

March 28, 1950

W. A. CLARK ET AL

2,502,247

EARTHENWARE PIPE MAKING MACHINE

Filed Aug. 21, 1947

2 Sheets-Sheet 1

FIG 1

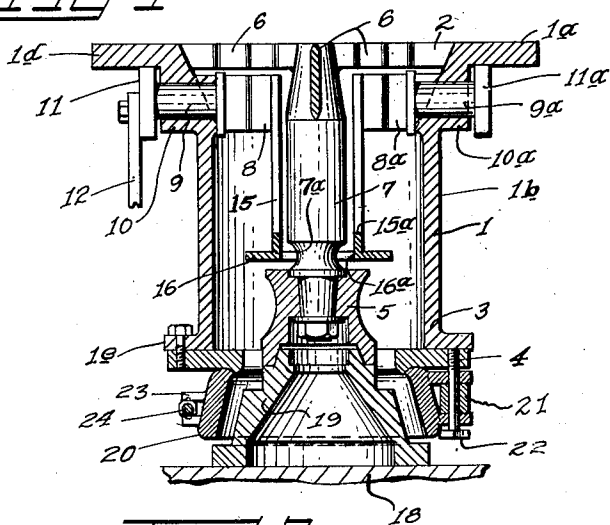


FIG 2

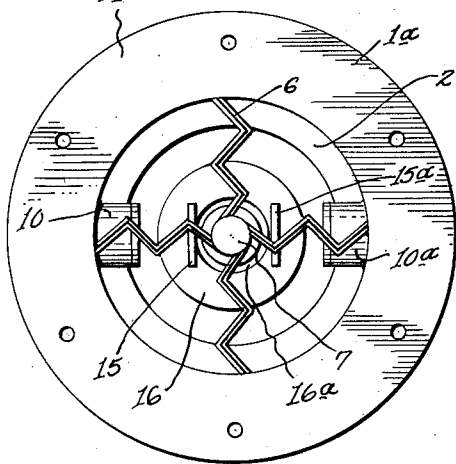


FIG 3

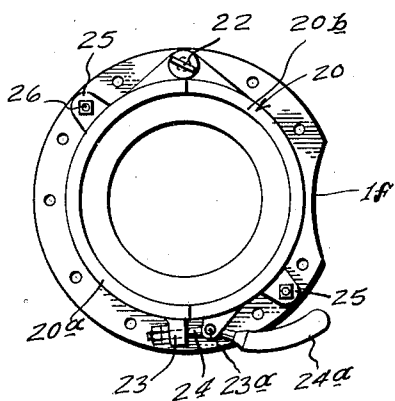
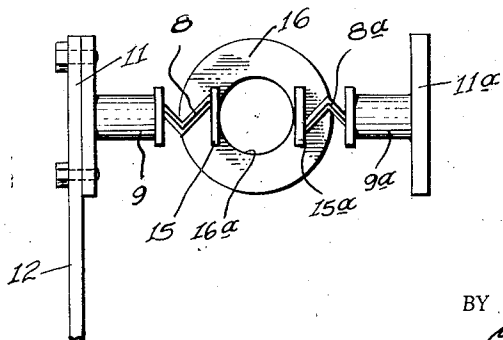


FIG 4



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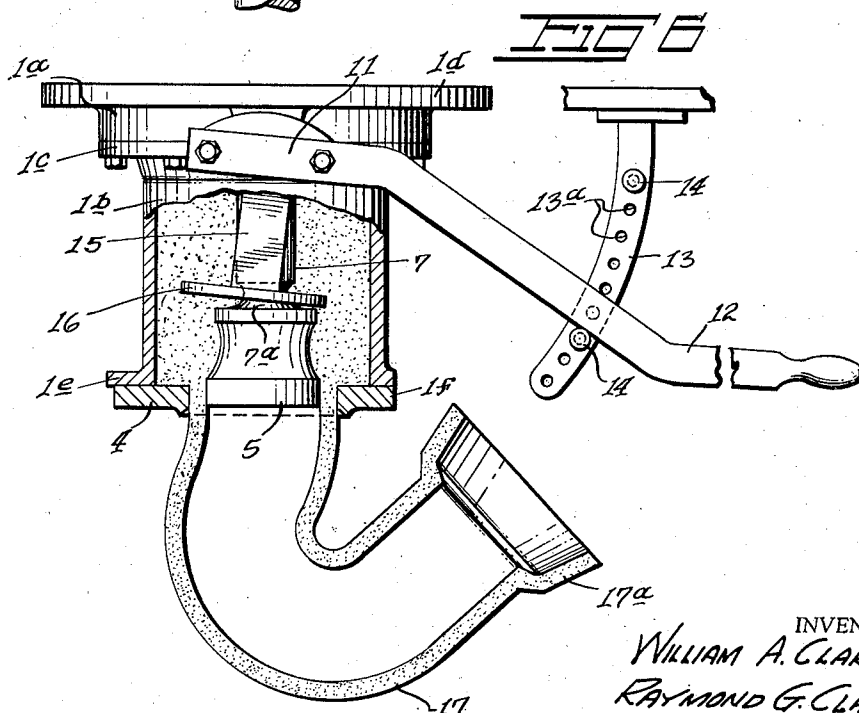
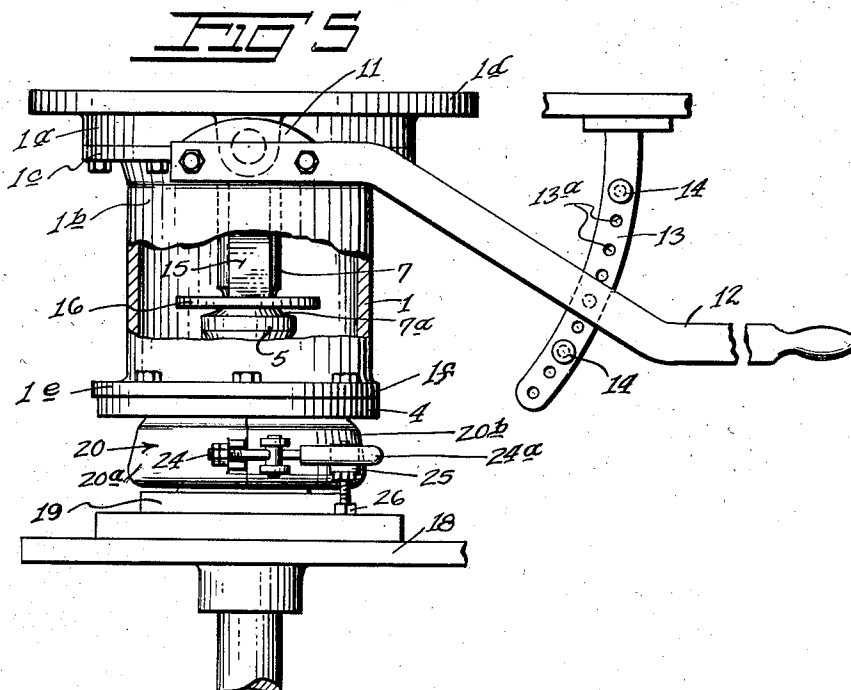
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EARTHENWARE PIPE MAKING MACHINE

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5 Claims. (Cl. 25—39)

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This invention relates to earthenware pipe making machines used for the making of drain pipes, traps and the like, the objects of the present invention being the provision of improvements in such pipe making machines which will enable bends to be formed in the pipes as simply and effectively as the machines produce straight pipes.

The known machines extrude the soft clay through dies in a straight line so that the soft clay pipe on leaving the dies is straight, and if it is desired to put bends into the pipe, the soft clay pipe on having passed out of the dies is manually pushed to form the desired bend or bends therein.

Such manual bending of the soft clay results in the clay at the outer radius of the bend being stretched and reduced in thickness, while the clay at the inner radius of the bend is compressed and thus increased in thickness, the manual bending also causing the forming of fracture lines in the clay which thus become defects in the bent pipe produced.

Our invention has been devised to provide improvements in the die bell of the machine which will enable it to produce the bends as and when required without any manual handling of the clay pipe for bending purposes, the bends being formed in the dies themselves and in such a manner that the thickness of the clay at all parts of the pipe including the bends is uniform, no stresses being applied to the pipe liable to cause formation of fracture lines in the clay, with the result that the pipes with bends therein can be produced in quantity and quickly, with a very greatly reduced percentage of defective pipes.

Broadly the invention comprises improvements in earthenware pipe making machines wherein deflector plate means are introduced to within the die bell in such a manner that the movements of said deflector plate means towards one side or the other of the die bell as caused by lever means connected to the deflector plate means, cause restriction or retarding of the rate of flow of the clay through the die bell to such side of said die bell towards which the deflector plate is moved, thereby causing variable rates of flow of the clay at different positions between the central and outer dies of the die bell and the forming of bends in the clay pipe extruded from such die bell.

In describing the invention reference will be made to the accompanying drawings in which:

Figure 1 shows a sectional elevation of the die bell apparatus with the improved mechanism applied thereto, such apparatus being in the posi-

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tion for start of pipe making when forming a flange on such pipe.

Figure 2 is a plan view of Fig. 1.

Figure 3 is an underneath view of the die bell 5 parts.

Figure 4 is a plan view of the deflector plate mechanism.

Figure 5 is a partially sectional side elevation of the die bell apparatus with the deflector plate in mid-position and

Figure 6 is a similar view to that of Fig. 5 but with the flanging dies removed and a bend being extruded as in the forming of a gully trap pipe.

In the invention, the improvements are applied to the portion of the pipe making machine known as the die bell 1, which is connected vertically below (in most cases) the clay forcing or pressure apparatus (not shown) which forces the soft clay through the die bell 1.

This die bell 1 is of usual cylinder form with an inlet end 2 for entry of the clay under pressure and an outlet end 3 with outer die 4 applied thereto through which the clay pipe is extruded, a centre die 5 for hole or bore forming being secured to the die bell 1 in usual manner as by a series of rigid zigzag form bridges 6 between its stem 7 and the die bell 1, which bridges 6 are located at the inlet end 2 of said die bell 1.

The additions to and modifications of such known apparatus comprise the application of two further and oppositely disposed bridges 8 and 8a behind two of the rigid bridges 6, these further bridges 8 and 8a being capable of partial rotation by being integral with spindles 9 and 9a at their outer ends which are rotatably mounted in journals 10 and 10a formed in the die bell 1 to permit the outer ends of the spindles 9 and 9a to project to the outside of the die bell 1, there being webs 11 and 11a at the outer ends of these spindles 9 and 9a to either one of which a handle lever 12 is connected to pass to an accessible position at the front of the die bell 1 for manual control movements over a suitably mounted quadrant 13 (see Fig. 5) in which there is a series of holes 13a into which stops 14 of bolt or like form are adapted to be fitted as desired.

The inner ends of the two bridges 8 and 8a have arms 15 and 15a which extend closely alongside opposite sides of the stem 7 towards its end at which the centre die 5 is located, these two arms 15 and 15a being secured to a deflector plate 16 which is circular in shape and having a hole 16a therein of size to permit the plate 16 to pass around a groove 7a in the stem 7 just behind the

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central die 5 and to be moved towards opposite sides of the die bell 1.

Normally, the upper or inlet end 2 of the die bell 1 is integral with the lower outlet end 3, but to enable the deflector plate mechanism (as shown in Fig. 4) to be entered to the die bell 1, such die bell 1 is split through the journals 10 and 10a so that there is an upper portion 1a and a lower portion 1b, these portions of the die bell 1 being connected by flanges 1c (see Figs. 5 and 6) the upper portion 1a having the flange 1d by which the apparatus is connected to the clay forcing apparatus, and the lower portion 1b of the die bell 1 having the flange 1e to which the outer die 4 is secured, this flange 1e and the rim of the outer die 4 being cut away 1f (see Fig. 3) for purposes hereinafter referred to.

The apparatus so far described is sufficient for the purposes of the present invention in the forming of bends in earthenware pipes when such pipes do not have flanges, but as most drainage pipes have flanges, by which they are connected to each other, such as the flange 17a of the earthenware gully trap pipe 17 being extruded as shown in Fig. 6, it is desirable to refer to the further known mechanism and the modifications made thereto to enable a gully trap pipe or other flanged pipe to be produced.

The known mechanism for pipe making includes a table 18 (see Figs. 1 and 5) which is adapted to be raised and lowered as required, this table 18 carrying the known inner flanging die 19, which, when the table with die 19 is raised, causes the said inner flanging die 19 to engage concentrically under the centre die 5.

Also, an outer flanging die 20 is adapted to be secured concentrically below the outer die 4 and for the purposes of the present invention, this outer die 20 is now made in two halves 20a and 20b each of which has hinge lugs 21 (see Fig. 1) by which the halves are secured hingably by a setscrew or like 22 concentrically to the outer die 4, these halves 20a and 20b including bolting lugs 23 and 23a (see Fig. 3) across which a pivoted bolt 24 with handle 24a is adapted to clamp the halves together, side lugs 25 on the halves 20a and 20b having vertically adjustable setscrews 26 therein, so that when the table 18 is raised, these setscrews 26 will have their heads in contact with such table to thereby give support to the outer flanging die 20 against the pressure of clay which, but for the support given by the setscrews 26, would tend to bend the die 20 downward with the hinging setscrew 22 as the pivotal point.

In use or operation, with the handlever 12 in a central position as shown in Fig. 5 at which the deflector plate 16 is located in a central position concentric with the die bell 1, the clay is forced evenly through the die bell 1 and the outer and central dies 4 and 5, straight pipes being formed with the outer die 4 forming the outer surface of the pipe and the central die 5 forming the hole in the pipe.

It being desired to form a flange 17a in a pipe, the apparatus is in the position as shown in Figs. 1 and 5, the clay being forced into the space of flange shape between the inner and outer flanging dies 19 and 20.

The forced feed of clay is stopped when it is noted that some of same is squeezed past the small space at the bottom of the outer flanging die 20, the table 18 with the inner flanging die 19 being then lowered and the outer flanging die 20 opened by releasing its bolt 24 and hinging

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the die halves 20a and 20b on their setscrew 22 to a position clear to the side of the die bell 1.

It being then desired to form a bend or bends in the pipe such as in the forming of a gully trap pipe 17, the handlever 12 is moved from the central position upward to bear against the upper stop 14 of the quadrant 13, such movement of the handlever 12 causing the bridges 8 and 8a to partially rotate so that the two arms 15 and 15a move the deflector plate 16 towards one side of the die bell 1.

This causes retarding or restriction of the flow of the soft clay to that side of the die bell 1 towards which the deflector plate 16 has moved and also tends to deflect the clay to the opposite side of the die bell 1 at which there is no restriction, with the result that with a slow rate of flow at the restricted side of the outer die 4 and a free flow at the opposite side thereof, a bend is extruded from the die bell 1.

The handlever 12 against the upper stop 14 will cause a bend of smallest radius possible to be produced consistent with the size of the pipe being made, the extent of the bend not quite reaching 180 degrees, the cut away portion 1f of the flange 1e and die 4 permitting the flange 17a of the pipe 17 to just clear in passing the outer side of the die bell 1, the handlever 12 being then sharply pulled down until it bears against the lower stop 14 of the quadrant 13 as shown in Fig. 6, this causing the deflector plate 16 to be moved towards the opposite side of the die bell so that the positions of restriction and free flow of the clay are just reversed from those as previously, although not to the same maximum extent in view of the lower stop 14 not being in the lowest hole 13a of the quadrant 13 because of the bend now to be produced requiring to be of a greater radius.

Thus it will be seen that by mere movements of the handlever 12 up or down, bends can be formed in opposite directions quickly and easily as required, the thickness of clay being unaffected by the retarding of flow and the free flow being nothing more than usual or normal, with the result that the pipe has uniform thickness and the clay is subjected to no stresses liable to cause fracture lines to form therein, the radius of any particular bend being obtained by the locating of a stop 14 in a particular hole 13a of the quadrant 13, the pressure of clay within the die bell 1 tending to force the deflector plate 16 to the concentric mid-position, so that if the handlever 12 is released, it will assume a mid-position which will cause the extrusion of straight pipes.

We claim:

1. An earthenware pipe making machine comprising a die bell having inner and outer dies, deflector plate means mounted within the die bell for movements towards and away from the side of the die bell lever means connected to the deflector plate means to move the latter and cause restriction or retarding of the rate of flow of the clay through the die bell at such side of said die bell towards which the deflector plate is moved, thereby causing variable rates of flow of the clay at different positions between the central and outer dies of the die bell and the forming of bends in the clay pipe extruded from such die bell.

2. An earthenware pipe making machine comprising a clay forcing apparatus a die bell composed of upper and lower connected portions, oppositely disposed cooperating journal halves formed in said portions, a flange by which the die bell is connected at its inlet end to the clay

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forcing apparatus, an outer die secured at the outlet end of the die bell, bridges secured at the inlet end of the die bell a stem carried by said bridges a centre die carried by said stem, deflector plate means disposed within the die bell around the centre die stem, and means outside the die bell for causing said deflector plate to be moved within said die bell to vary the flow of clay on opposite sides of the die.

3. An earthenware pipe making machine as claimed in claim 2 wherein the deflector plate means comprise a circular plate with a central hole therein adapted to be movably disposed around the stem of the centre die in the vicinity of a groove in said stem, two arms secured to said circular plate extending towards the inlet end of the die bell along opposite sides of the stem, bridges connected to the ends of said arms in the vicinity of the inlet end of the die bell, spindles connected to said bridges adapted to bear within the journals at opposite sides of the die bell and webs at the outside ends of the spindles for actuating the spindles.

4. An earthenware pipe making machine as claimed in claim 2 wherein the means for causing the deflector plate to be moved within the die bell comprise a handlever secured to a web of a spindle of the deflector plate means and a quadrant alongside which the handlever is movable, said quadrant having a series of holes therein for receiving stops.

5. An earthenware pipe making machine comprising a clay forcing apparatus a die bell composed of upper and lower connected portions which split oppositely disposed cooperating

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journal halves formed in said portions, a flange by which the die bell inlet end is adapted for connection to clay forcing apparatus, an outer die secured to the outlet end of the die bell, bridges secured at the inlet end of the die bell, a stem carried by said bridges a centre die carried by said stem, a circular plate with central hole therein movably disposed around the stem of the centre die in the vicinity of a groove in said stem, two arms secured to said circular plate extending towards the inlet end of the die bell along opposite sides of the stem, bridges to the ends of such arms in the vicinity of the inlet end of the die bell, spindles connected to said bridges adapted to bear within the journals at opposite sides of the die bell, webs at the outside ends of the spindles, a handlever secured to a web and a quadrant alongside which the handlever is movable, said quadrant having a series of holes therein for receiving stops.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
411,023	Fish	Sept. 17, 1889
1,015,334	Myers	Jan. 23, 1912
1,460,451	Smith	July 3, 1923
1,574,433	MacKenzie	Feb. 23, 1926
1,677,808	Alassio et al.	July 17, 1928