

March 9, 1943.

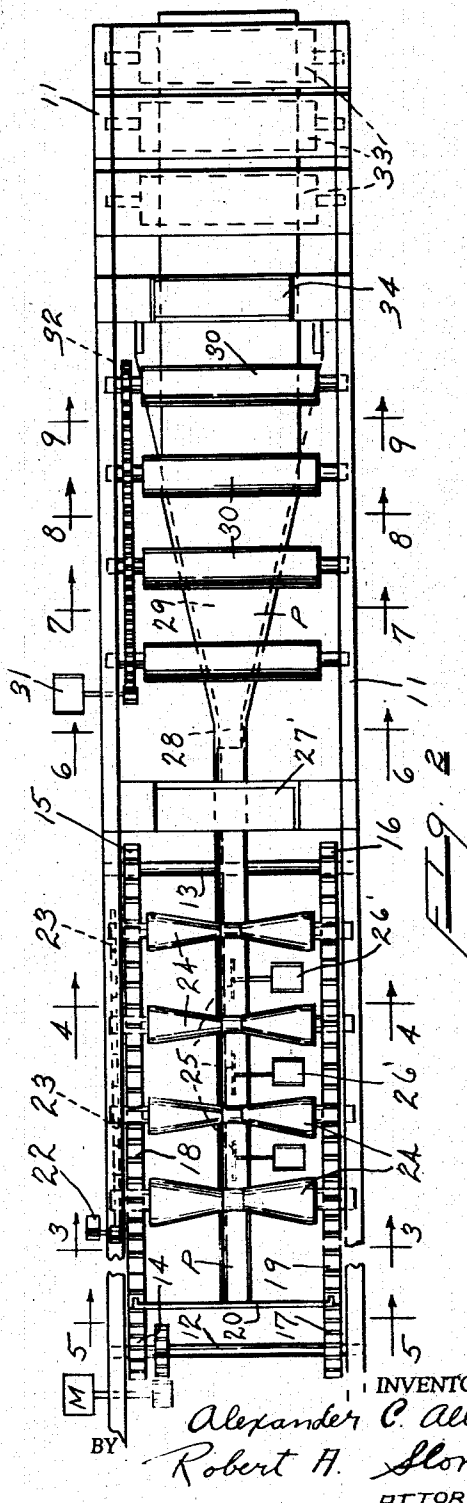
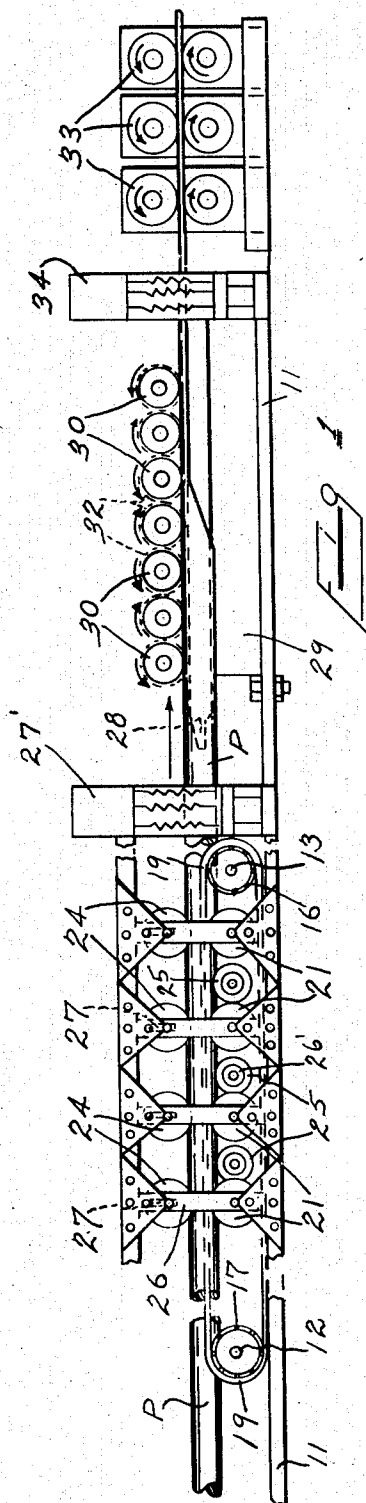
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2,313,702

APPARATUS FOR SPLITTING, SPREADING, AND FLATTENING PIPE

Filed Feb. 5, 1942

2 Sheets-Sheet 1



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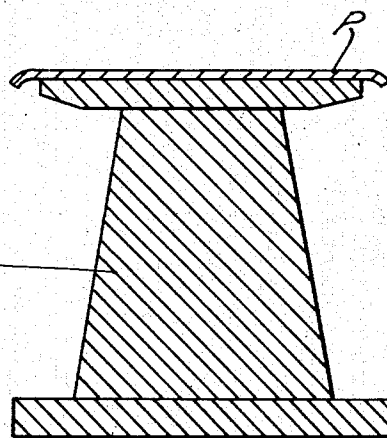
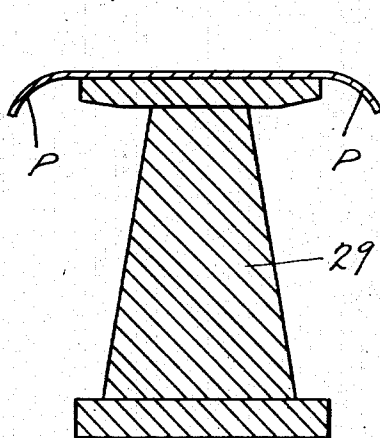
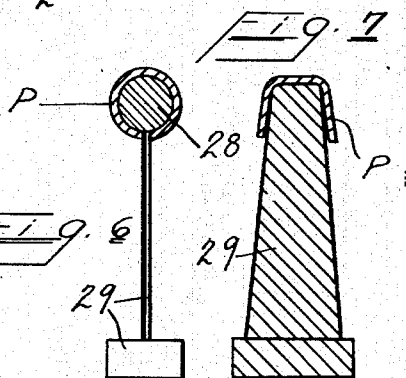
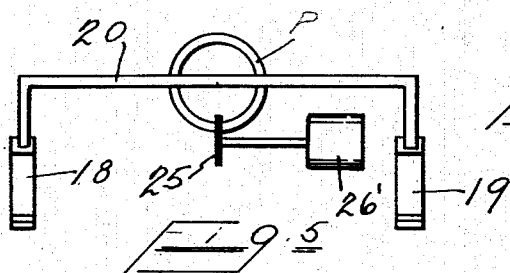
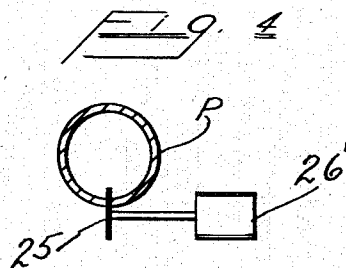
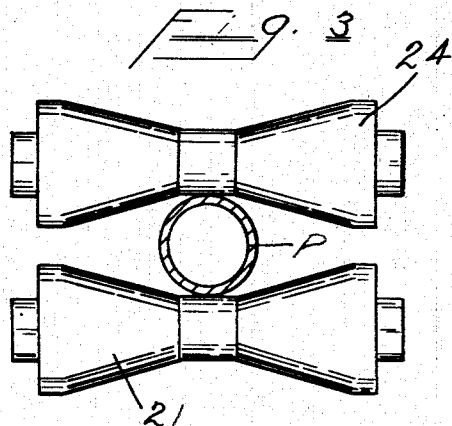
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APPARATUS FOR SPLITTING, SPREADING, AND FLATTENING PIPE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,313,702

APPARATUS FOR SPLITTING, SPREADING,
AND FLATTENING PIPEAlexander C. Allen, Monroe, Mich., assignor of
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Application February 5, 1942, Serial No. 429,628

11 Claims. (Cl. 29—17)

This invention relates to an apparatus for splitting and spreading pipe, and more particularly to a means for performing a series of steps for progressively slitting or cutting lengthwise a length of pipe, drawing the slit pipe over a suitable forming anvil, thereby spreading open the pipe into a flat sheet, and further drawing said sheet through a series of leveling rolls to produce a flat length of metal stock.

The invention also relates to suitable apparatus for carrying out each of the steps in the above mentioned method.

Heretofore tubular goods that are rejected for mechanical failure, not physical stress, in failing to come up to certain predetermined standards, are utilized where possible in the manufacture of ornamental items such as poles, railings, vent pipes or non-pressure purposes. However, it is seen that their utilization is somewhat limited as compared to their possible utility if such rejected pipe could be opened up and flattened into flat strips of stock, plates, or sheets.

The same is true of old and discarded pipes and tubing, for this source of pipe is equally available. It would appear that there is considerable tonnage of old pipe and tubes which would also come up to the specifications required of plates and sheets or strips produced from new rejected tubular goods.

It is therefore the object of this invention to teach novel apparatus for reducing metallic tubular goods new or old to flat sheets or strips of stock.

It is the object of this invention to teach an apparatus for slitting tubular stock, and then forming or spreading the same into flat sheets or strips.

It is the further object herein to provide also a means for leveling out such flattened stock for commercial use.

It is a further object herein to provide an apparatus for rendering the tubular stock partially malleable before the forming operation; and also, if desired, rendering the flattened stock further malleable before leveling or reducing the gauge of the same through suitable rollers.

It is a still further object herein to provide a means for propelling a length of pipe over a delivery table and into the conveying rollers which are adjacent a plurality of tandem set saws or cutters disposed therebeneath.

This invention relates to the various means hereinafter described in detail and also to the various arrangements of apparatus and their various combination as now more fully set out

in the appended specification and drawings of which—

Fig. 1 is a fragmentary diagrammatic side elevational view of apparatus for carrying out the various methods taught by this invention.

Fig. 2 is a fragmentary top plan view thereof.

Fig. 3 is a fragmentary section on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary section on line 4—4 of Fig. 2.

Fig. 5 is a fragmentary section on line 5—5 of Fig. 2.

Fig. 6 is a fragmentary partial section on line 6—6 of Fig. 2.

Fig. 7 is a fragmentary partial section on line 7—7 of Fig. 2.

Fig. 8 is a fragmentary section on line 8—8 of Fig. 2.

Fig. 9 is a fragmentary partial section on line 9—9 of Fig. 2.

The above drawings illustrate merely preferable apparatus for carrying out the various methods embodied herein, it being expressly understood that other apparatus within the scope of the claims hereinafter might equally well carry out such methods.

Referring to the drawings Fig. 1 shows a partially broken away delivery table 11 upon which pipe P is placed before being slit. Shafts 12 and 13 rotatably journaled within said table have sprocket wheels 14, 15, 16 and 17 secured thereon providing rotatable actuating means for the interconnecting sprocket chains 18 and 19.

A portable yoke 20 with its ends suitably secured to said chains is adapted to further push the pipe onto the conveying rollers 21, after the same has been manually started on its way over the delivery table 11. Said rollers journaled within table 11 and power actuated by a motor 22 and a train of intermeshing gears 23 cooperates with the hold-down rollers 24 for conveying said pipe P into operative cutting engagement with a series of tandem disposed rotary saws or cutters 25. After said yoke has reached its full travel via the propelling chains, the yoke gravitates out of position and is returned to the end of the delivery table 11 manually or by conveyor belt. It is understood that a plurality of yokes may be employed in spaced relation on said conveyor.

Hold-down rollers 24 rotatable journaled within the supporting brackets 26, are adapted to vertical adjustment within suitable slots 27 therein so as to accommodate various diameters of pipe.

Rotary pipe cutting saws or cutters 25 each

separately actuated by motors 26' are disposed in a line longitudinally of the pipe P and are so positioned vertically below said pipe as to progressively take deeper cuts in the pipe, as it proceeds as shown in Figs. 1 and 4.

The power actuated rolls 21 convey the pipe further longitudinally whence it passes through preferably an electric induction heater 27' thereby producing a malleable or partially plastic condition to the slit pipe prior to its being spread. This heater is advantageous but is not absolutely necessary to the carrying out of the above described method.

As the forward end of the slit pipe proceeds over the nose or horn 28 of the anvil 29 it is further engaged by the powered rolls 30 actuated by motor 31 and the intermeshing train of gears 32 even before spreading of the pipe begins. Buckling of the pipe is thus prevented because at the moment spreading begins the pipe is firmly held between the top surface of the anvil 29 and the rollers 30.

Anvil 29 at its front portion as in Fig. 6 is relatively thin coinciding to the width of the cut already made in the longitudinally progressing pipe. Anvil 29 however tapers outwardly progressing over its entire length as best seen in Figs. 7, 8 and 9 whereby the split pipe is progressively spread apart until it tends to assume a substantially flattened out shape at the end of the anvil. Throughout the spreading operation the pipe is held down to the top surface of the anvil by the propelling rollers 30.

Pipe P as seen in Figs. 1 and 2 is then further translated through a plurality of leveling or gauge reducing rollers 33, each separately power operated in any convenient manner, and comes out of said rolls as a flat strip or sheet of stock.

A second electric induction heater or any other type 34 may be interposed between rollers 30 and the leveling rollers 33 for the same reason above given in respect to the induction heater 27.

More particularly, in a case where the rollers 33 are gauge reducing it is desirable that the sheet or strip of material be first rendered malleable or slightly plastic to facilitate said reduction of gauge.

In this event it may be desirable to provide a suitable table or other conveying means for carrying the stock to a quenching tank for cooling before the same is stored for future use or delivery.

It is contemplated, if desired, that a vacuum cleaner or blower or both could be employed for carrying out a further step in the above method for cleaning out dirt from the pipe before it reaches the cutters. And, or on the other hand a magnetizing coil could be employed for picking up ferrous metal particles in the pipe before cutting.

It will be understood that any desired number of rollers may be employed at any point in the conveying apparatus. It may be for instance, that five rollers could be used to advantage at points 21 and 24.

Having described my invention, reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. Apparatus for producing sheets or strips of stock from pipe comprised of operable pipe translating means onto which said pipe is adapted to be supported, means disposed above said operable means adapted to exert a downward pressure on said pipe, rotatable cutting means adjacent said

operable means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, and operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same.

2. Apparatus for producing sheets or strips of stock from pipe comprised of operable pipe translating means onto which said pipe is adapted to be supported, means disposed above said operable means adapted to exert a downward pressure on said pipe, rotatable cutting means adjacent said operable means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, and leveling rollers through which said pipe is further adapted to be translated for obtaining a flat sheet of stock.

3. Apparatus for producing sheets or strips of stock from pipe comprised of operable pipe translating means onto which said pipe is adapted to be supported, means disposed above said operable means adapted to exert a downward pressure on said pipe, rotatable cutting means adjacent said operable means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, and pre-heating means through which said pipe is adapted to be translated disposed intermediate said anvil and said cutting means.

4. Apparatus for producing sheets or strips of stock from pipe comprised of operable pipe translating means onto which said pipe is adapted to be supported, means disposed above said operable means adapted to exert a downward pressure on said pipe, rotatable cutting means adjacent said operable means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, pre-heating means through which said pipe is adapted to be translated disposed intermediate said anvil and said cutting means, gauge reducing rollers through which said spread pipe is further adapted to be translated for obtaining a flat sheet of reduced gauge stock, and pre-heating means through which said flattened out strip of material is adapted to be translated disposed intermediate said anvil and said gauge reducing rollers.

5. Apparatus for producing sheets or strips of stock from pipe comprised of a delivery table for longitudinally supporting pipe, operable pipe translating means onto which said pipe is adapted to be supported, means disposed above said operable means adapted to exert a downward pressure on said pipe, rotatable cutting means adjacent said operable means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same.

6. Apparatus for producing sheets or strips of

stock from pipe comprised of a delivery table for longitudinally supporting pipe, a plurality of transversely disposed power actuated rollers onto which said pipe is adapted to be translated, a plurality of idler hold-down rollers transversely disposed above said power rollers, rotatable cutting means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, and operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same.

7. Apparatus for producing sheets or strips of stock from pipe comprised of operable pipe translating means, means disposed above said operable means adapted to exert a downward pressure on said pipe, a plurality of rotatable cutting means disposed in a line for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, and operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same.

8. Apparatus for producing sheets of stock from pipe comprised of operable pipe translating means, means disposed above said operable means adapted to exert a downward pressure on said pipe, cutting means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, and operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same.

9. Apparatus for producing sheets of stock from pipe comprised of operable pipe translating means, means disposed above said operable means adapted to exert a downward pressure on said pipe, cutting means for longitudinally slitting said pipe, a wedge shaped anvil over

which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, and leveling rollers through which said pipe is further adapted to be translated for obtaining a flat sheet of stock.

10. Apparatus for producing sheets of stock from pipe comprised of operable pipe translating means, means disposed above said operable means adapted to exert a downward pressure on said pipe, cutting means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, and pre-heating means through which said pipe is adapted to be translated disposed intermediate said anvil and said cutting means.

11. Apparatus for producing sheets of stock from pipe comprised of operable pipe translating means, means disposed above said operable means adapted to exert a downward pressure on said pipe, cutting means for longitudinally slitting said pipe, a wedge shaped anvil over which said pipe is adapted to be translated for spreading the same into a substantially flat strip of stock, operating means above said anvil adapted to hold said pipe against the top surface thereof as it progresses over the same, gauge reducing rollers through which said spread pipe is further adapted to be translated for obtaining a flat sheet of reduced gauge stock, and pre-heating means through which said flattened out strip of material is adapted to be translated disposed intermediate said anvil and said gauge reducing rollers.

ALEXANDER C. ALLEN.