April 23, 1963 P. E. HENLEY 3,086,509

MACHINE FOR CUTTING VITRIFIED CLAY PIPE

Filed Dec. 22, 1961 3 Sheets-Sheet 1

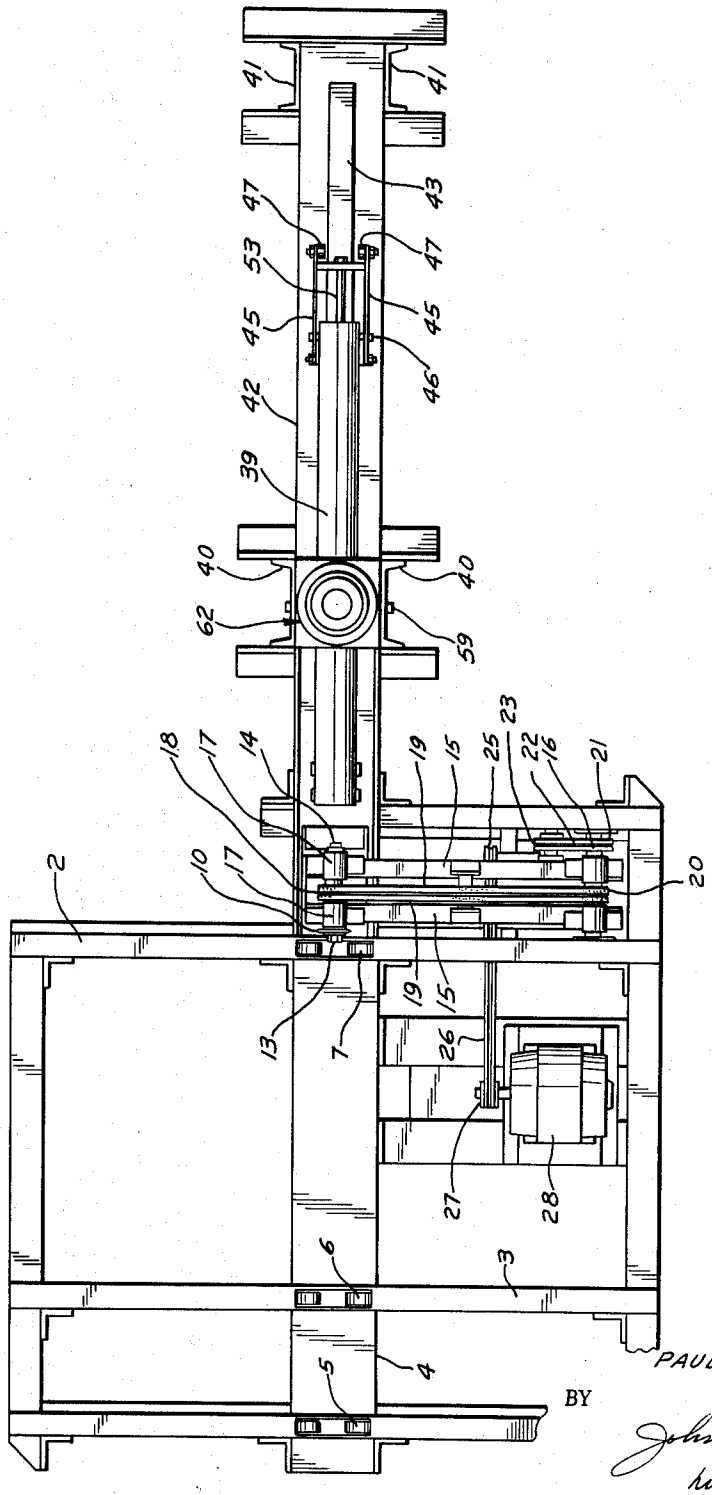


Fig. 1.

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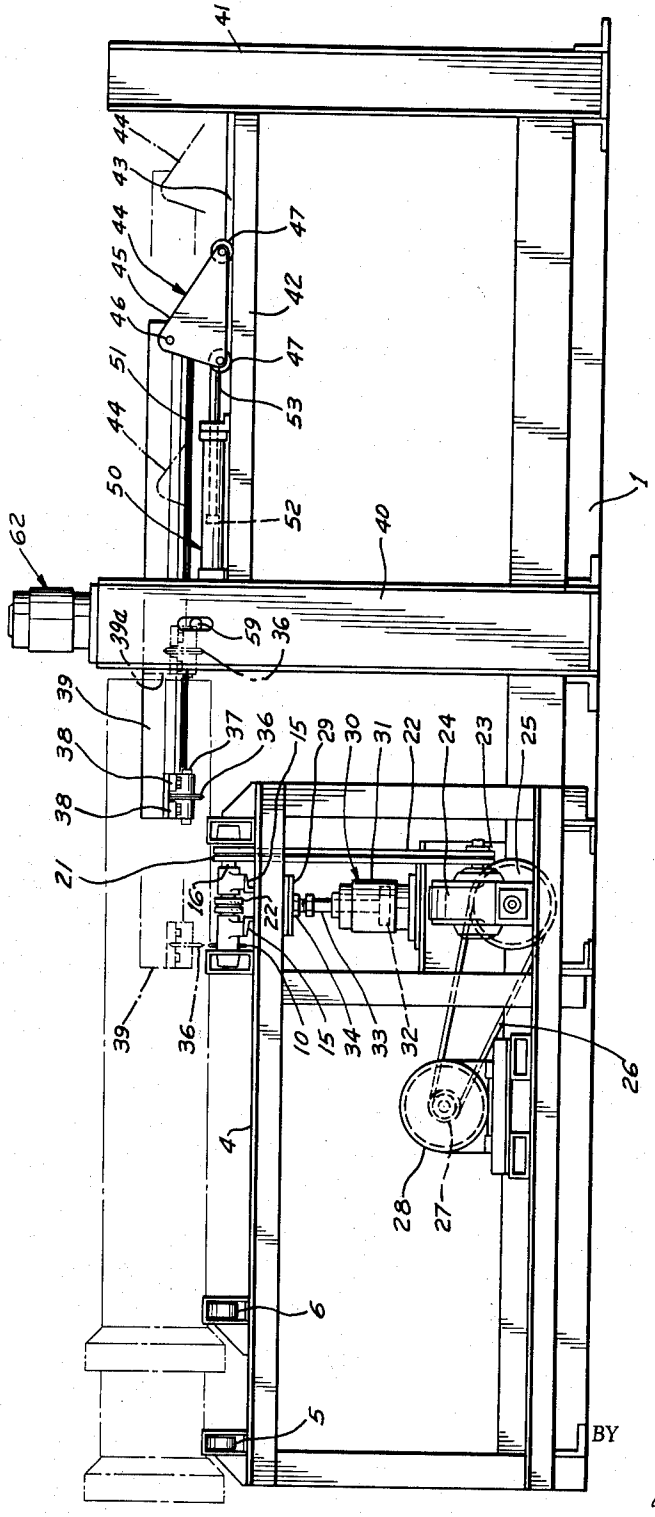


Fig. 2.

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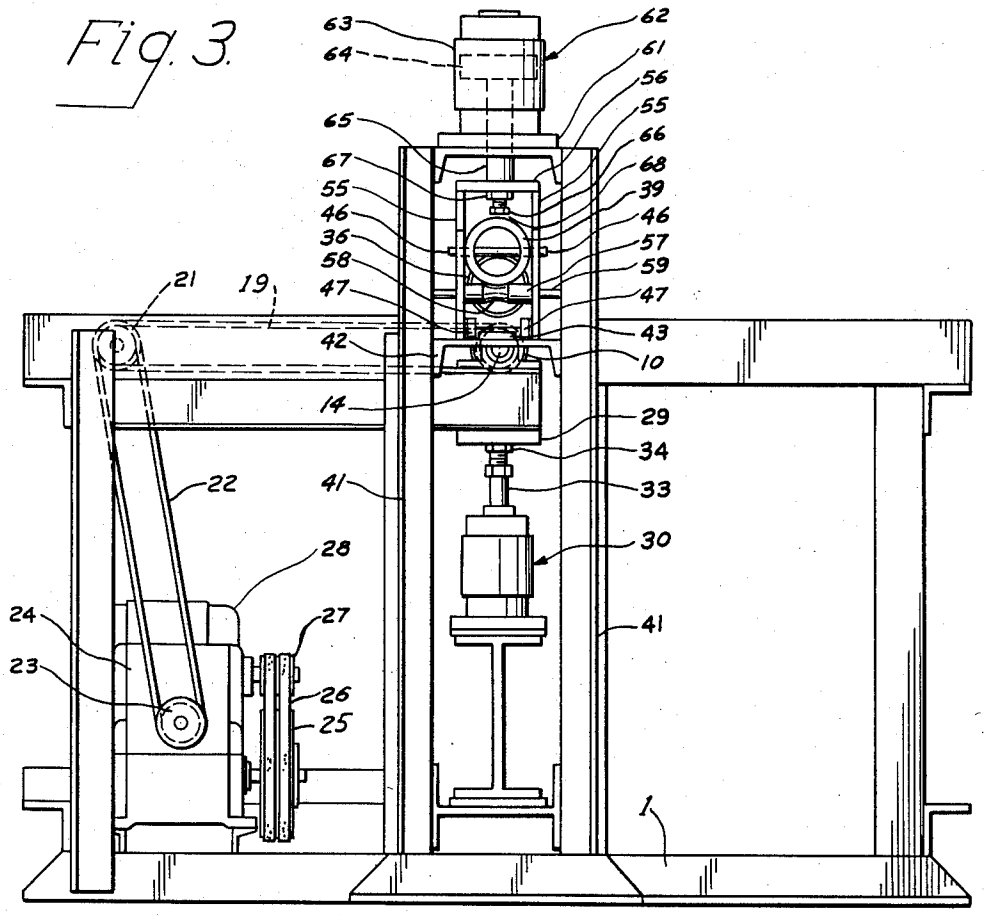
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Fig. 3.



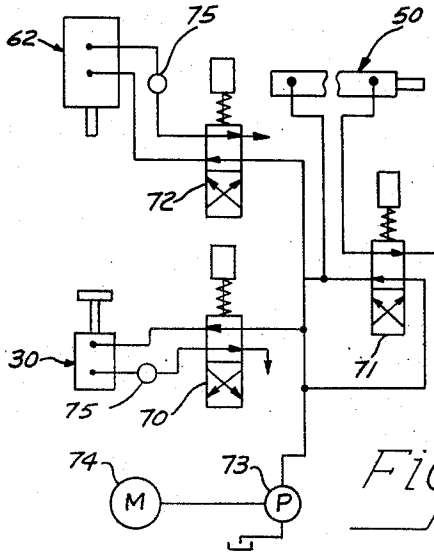


Fig. 5.

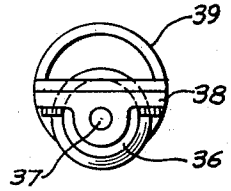


Fig. 4.

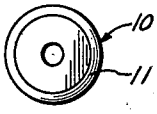


Fig. 6.

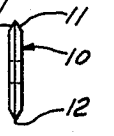


Fig. 7.

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Patented Apr. 23, 1963

3,086,509

MACHINE FOR CUTTING VITRIFIED CLAY PIPE

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Filed Dec. 22, 1961, Ser. No. 161,543
14 Claims. (Cl. 125—23)

This invention relates to a pipe cutting machine, and particularly to a machine for the cutting off of defective spigot end of vitrified and other types of sewer pipe.

The market for vitrified sewer pipe is highly competitive and consequently the pipe must be produced at a very low cost. Generally, the bell and spigot types of pipe are produced in standard lengths of four and five feet, though sometimes three foot lengths are sold. Extreme and special care in firing each individual pipe would be too expensive competitively for general sales, so the pipe are fired in large charges, reliance being placed on the law of averages that a high enough percentage of acceptable tile will result from each charge. As a result, an appreciable percentage of pipes having defective, out-of-round, or axially warped spigot ends, or spigot ends which are otherwise distored beyond the allowable tolerances for straightness and roundness, occur. However, there are many uses for tile shorter than the standard lengths, especially in making the final junction between two portions of a line, or in connecting the end of a line to a fitting so spaced that a standard tile is too long to fit. Accordingly, if the defective spigot ends can be removed, very large proportion of the labor and material involved in forming the tile can be salvaged and the shorter tiles resulting from removal of the defective ends can be sold for uses in locations where full lengths are too long, as above indicated. This may not have been a great saving at earlier times when such tile were made in two or three foot lengths, but is considerable in pipes of four or more feet in length.

Further, the cut-off spigot ends, instead of being fractures, can be removed in sound condition, and can be used for rough surface water drains and the like, such as field tile, or the drain tile of filter beds, where close fit joints are not desired.

Heretofore, when shorter than standard lengths of pipe are required, the cutting has been done in the field. However, this type of cutting and removal of part of the pipe from the spigot end is not very satisfactory, and often results in a fractured tile which may later develop leaks or be cracked apart by roots and the like, and in improperly fitting and sealed joints.

Hence, one object of the present invention is to make possible an effective and economical salvaging of sewer pipe by efficient removal of defective spigot ends, and to provide for the cutting of sewer pipe to the proper length for completing final joints in or to pipe lines.

A more specific object is to cut off the defective spigot ends in such a manner that neither the remaining belled portion of the tile nor the spigot end portion cut off is fractured, and so that the ends at the cut are smooth and free from jagged ends, and are severed in a plane normal to the axis of the tile.

Another object is to support and protect the cut-off spigot end so that, instead of being broken up, it is suitable for use for drains and the like in fields and other places where accuracy of fit and accuracy of shape are not important.

Many attempts have been made heretofore to remove the defective ends or to cut off the defective ends of such vitrified pipe at the manufacturing site. A common type of procedure was to use abrasive wheels, but these are

economically too expensive on a production basis, both because of the relatively slow speed of cutting and because of the cost of maintenance of the wheels. Furthermore, if a longitudinally warped pipe is rotated about its axis for cutting with a small diameter cutting wheel, the pipe binds on the wheel, after the wheel has cut partway into them, thereby damaging the pipe.

On the other hand, if a large wheel adapted to make a direct cut entirely through the pipe is employed, excessively large diameter abrasive wheels are required. If the pipe is not to be rotated, then very expensive equipment is required for rotating the abrasive wheel about the axis of the pipe. Another type of device is one employing a hardened steel wheel arranged for cutting the outside of the tile until a sufficient kerf is cut so that it cracks off the spigot end. However, this results in the breaking off the end and leaving edges too jagged and irregular to be useful for most purposes, and particularly for applying the various factory made die cast joints of various types of synthetic resin. Another attempt has been to provide a chain containing multiple cutting discs which is tightened around the pipe until it cracks off the end. This has the same disadvantage as the hardened steel wheel mentioned, as well as many of the disadvantages of the abrasive type machine.

In addition, it and others of the prior machines and devices have an inherent disadvantage of cutting along a plane which is not at a right angle to the axis of the sound, cylindrical salvaged length of pipe remaining.

The present machine is one which is arranged to score and kerf the pipe from the inside outwardly and the outside inwardly concurrently in a common plane normal to the axis of the cylindrical portion of the pipe until final fracture occurs of the circumferentially extending juncture material between the bases of the two kerfs. By this method, the cut end surfaces of each portion of the pipe are smooth and sound, and lie in a plane normal to the axis of the salvaged portion of the pipe. This plane results from the position of the supporting trunnions on which the pipe is located for rotation relative to the position and operation of the cutters employed.

Another object is to provide a machine of this character onto which the pipe may readily be rolled from the conventional skid or table into position for cutting and from which the salvaged portion of pipe can readily be rolled onto a discharge table or skid.

A more specific advantage resides in supporting the pipe for rotation about an axis normal to the cutting plane by trunnions which are arranged close to the shoulder of the bell of the pipe and close to the zone to be cut.

Another object is to arrange for the support of the cut-off spigot end of the pipe and remove it from cutting position into a position in which it can be removed from the machine readily without damage, and thus salvaged for use for rough drain tile and the like.

Various other objects and advantages of the invention will become apparent from the following description wherein reference is made to the drawings, in which:

FIG. 1 is a top plan view of the machine embodying the principles of the present invention.

FIGS. 2 and 3 are a front elevation and a right end elevation, respectively, of the machine illustrated in FIG. 1;

FIG. 4 is an enlarged fragmentary left end elevation of the internal cutter of the machine and its support;

FIG. 5 is a schematic showing of the control feature of the machine; and

FIGS. 6 and 7 are a side elevation and an end elevation, respectively, of one of the cutters used in the present invention.

Referring to the drawings, the machine comprises a

frame, indicated generally at 1, having at one end a supply ramp 2 and a discharge ramp 3 with a pipe supporting portion 4 therebetween. The pipe supporting portion 4 is so arranged that the pipes to be salvaged can be rolled down the ramp 2 into position on the portion 4 and, after the spigot portion has been cut off, the salvaged belled portion of the pipe can be rolled from the portion 4 onto the discharge ramp 3, and thus removed from the worksite.

In order to support the pipe in cutting position, the portion 4 is provided with pairs of trunnions, such as indicated at 5, 6, and 7, in the form of rollers rotatably mounted on the frame with their axes horizontally disposed. These trunnions are such that the pipes can readily be rolled thereonto from the ramp 2 and, when rolled thereonto, are supported thereon for rotation about a horizontal axis of the portion of the pipe to be salvaged. Generally, the trunnions 5 and 7 are arranged for supporting a five-foot length for removing one foot from the spigot end, while the trunnions 6 and 7 are arranged for supporting a four-foot pipe for removing one foot from the spigot end. The position of the trunnions 5 and 6 are such that they engage the pipe at the shoulder of the bell and thus limit its movement in a direction axially toward the cutter position. Generally, in use, if the longer pipe are to be salvaged, the trunnions 6 may be temporarily removed. On the other hand, if desired, all of the trunnions may be adjustable endwise of the portion 4 toward and away from the cutter position for cutting off preselected lengths from the spigot end of the pipe.

As mentioned hereinbefore, the machine is to operate for concurrently cutting a kerf into the pipe inwardly from the exterior periphery of and concurrently into the pipe outwardly from the interior periphery, both kerfs being in a plane normal to the axis of the trunnions and hence to the axis of the cylindrical salvaged bell portion of the pipe. The kerfs being coplanar, the pipe is cut from both peripheries partway inwardly of its thickness concurrently so that the pipe material between the bottoms of the kerf become so thin that the kerfed ends break off with a clean break which is in a plane normal to the axis of the portion of the pipe supported on the trunnions.

To this end, an external cutter 10 in the form of a cutting roller is mounted on the frame 1. The roller is a hardened steel disc of a uniform thickness except for its periphery which is bevelled inwardly from both faces of the disc, as indicated at 11, to provide a sharp cutting edge 12. The cutter 10 is secured by a nut 13 onto the threaded end of a power driven shaft 14 so that it is rotatable with the shaft. The cutter 10 is arranged to be raised from a normal position below the level of the peripheral surface of a pipe supported on the trunnions, upwardly toward the axis of the pipe. In order to support the cutter 10, while providing for a simple power supply for driving the shaft 14, a pair of supporting arms 15 are provided. The arms 15 are spaced apart axially of the shaft 14 and are mounted on a shaft 16, spaced from and parallel to the shaft 14, for swinging upwardly and downwardly about the axis of the shaft 16. Mounted on the end of the arms opposite from the shaft 16 are suitable bearings 17 in which the shaft 14 is secured for rotation about a horizontal axis while held in fixed position axially.

For driving the shaft 14, a suitable pulley 18 preferably of the V-belt type, is provided. The pulley 18 is driven by a pair of V-belts 19. The V-belts, in turn, are driven by a V-belt pulley 20 mounted on the shaft 16 for rotation therewith. The shaft 16, in turn, is provided with a co-rotatable dual V-belt pulley 21 which is driven by two V-belts 22 from a main V-belt driving pulley 23 of a transmission 24. The transmission 24 is driven by a pulley 25 through the medium of a V-belt 26 and a pulley 27 of an electric motor 28. The transmission 24 is a speed reduction transmission and may be arranged for varying the speed, if desired.

It is apparent that with this arrangement, the arms 15 can be swung upwardly and downwardly about the axis

of the shaft 16 the distance requisite for cutting into the tile to a depth from the exterior periphery. Since the pivotal axis of the arms is coincident with the axis of the shaft 16, this action can be obtained without any change in the tension of the belts 19 due to the different positioning of the arms 15. The arms 15 are provided, at a level below the axis of the shaft 14, with a suitable lifting platen 29. For lifting and lowering the swinging arms 15 upwardly about the axis of the shaft 16, a suitable piston and cylinder assemblage 30 is provided. This assemblage comprises a cylinder 31 in which is reciprocable a piston 32 having a piston rod 33. The upper end of the rod is provided with an adjustment bolt 34 which normally bears against the undersurface of the platen 29 when the piston is in fully retracted or lowered position. By admitting air pressure to the lower end of the cylinder 31, the piston is caused to rise moving with it the platen 29 and swinging the arms 15 upwardly for applying the power driven cutter 10 to the exterior periphery of the pipe while the cutter is being rotatably driven.

As heretofore mentioned, it is desirable that concurrently with the cutting or scoring of the tiles from the exterior periphery that it be cut or kerfed concurrently from the interior periphery in the common plane through and normal to the axis of the pipe portion supported on the trunnions 5 and 7 or 6 and 7. For this purpose, an internal cutter 36 is provided. This cutter is in the form of a disc which is the same in all respects as the cutter 10, except that it is not driven but is freely rotatable. The cutter 36 must be arranged so that it can be entered into the end of the tube and then moved against the inner periphery of the tube so as to cut a kerf coplanar with the kerf cut by the cutter 10, but also so that it is urged toward the cutter 10 with the axes of the cutters 10 and 36 in a common plane normal to the axis of the pipe portion supported on the trunnions. Furthermore, it must be self-supported so that it can be moved inwardly, upwardly, from the inner periphery of the pipe a substantial distance so that it can readily be withdrawn or inserted through an end of a pipe which may have an axis at a considerable angle to the axis of the portion of the pipe resting on the trunnions. For this purpose, the interior cutter 36 is carried on a rotatable shaft 37 which is approximately horizontal or parallel to the shaft 14 and which is supported in suitable bearings 38. The bearings 38 are secured by suitable bolts to a rigid rocker or operating arm 39 by which the cutter 36 is moved axially of the pipe so that it cuts in a plane normal to the pipe axis and coplanar with the cutter 10, and so that it can be moved approximately radially of the tile for cutting or scoring a kerf therein.

Thus, the cutter 36 is mounted on the outer end of the rigid rocker arm 39 and the arm 39 is mounted for swinging upwardly and downwardly about a horizontal axis and for movement generally axially of the pipe. The frame 1 is provided with pairs of upright frame members 40 and 41. The upright frame members 40 are spaced apart from each other horizontally transversely of the axis of the cutter 36, as also are the members 41. A supporting frame member 42 extends from the members 40 to the members 41 and is connected at its opposite ends to both of the members 40 and to both of the members 41, thus providing a horizontal table 42.

Mounted on the table 42 is a longitudinal guide 43 on which a carriage 44 is mounted for movement endwise of the table in a direction toward and away from the pipe supported on the trunnions. The carriage 44 comprises a pair of upright plates 45 spaced apart horizontally from each other and pivotally connected by a pivot 46 to the arm 39. The arm 39 is preferably in the form of a rigid thick wall tube and it is disposed between the plate 45 for swinging about the axis of the pivot 46. The plates are also provided with suitable rollers 47 which engage the opposite edges of the guide 43 and roll along the upper surface of the table 42, thus constraining the carriage

to move in a lineal path toward and away from the pipe. This arrangement permits the movement of the arm **39** endwise so as to insert it into and withdraw it from the spigot end of the pipe, and also so as to permit its being lifted and lowered for applying and withdrawing the cutter **36** from the interior surface of the pipe.

For moving the carriage **44** along the guideway **43**, a suitable reversible piston and cylinder assemblage **50** is provided. This assemblage comprises a cylinder **51** in which is reciprocable a piston **52** having a piston rod **53**. The rod is pivotally connected to the carriage **44**. Thus, upon extension of the assemblage **50**, the arm is withdrawn to the position illustrated in FIG. 2, and upon retraction of the piston it is advanced to the cutting position. In order to support the arm so that it is freely swingable about the axis of the pivot **46**, and yet is freely movable axially, a suitable guide and supporting head is provided. This head comprises a pair of upright plates **55** spaced apart from each other at opposite sides of the arm **39** and connected together at the top by a cross plate **56**. Mounted between the plates **55** below the arm **39** is a roller **57** having a concave central portion **58** for rolling engagement with the outer periphery of the arm **39** and for supporting the arm in slightly spaced relation to the inner surfaces of the plate **55**. The roller **57** is mounted on a shaft **59** which extends entirely through the plates **55** and at its outer ends extends through suitable elongated slots in the upright members **40** for limiting the upward and downward movement of the arm **39**.

Mounted on the upper end of the upright members **40** is a transverse supporting member **61** on which is mounted a piston and cylinder assemblage **62**. This assemblage comprises a cylinder **63** in which a piston **64**, having a piston rod **65**, is reciprocable. The lower end of the piston rod **65** is tapped to receive an adjusting bolt **66** which can be adjusted to various extended and retracted positions and secured in the position selected by means of a lock nut **67**. The underface of the bolt, when the piston is retracted, is normally slightly above the upper peripheral surface of the arm **39**, as indicated at **68**.

Upon admitting air to the upper end of the cylinder of the assemblage **62**, the piston is moved downwardly until the bolt **66** engages the arm **39** about the axis of the pivot **46**, thus applying the cutter **36** to the interior periphery of the pipe. Upon admission of air to the lower part of the assemblage **62**, the bolt is lifted clear of the arm **39** and the roller **58** is engaged with the underside of the arm and lifts the arm to an upward position which retracts the cutter **36** from the interior periphery of the pipe.

For the purpose of supporting the cut-off spigot ends for salvage and withdrawing it out of the path of the salvaged bell portion of the pipe after the cut-off operation, the arm **39** extends beyond the upright support **40** for a considerable distance even when partially retracted, although the arm **39** may be retracted to such a degree that the cutter **36** is substantially at the face of the members **40** nearest the cutter **10**.

As illustrated in FIG. 5, the assemblages **30**, **50** and **62** are arranged to be operated remotely. A simple control for this purpose may comprise solenoid operated, spring return, reversing valves **70**, **71** and **72**, respectively, all of which are connected to a suitable source of air under pressure which may be a pump, indicated at **73**, driven by a motor **74**, or the usual air lines provided in the plant. The air pressure is adequate to apply the outer or lower cutter **10** under pressure. Greater pressure is provided on the inner or upper cutter **36** than on the lower cutter **10** so as to prevent raising the pipe off of the trunnions by the cutter **10** while the pipe is being cut. Since the plane of cutting is adjacent to the trunnions **7**, the downward pressure of the cutter **36** does not cause the pipe to cock or tilt relative to the axes of the trunnions.

The differentials in total pressure applied to each cutter may be obtained by pressure regulators **75** in the lines, or by using cylinders of different bores, or both. For example the cylinder **63** may be five inches and the air pressure supplied thereto from 80 to 90 p.s.i., the total thus applying a downward pressure to the cutter **36** of from 1550 to about 1750 pounds. Assuming the lower cylinder **31** has a four inch bore and the pressure is supplied to about 60 to 70 pounds p.s.i., the total upward pressure applied to the cutter **10** might range from 750 to about 800 pounds, or approximately half as much as that applied to the cutter **36**. These pressures can be preselected by pressure regulators **75**, if desired, but it is desirable that the cutter **36** be applied with pressure which is substantially greater than that with which the lower cutter **10** is applied, yet both pressures must be at all times adequate to apply the cutters to the pipe to cause the cutters to cut kerfs both from the inside and from the outside of the pipe, concurrently, so that the material between the bottoms of the kerf, and which must be finally fractured to free the spigoted end and bell end from each other, is a substantial distance inwardly radially of the pipe from both the external peripheral surface and the internal peripheral surface.

In operation, the pipe are loaded onto the ramp **2** with the bell ends to the left in FIG. 1. In this position, they are rolled across the ramp, the leading pipe being rolled onto the trunnions **5** and **7** if it be a five foot length, or the trunnions **6** and **7** if it be a four foot length. The pipe are pushed spigot end foremost toward the cutter **10**, or to the right in FIG. 1, on the trunnions so that the shoulder of the bell rests against the proper one of trunnions **5** and **6**. At this time, the arm **39** is in a fully withdrawn position, as indicated by the dot-dash line **39***a* in FIG. 2. The cutter **10** is being continuously driven by the motor **28** through the transmission mechanism hereinbefore described. The cutter **10** is below the level of the underside of the pipe. In this position, the assemblage **50** is energized to move the arm **39** to dispose the cutter **36** in the spigot end of the pipe in coplanar relation to the cutter **10**, but in spaced relation to the interior peripheral wall of the pipe. The outer end of the arm **39** and the cutter **36** are spaced from the inner periphery of the tile a sufficient distance so that the inner wall surface of the spigot end of a pipe with a longitudinally curved or warped spigot end will not strike the arm **39** or cutter **36** as the warped end swings in eccentric relation to the axis of the portion of the pipe supported on the trunnions as the pipe is rotated on the trunnions. The action of the cylinder **50** continues until it is in fully retracted position and thus serves as its own stop to stop the arm in the fully advanced extended position with the cutter **36** coplanar with the cutter **10**.

Next, the assemblage **62** is actuated to cause it to depress the arm **39** about the axis of the pivot **46**, thus applying the cutter **36** under cutting pressure to the interior peripheral surface of the pipe. Since the cutter **36** is not driven and the pipe at this time is not rotating, the cutter merely bears against the interior surface without any appreciable cutting.

Next, the assemblage **30** is operated to lift the driven cutter **10** into pressure contact with the exterior of the pipe in the plane normal to the axis of the bell portion of the tile as that in which the cutter **36** is disposed. Since the cutter **36** is pressed downwardly with greater force than the cutter **10** is pressed upwardly, the pipe remains rotatably supported by its outer peripheral surface on the trunnions. When the cutter **10**, which is continuously driven, is pressed firmly against the exterior of the pipe, it engages under sufficient frictional contact to rotate the pipe about an axis parallel to the axes of the trunnions. This is the only drive for rotating the pipe. As the cutter **10** rotates the pipe, it also cuts a kerf therein from the outside inwardly. At the same time, since the pipe is being rotated, its interior periphery frictionally rotates the

cutter **36** so that it rolls along the interior periphery and cuts a coplanar internal kerf from the inside outwardly.

The driving of one cutter only is highly desirable because of the difference in radii of the bottoms of the two kerfs at each instant of cutting, the radius of the bottom of the outer kerf continuously decreasing and that of the inner kerf continuously increasing. If both cutters were driven, very careful timing in driving would be required to see that each cutter rolled without appreciable slippage against the periphery of the tile. Such slippage between the cutters and the pipe soon wears out the cutters, or reduces their cutting efficiency to such a degree that they must be removed, sharpened, and replaced frequently, a procedure which is expensive.

Pressure of the assemblages **62** and **30** continues until the portion of the pipe between the spigot end and the plane of the kerfs breaks off. Usually this occurs when the cutters have cut into the pipe a substantial distance from both peripheral surfaces so that only a web between the bases of the kerfs remains. This web breaks generally very smoothly and does not cause chipping or fracturing of the vitreous surface. It breaks off clean, leaving almost planar exposed ends. The spigot portion of the pipe thus cut off cannot drop from the overhanging end of the arm **39**. As soon as the break off occurs, the arm **39** rises and retracts, thus supporting the cut-off portion and carrying it back to a position away from the cutters and in which it can readily be removed and thus salvaged, while the bell portion of the pipe remaining supported on the trunnions can readily be removed by rolling onto the discharge ramp **3**. Thus, not only the bell portion of the pipe, but also the spigot end portion of the pipe is salvaged.

The apparatus is shown with the outer cutter **10** driven. Obviously, the inner cutter could be driven and the outer cutter left free to rotate as a follower. However, this greatly complicates the structure inasmuch as the driving mechanism must be maintained within such a small area and the thickness of the walls of the pipe or arm **38** must be considerable to withstand the force with which it is applied.

If desired, instead of individually controlling the valves **70**, **71**, and **72**, a single sequence control of conventional make may be employed, so that the assemblage **50** will first advance the arm **39** to cutting position, then the assemblage **62** will be operative to apply the internal cutter **36**, followed by operation of the assemblage **30**, to apply the lower or external cutter **10**.

Having thus described my invention, I claim:

1. A cut-off machine for cropping defective spigot ends of clay pipes and comprising: pipe supporting means adapted for supporting a length of clay pipe for rotation about a predetermined axis coincident with the axis of the normal portion of the pipe, external rotatable cutter means for engaging and cutting an external peripherally extending kerf in the pipe from the exterior of the pipe inwardly during rotation of the pipe about said predetermined axis, internal rotatable cutter means for engaging and cutting an internal peripherally extending kerf in the pipe from the interior of the pipe outwardly during said rotation, supporting means for the cutter means and supporting the cutter means for movement relative to each other in a direction endwise of said predetermined axis into a cropping position wherein they can cut kerfs in a common plane normal to said predetermined axis, and for movement transversely of said predetermined axis and relatively toward each other while in said location, and cutter applying power means for effecting the transverse movement of the cutter means.

2. A machine according to claim 1 wherein drive means are provided for rotating a pipe so supported about its normal axis during cutting by the cutter means.

3. A machine according to claim 1 wherein the cutter power means are operable for urging the cutter means into cutting position under yielding pressure.

4. A machine according to claim 1 wherein at least one cutter means is a power driven rotary cutter rotatable about an axis parallel to said predetermined axis, said drive means comprises said one rotary cutter, and the pipe supporting means are adapted to support the pipe for rotation by the power driven cutter means.

5. A machine according to claim 4 wherein the other cutter means is a rotary idler cutter freely rotatable about an axis parallel to said predetermined axis and adapted to be driven rotatably by frictional engagement with a pipe being rotated by the power driven cutter.

6. A machine according to claim 5 wherein the cutters are positioned peripherally of the predetermined axis so that their instantaneous points of engagement against the internal and external surfaces of a pipe so supported will be at substantially the same peripheral location about said axis.

7. A machine according to claim 4 wherein the pipe supporting means comprises sets of idler rollers adapted to engage the outer periphery of the pipe at axially spaced locations, one set of which is adjacent said plane of the cutter means, and both sets of which are aligned radially with the uncropped portion of the pipe.

8. A machine according to claim 7 wherein the other of said sets of idler rollers is adapted to engage the pipe at the base of the bell.

9. A machine according to claim 1 wherein the power means are operable for effecting the transverse movement of the cutter means concurrently, whereby a pipe can be kerfed internally and externally concurrently.

10. A machine according to claim 1 wherein the supporting means of the cutter means includes an arm, means supporting the arm for relative movement generally endwise of said axis into position to lie within a supported pipe in spaced relation to the inner peripheral wall surface of the pipe, and for movement such that the portion of the arm in the pipe can move transversely toward and away from the pipe wall, and means connecting the internal cutter means on said arm portion.

11. A machine according to claim 1 wherein the supporting means for the cutter means includes two individual supports, one for each cutter means, and each support supporting its associated cutter means for movement toward and away from its cutting position, and separate power means are provided for the individual supports, respectively, for moving them to cutting position, respectively.

12. A pipe cropping machine for cropping a defective end portion of a bell and spigot clay pipe, and comprising a frame, a plurality of supporting idler rolls thereon adapted to engage the periphery of a pipe adjacent the bell and adjacent, but spaced from, the part to be cropped, and to support the pipe in fixed position axially and for rotation about a predetermined axis coincident with its normal axis, a power rotated rotary cutter mounted on the frame for movement toward the pipe axis for engaging the exterior of the pipe and cutting an external peripheral kerf in the pipe adjacent the part to be cropped, power means to effect said movement, whereby, during cutting, the power rotated rotary cutter can cause the pipe to rotate about its normal axis, an internal idler rotary cutter, a carrier therefor mounted on the frame and arranged for movement endwise into an end of the pipe in spaced relation to the internal pipe wall, while the pipe is supported on the idler rolls, to position the internal cutter for cutting an internal kerf in the pipe at the same position, lengthwise of the pipe, as the external kerf, and for movement transversely to cause the internal cutter to move transversely of the pipe toward the external cutter and so that the cutters engage the pipe internally and externally, respectively, and power means to effect said endwise and transverse movements, respectively.

13. A machine according to claim 12 wherein the carrier includes a slide movable endwise relative to the

pipe, and pivot means connect the arm to the slide for swinging of the arm about an axis extending in a direction transversely of the predetermined axis.

14. A machine according to claim 1 wherein the pipe supporting means are idler rollers, the internal cutter means is an idler rotary cutter, and the external cutter means is a power driven rotary cutter operable to rotate the pipe by its frictional engagement therewith for cutting,

and said rotary cutter is the sole means for rotating the pipe.

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