

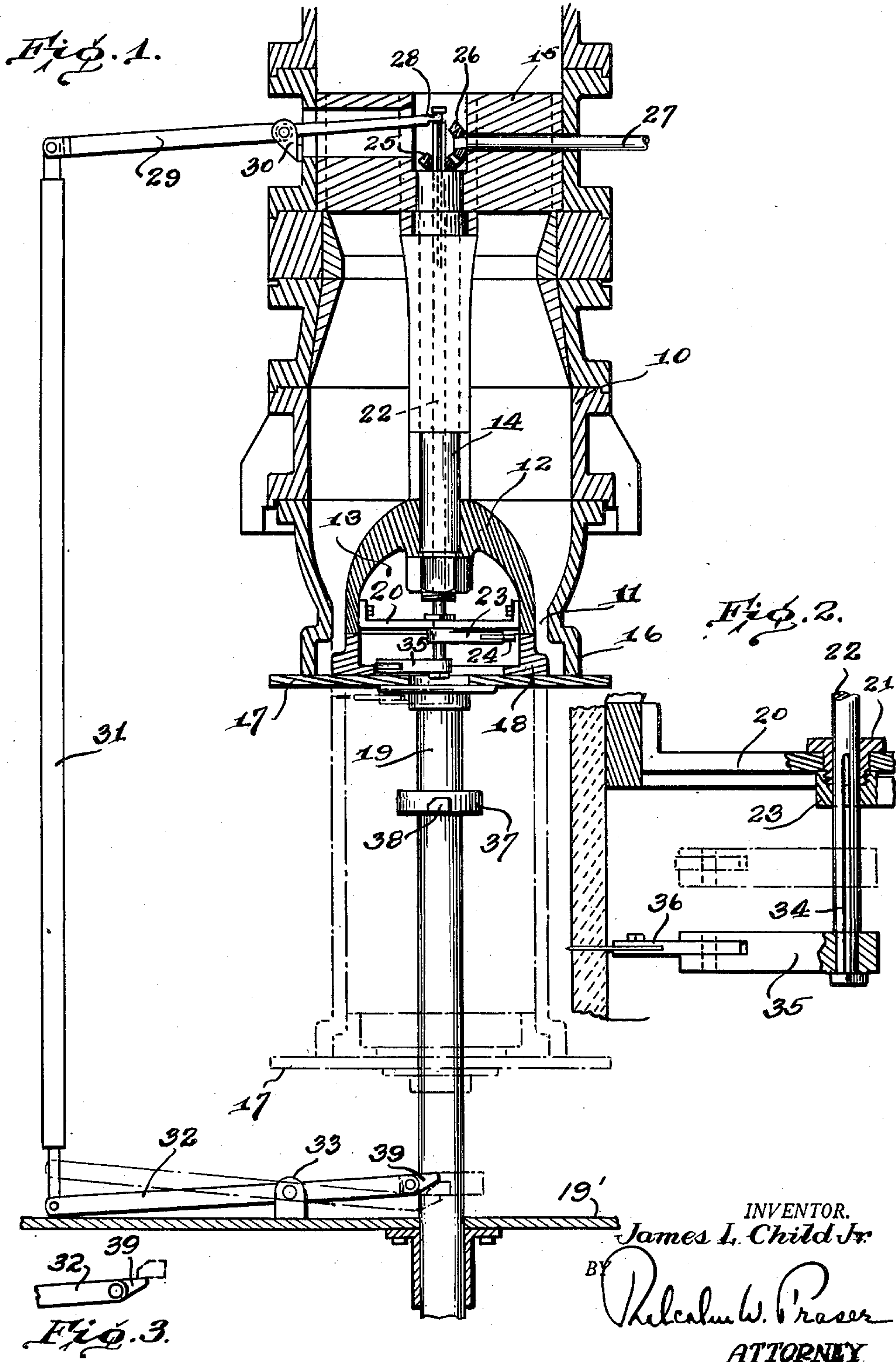
March 6, 1951

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2,544,254

SEWER PIPE CUTTING MECHANISM

Filed March 17, 1948



UNITED STATES PATENT OFFICE

2,544,254

SEWER PIPE CUTTING MECHANISM

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Application March 17, 1948, Serial No. 15,483

5 Claims. (Cl. 25—109)

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This invention relates to apparatus or machines for forming sewer pipe but more particularly to a mechanism for severing the pipe after it has been formed, and an object is to produce a simple and efficient mechanism of this character thereby greatly expediting the production of the finished pipe by improved and inexpensive means.

For purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which.

Figure 1 is a vertical sectional elevation of an apparatus for forming sewer pipe and incorporating the pipe severing mechanism; and

Figure 2 is an enlarged fragmentary sectional view showing the vertically shiftable knife in its lowered or operative position.

Fig. 3 is a fragmentary view showing the up position of the lever.

The illustrated embodiment of the invention comprises a suitable chamber 10 through which the clay in the desired degree of plasticity is forced by any suitable means (not shown), the clay being introduced at the upper end of the chamber and forced downwardly, a reduced passage 11 being provided between an internal die part 12 which is generally dome-shaped and the outer wall or casing of the chamber 10. The die part 12 has a central cavity 13 and is supported by a vertical tube 14, the upper end of which is suitably connected to a spider 15.

The walls of the chamber 10 directly beneath the reduced passage 11 extend outwardly, as indicated, to form a female bell die 16.

In operation, the material is forced through the die passage 11 and on to a balance table 17 which carries a male die member 18 to cooperate with the female die 16 to form the bell of the sewer pipe. At the outset, the balance table 17 is in its raised position, as shown by the full lines on Figure 1. Then as the material is forced from the chamber 10 through the die passage 11 and after the bell has been formed, the table gradually lowers. The table is carried by a post 19 which is vertically reciprocable and with which may be associated springs or other mechanism so that as the pipe is formed, it is gradually lowered. Such mechanism, as well as the guide for the post 19, are not shown but are well known to those skilled in this art, so that further description and illustration thereof are not considered necessary.

The post 19, however, is movable through an opening in a base support 19' with which its guiding means may be associated, which base

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support may be the floor of the room in which the apparatus is located.

After the balance table 17 has moved downwardly to the broken line position shown in Figure 1, it is necessary that the finished pipe be cut to length and also that any straight pipe material remaining in the region of the female bell die 16 must be removed in order that the operation can be repeated to form another sewer pipe. For this purpose, a horizontally disposed bar 20 is disposed within the cavity 13 of the die 12 and is rigidly secured to the inner walls thereof. Mounted centrally of the bar 20 is a flanged bearing sleeve 21 which is suitably keyed to a vertically shiftable drive shaft 22. Fixed to the under side of the sleeve 21 is a knife holder 23 in the form of an arm carrying a suitable knife 24 at the outer end. The knife 24 is pivoted to the end portion of the holder arm 23 and is adapted to swing outwardly to operative position by centrifugal force upon rotation of the shaft 22 in one direction. However, upon rotation of the shaft 22 in the opposite direction, the knife remains in its inoperative position. Sewer pipe cutting knives of this character are well known to those skilled in this art so that detailed description and illustration thereof are not regarded as necessary. By way of example, a knife of this general character is shown and described in the patent to Wallace 526,274, dated September 18, 1894.

The drive shaft 22 extends upwardly through the tubular support 14 and keyed to the upper end of the shaft is a bevel gear 25 which meshes with a bevel gear 26 fixed to a shaft 27. The shaft 27 is connected to any suitable source of power with suitable clutch means so that it may be rotated in one direction or the other. However, this drive and reversing connection forms no part of the present invention so that detailed description thereof is not considered necessary.

The upper end of the drive shaft 22 is keyed to the gear 25 so that it may shift vertically, and engaging the upper end of the shaft 22 which extends above the gear 25 is a fork 28 on the end of a lever arm 29. The lever arm 29 is pivoted to a bracket 30 intermediate its ends and the outer end of the arm is connected by a vertical link 31 to a lever 32 pivoted intermediate its ends to a bracket 33 which may be secured to the floor 19'. Manifestly by rocking the lever arm 32, the shaft 22 is shifted upwardly or downwardly without disturbing the driving connection between the shaft and the gear 25. The lower end portion of the shaft 22

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is formed with a keyway 34 into which extends a key rigid with the flanged sleeve bearing 21. This enables the shaft to shift vertically without disturbing the driving connection to the knife holder 23.

On the extreme lower end of the drive shaft 22 is fixed another keyed holder arm 35 to which is pivoted a knife 36 which operates in the same manner as the knife 24, i. e. in one direction of rotation of the shaft 22, the knife is thrown outwardly by centrifugal force to its operative position, but rotation of the shaft 22 in the opposite direction causes the knife to retract to its inoperative position.

Mounted on the table post 19 is a collar 37 arranged at the desired position beneath the table 17. On the collar is a contact 38 which is adapted to engage a projection 39 at the inner end of the lever arm 32. The projection 39 is normally in position to be engaged by the contact 38 when the table post 19 moves downwardly.

In operation, as above described, the table is first disposed in its uppermost position in engagement with the under face of the female bell die 16. After the bell is formed, the sewer pipe body is gradually formed and the table 17 moves downwardly until the contact 38 engages the projection 39 thereby rocking the lever arm 32 in a clockwise direction which, through the link 31 and lever 29, moves the shaft 22 downwardly. This downward movement continues to a predetermined point at which the knife holder 35 is positioned at the proper point above the table 17, thereby predetermining the length of the sewer pipe. Upon rotating the shaft 27 in the desired direction, both knife holder arms 23 and 35 are rotated to cause the knife blades to be swung outwardly by centrifugal force thereby severing the walls of the pipe in the region directly above the female bell die 16 and also a proper distance below, thus excising a section of the tube which can be discarded or returned to the chamber 10 for reworking. During this operation contact 38 holds the lever 32 down while the two cutters are operated. Manifestly, the table 17 can then be moved upwardly to commence the formation of another sewer pipe length, the bell die having been freed of material. It will also be understood that by reversing the direction of rotation of the shaft 27 and accordingly the drive shaft 22, the knives are returned to their retracted or inoperative position and the knife holder 35 will be moved upwardly to lie within the male bell die member 18 during the start of the pipe forming operation. In this operation contact 38 will be moved upward out of engagement with the projection 39, allowing return of lever 32 to normal position. The weight of the link 31 is such as to cause the return of these parts automatically so that the projection 39 will be properly positioned for the next downward movement of the table post.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. Sewer pipe cutting mechanism comprising a die for forming sewer pipe, female bell die part adjacent the outlet end of said die, pipe cutting mechanism comprising a pair of vertically spaced rotary coaxial cutting knives, each being movable outwardly by centrifugal force to operative position upon rotation in one direction and in-

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wardly to inoperative position upon rotation in the opposite direction, a stationary mounting for one knife adjacent the outer end of said female die part, a mounting for the other knife enabling axial shifting movement in directions toward and away from said first knife, a pipe supporting table, a male die on said table movable into position relative to said female bell die to form the sewer pipe bell, a mounting for said table enabling movement thereof away from said female bell die part as the sewer pipe is formed, actuating mechanism responsive to movement of said table during the latter part of its movement for imparting shifting movement to said shiftable knife for operatively positioning same for severing in cooperation with said first knife a pipe section in order to leave said female bell die part free for the next forming operation, and a conjoint drive for said knives.

2. Sewer pipe cutting mechanism comprising a die for forming sewer pipe, female bell die part adjacent the outlet end of said die, pipe cutting mechanism comprising a pair of vertically spaced rotary coaxial cutting knives, each being movable outwardly by centrifugal force to operative position upon rotation in one direction and inwardly to inoperative position upon rotation in the opposite direction, a stationary mounting for one knife adjacent the outer end of said female die part, a mounting for the other knife enabling axial shifting movement in directions toward and away from said first knife, a pipe supporting table, a male die on said table movable into position relative to said female bell die to form the sewer pipe bell, a mounting for said table enabling movement thereof away from said female bell die part as the sewer pipe is formed, an articulated actuating device responsive to movement of said table at a predetermined point in its movement for positively shifting said shiftable knife within the formed sewer pipe to desired cutting position, and a common drive for said knives.

3. Sewer pipe cutting mechanism comprising a die for forming sewer pipe, female bell die part adjacent the outlet end of said die, pipe cutting mechanism comprising a pair of vertically spaced rotary coaxial cutting knives, each being movable outwardly by centrifugal force to operative position upon rotation in one direction and inwardly to inoperative position upon rotation in the opposite direction, a stationary mounting for one knife adjacent the outer end of said female die part, a mounting for the other knife enabling axial shifting movement in directions toward and away from said first knife, a pipe supporting table, a male die on said table movable into position relative to said female bell die to form the sewer pipe bell, a mounting for said table enabling movement thereof away from said female bell die part as the sewer pipe is formed, link and lever mechanism for shifting said shiftable knife to the desired cutting position a predetermined distance beyond said female bell die part, an element responsive to movement of said table mounting for actuating said link and lever mechanism, and drive means for said cutting knives.

4. Sewer pipe cutting mechanism comprising a die for forming sewer pipe, female bell die part adjacent the outlet end of said die, pipe cutting mechanism comprising a pair of vertically spaced rotary coaxial cutting knives, each being movable outwardly by centrifugal force to operative position upon rotation in one direction and inwardly to inoperative position upon rotation in the opposite direction, a stationary mounting for one knife

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adjacent the outer end of said female die part, a mounting for the other knife enabling axial shifting movement in directions toward and away from said first knife, a pipe supporting table, a male die on said table movable into position relative to said female bell die to form the sewer pipe bell, a mounting for said table enabling movement thereof away from said female bell die part as the sewer pipe is formed, a drive shaft common to said cutting knives, a mounting for said shaft enabling axial movement, a lost motion drive connection between said shaft and said first knife, a lever for shifting said drive shaft, a lever arranged beneath said table, a link connecting said levers, and means movable with said table and engageable with said second lever for rocking same to effect axial shifting of said drive shaft.

5. Sewer pipe cutting mechanism comprising a die for forming sewer pipe, female bell die part adjacent the outlet end of said die, pipe cutting mechanism comprising a pair of vertically spaced rotary coaxial cutting knives, each being movable outwardly by centrifugal force to operative position upon rotation in one direction and inwardly to inoperative position upon rotation in the opposite direction, a stationary mounting for one knife adjacent the outer end of said female die part, a mounting for the other knife enabling

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axial shifting movement in directions toward and away from said first knife, a pipe supporting table, a male die on said table movable into position relative to said female bell die to form the sewer pipe bell, a vertically movable post supporting the table at its upper end, a collar on said post spaced below said table, link and lever mechanism for shifting said shiftable knife to position of use and having a part engageable by said collar so that upon continued downward movement of said post said mechanism is actuated, and a common drive for said knives.

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REFERENCES CITED

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

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