on the similarly arcuate bearing plates 25 as the heads 14 are rotated. Upon subsequent tightening of the bolts 19 the heads 14 are locked in place. And it will be observed that the forward supports 24 sustain substantially all of the weight load imposed upon the heads 14 by the pipe 10. This is an important feature of the apparatus since any appreciable deflection of the tubular members 20 would be undesirable as tending to bind the rotating drive shafts 37.

Usually it is desirable to provide two longitudinally spaced pairs of driving heads, as illustrated in Figure 1, so that driving engagement is had with the pipe 10 at spaced points. This becomes particularly important in the handling of pipe of very small size since the pressure exerted upon the pipe by the rolls 15 and 16 tends to deflect the same, and sometimes to a rather substantial extent. This effect or at least the difficulty caused thereby is minimized by the use of more than one set of driving heads at longitudinally spaced points as will be understood.

It will also be noted in Figure 1 that the opposing driving heads of each cooperating pair thereof are offset to a certain degree. This is desirable in many installations since the heads 14 must be moved closer together to handle piping of small sizes, and unless a certain amount of offset is provided the lower rolls 16 will interfere, preventing proper functioning of the apparatus.

To support the driving heads 14 in operative relation I provide, in the illustrated embodiment of the invention, a table structure comprising a pair of spaced transversely disposed channel members 52 which are rigidly supported above a floor or base 53 by means of suitable legs 54, and which serve to support and guide platforms 27' in transverse movement toward and away from the pass line of the pipe 10. It will be understood, of course, that the driving heads 14 positioned on one side of the pipe 10 or pass line thereof will be mounted on one platform 27', while the heads 14 positioned on the opposite side of the pipe will be mounted on a separate platform 27', not specifically shown, but similar in substantially all respects to the illustrated platform.

As shown in Figure 2 the platforms 27' are provided near each end with downwardly extending block portions 55 adapted to threadedly engage spaced shafts 56 and 57 (see Figure 5) whereby upon rotation of the shafts 56 and 57 the platforms 27' will be caused to move toward or away from the pass line of the pipe as desired. Shafts 56 and 57 are of course threaded oppositely at each end so that movement of each of the platforms 27' will be equal and opposite and the driving heads 14 will at all times be uniformly spaced from the pass line. To rotate the shafts 56 and 57 I may provide a crank 58 which connects, for example, shaft 56, and a chain 59 or other positive drive arrangement whereby equal rotation of both shafts 56 and 57 is effected upon rotation of the crank 58.

In order to simplify adjustment of the angularity of the driving heads 14 I have provided an arrangement for interconnecting all of the heads so that upon adjustment of one, similar equal adjustment is effected upon the others. Thus, as shown in Figures 1 and 5, I provide crank arms 60 which rigidly connect the drive head assemblies and extend radially outward thereof. Pivotally connecting the arms 60 and extending downwardly therefrom are connecting links 61 which extend through suitable openings in the platforms 27'. The links 61 are pivotally connected at their lower ends to bell crank levers 62 keyed to shafts 63 and 64 in the manner shown in Figure 5.

Shafts 63 are journaled in the table structure and are arranged in offset and overlapping relation. And both of the last mentioned shafts 63 carry gears 65 which are arranged to intermesh whereby rotation of one of the shafts 63 in a first direction will effect a similar rotation of the other shaft, but in the opposite direction. Thus, when one driving head of a cooperating pair thereof is adjusted into a new angular relation with the pipe 10, an equal and opposite adjusting movement is effected upon the other head of the pair.

In addition, I have connected the lower legs of the bell cranks 62 by means of links 66 so that adjustment of one driving head operates to effect the same adjustment of a corresponding driving head where more than one pair thereof are employed. As will be readily understood, this arrangement assures that all of the driving heads, regardless of the number of pairs thereof utilized, will be positioned in the same relation to the pipe 10.

As shown in Figures 2 and 5, shafts 63 and 64, carrying the bell crank levers 62, are splined for a substantial length, whereby to have rotary driving engagement with the levers 62 while at the same time permitting longitudinal sliding movement of the levers 62. Thus, when the crank 58 is rotated to effect an inward or outward movement of the platforms 27' and driving heads 14 the bell crank levers 62 are carried along with the platform in its movement. Suitable fork-like members 69 depending from the platforms 27' and engaging the levers 62 serve to effect such movement.

For driving the rolls 15 and 16 of the various driving heads 14 I have provided a drive shaft 66 which is journaled transversely in the table structure and which is provided with splined end portions as shown in Figure 5. Slidably mounted on each splined portion of the shaft 66 is a sprocket 67 adapted to have driving engagement with one or more of the driving heads 14 by means of chains 68. In the present embodiment of the invention each of the sprockets 67 is arranged to drive two heads 14, as shown in Figure 5. And means, not shown, similar to the fork-like member 69 are provided for shifting the sprockets 67 along the splined shaft 66 as the platforms 27' are adjusted inwardly and outwardly of the pipe 10.

Driving power is imparted to the shaft by means of a conventional electric motor 70, for example, and a suitable power transmission device 71 arranged to permit various output speeds to be transmitted to the drive shaft 66. Varied output speeds are of course desirable in order to adapt the apparatus for handling piping of various sizes.

It should thus be apparent that I have accomplished the objects initially set forth. Th apparatus disclosed herein is of a relatively simple nature yet is strong and durable and wholly suitable for the purpose intended. Apparatus of the type contemplated by this invention is generally subjected to extremely hard usage in that it is frequently transported from place to place as the site of operations is moved, for example, and the apparatus

is also generally subjected to direct exposure to the weather during much of the time. Thus I have attempted by my present invention to provide apparatus which would be most suited for operation under these severe conditions while at the same time being capable of easy adjustment to accommodate various sizes of piping and operative to provide a uniform and substantially positive driving motion.

Thus, my arrangement, comprising the releasably held tubular member **20** and forward support **24**, facilitates adjustment of the angularity of the driving heads **14** with respect to the pipe while at the same time providing an extremely rugged construction which is adequately able to withstand the weight of the piping handled as well as other forces to which the heads **14** may be subjected. And by providing interconnecting linkage whereby equal adjustment of all of a plurality of driving heads is assured I avoid undue wear upon the driving rolls **15** and **16** as would result where, for example, certain of the heads **14** were inadvertently adjusted at slightly different angles than others.

Another important feature of my invention resides in the manner of pivotally supporting the upper journal bracket and the arrangement for adjusting the relation of the upper journal to the lower journal. Thus, I have utilized the same shaft **31** both as a means of pivotally connecting the upper and lower journal brackets and as a drive shaft from which power may be applied to the upper and lower drive rolls **15** and **16** regardless of the angularity of the journal brackets.

To adjust the separation of the rolls **15** and **16** to accommodate any particular size of pipe it is merely necessary to rotate the bolt **43** to move the pins **48** and **47** either closer together or farther apart as may be desired. And with the rolls **15** and **16** in any preset position the spring **49** provides for further separation of the rolls against a yieldable force so that a yieldable driving engagement with the pipe **10** is afforded. In addition, the spring **49** provides a certain amount of flexibility whereby the rolls **15** and **16** may temporarily move farther apart or closer together to conform with irregularities in the pipe while maintaining driving engagement therewith at all times. And this feature may be of considerable importance in the coating, wrapping and reconditioning of used pipe as will be readily understood.

It should be understood, however, that the embodiment of my invention herein disclosed and specifically described is intended to be illustrative only. And reference should therefore be had to the appended claims in determining the full scope of the invention.

I claim:

1. In apparatus for handling pipe the combination of a pair of horizontally movable platforms, means to move said platforms simultaneously toward or away from each other, a driving head mounted on each of said platforms, each of said driving heads comprising a pair of spaced driving rolls, separate journal means for each of said rolls, means comprising a shaft for pivotally connecting said journal means, driving means connecting said shaft and each of said rolls, means comprising a cylindrical member secured to one of said journal members for rotatably mounting said driving heads, a support member rigidly secured to said one of said journal members, said support member having an arcuate lower surface, an arcuate bearing plate supported on said platform and arranged to engage the lower surface of said support member, and means to yieldably urge said journal members together.

2. In a driving head for pipe handling apparatus the combination of a support having a tubular portion therein comprising a clamp, a tubular member received in said tubular portion and releasably retained therein for limited rotational movement, a first journal member mounted on said tubular member at one end thereof, an arcuate supporting member for said first journal member, a second journal member pivotally connected to said first journal member, upper and lower drive rolls mounted in said journal members, means to rotate said drive rolls, and means to yieldably urge said second journal member toward said first journal member.

3. Apparatus according to claim 2 further characterized by said last mentioned means comprising an elongated bolt having pivotal connection with said second journal member and said tubular member, said bolt also having a slidable connection with one of said last mentioned members, and spring means adapted to yieldably act upon said bolt and one of said last mentioned members whereby to urge said second journal member toward said first journal member.

4. Apparatus according to claim 2 further characterized by said means to rotate comprising a first shaft journaled in said tubular member, means comprising a second shaft for pivotally connecting said first and second journal members, first drive means interconnecting said first and second shafts, and second drive means interconnecting said second shaft and said drive rolls.

5. In apparatus for handling pipe the combination of a pair of horizontally movable platforms, means to move said platforms simultaneously toward or away from each other, a driving head mounted on each of said platforms, each of said driving heads comprising a pair of spaced driving rolls, means comprising a cylindrical member for rotating each of said driving heads, and means interconnecting said driving heads whereby upon rotation of one of said heads in one direction said other head will be rotated equally in the opposite direction.

6. Apparatus according to claim 5 further characterized by said driving heads being positioned in offset relation whereby to prevent interference of said drive rolls upon said platforms and heads being moved together in close relation.

7. Apparatus according to claim 5 further characterized by said means interconnecting said driving heads comprising a pair of splined shafts and interconnecting means slidably engaging each of said splined shafts, said interconnecting means being carried by said platforms and being movable therewith, and means interconnecting said shafts whereby upon rotation of one of said shafts opposite rotation is imparted to the other of said shafts.

8. In a driving head for pipe handling apparatus the combination of a platform, a support mounted on said platform and having a tubular portion comprising a clamp, a tubular member releasably journaled in said tubular portion for limited rotational movement, said tubular member having an end portion extending forwardly of one end of said support, a first drive roll journal member rigidly secured to one end portion of said tubular member, a second drive roll journal member secured in pivotal relation to said first journal member, drive rolls carried by said journal members, a drive shaft for said drive rolls journaled in said tubular member, and yieldable means for urging said second journal member toward said first journal member.

9. Apparatus according to claim 8 further characterized by said yieldable means including means to limit the pivotal movement of said second journal member in a direction tending to move said rolls closer together.

10. Apparatus according to claim 8 further characterized by support means secured to said first journal member below and closely adjacent said drive rolls, and bearing means cooperating with said support means for supporting downward forces exerted upon said drive rolls.

11. In apparatus for handling pipe the combination of a pair of horizontally movable platforms; means to move said platforms toward and away from each other; driving heads mounted on each of said platforms, said driving heads each comprising in combination a support, a first journal member rotatably mounted in said support, a second journal member pivotally secured to said first journal member, drive rolls mounted in each of said

journal members, means to limit the pivotal movement of said second journal member in a direction tending to move said rolls closer together, and means to yieldably restrain pivotal movement of said second journal member in the opposite direction; means interconnecting said driving heads whereby upon rotation of one of said heads relative to the support therefor equal and opposite rotation of the other head will be effected, and means to clamp said heads in preset rotative positions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,030,283	Coda	June 25, 1912
2,588,714	Fleming	Mar. 11, 1952