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DRAIN TILE LAYING APPARATUS

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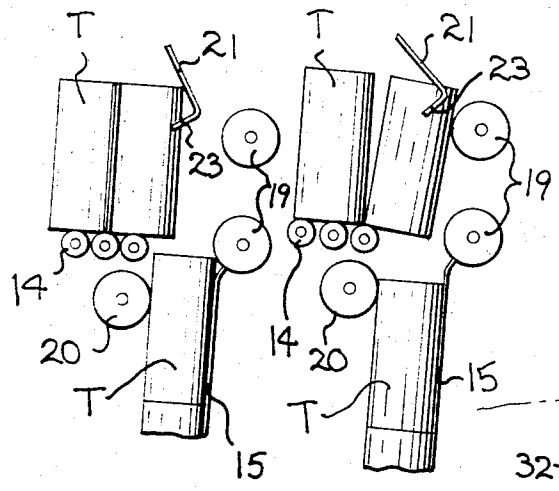


FIG. 2

FIG. 3

FIG. 1

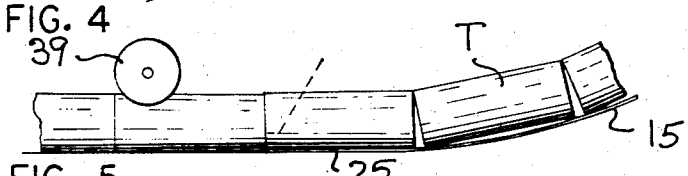


FIG. 4

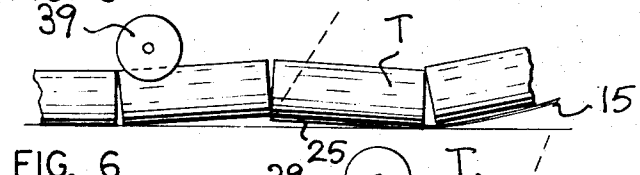


FIG. 5

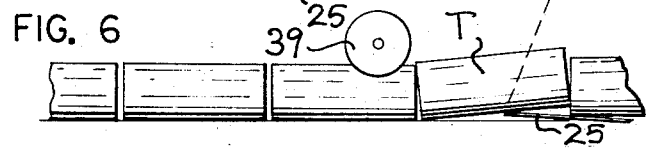


FIG. 6

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DRAIN TILE LAYING APPARATUS

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This invention relates to tile laying apparatus, such for example as for laying clay drain tile in a trench in orderly formation and of the type that typically can be hauled by the trenching machine and ride along the bottom of the freshly formed ditch.

An object is to produce a new and improved apparatus of this character to which tile are delivered for example by hand to form a row, the individual tile of which advance to a chute establishing a vertically disposed column which are individually discharged into the trench in a row where the tile may be snugly arranged together or, if desired, a predetermined spacing between adjacent tile may be achieved by simple adjustment which can be made during the travel of the apparatus.

Another object is to provide apparatus of this character with weighted means for traveling over the tile in the trench to insure proper alignment of the tile and, when desired, to maintain predetermined spacing between adjacent tile.

A further object is to provide such apparatus with an arrangement on which the tile may be originally placed by hand and over which the tile gravitate to the chute, thereby enabling the operator after having delivered a number of tile thereto, to perform other tasks without interfering with the orderly tile feeding operation.

A still further object is to produce an adjustable tilting tray over which the tile travel and which determines the amount of spacing, if any, between adjacent tile in the trench.

Other objects and advantages of the invention will hereinafter appear and, 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 rear end perspective view of the tile laying apparatus;

FIGURE 2 is a diagrammatic view of a portion of the platform on which the tile is advanced to the vertical chute and showing the detent which acts as a retarder for the top of the tile so that the latter does not tip excessively toward the backing wheels;

FIGURE 3 is a view similar to FIGURE 2 but showing the foremost tile tipped slightly toward the adjacent backing roll with a portion engaging the foremost idler roll on the platform and before the tile falls into the chute;

FIGURE 4 is a diagrammatic view showing the tilt tray lying flat so that the tile are moved into engagement with each other;

FIGURE 5 is a view somewhat similar to FIGURE 4 but showing the tilt tray adjusted to cause angle delivery of the tile to effect spacing between adjacent tile; and

FIGURE 6 is a view somewhat similar to FIGURE 5 but showing that the spacing between the adjacent tile is maintained by the weighted wheels which prevent the tile from crowding together.

The illustrated embodiment of the invention comprises a tile laying apparatus for laying drain tile in a trench which has previously been excavated. As shown, the apparatus comprises an upright frame **10**, having a vertical part **11** and a bottom horizontally disposed part **12** and an upper horizontal platform **13**. The apparatus is dragged along a trench which is suggested by the lines F–F′ in FIGURE 1 and may be hauled by a trenching machine

(not shown) through, for example, a universal tow hitch H and a chain C.

The horizontal platform part **13** has a series of relatively closely spaced transverse idler rollers **14**, which provide the floor of the platform and on which the tile T are manually placed in a row in upright position. For holding the tile T in position on the platform **13** guide rails **13***a* are provided on opposite sides. The platform **13** inclines downwardly from its rear end, an angle of the order of nine degrees being found to be satisfactory so that the tile T will gravitate from left to right of the figure toward a downwardly and rearwardly inclined or curved chute **15**.

The chute **15** is equipped with a replaceable stainless steel wear track **16** over which the tile travel. At the upper end portion of the chute are laterally spaced guide panels **17** and at the lower portion of the chute are laterally spaced guide rails **18**, which insure the desired gravitational movement of the tile from the platform **13** to the lower end of the chute from which the tile are discharged to the trench. Above the chute **15** is a pair of vertically spaced backing wheels **19**, which may be of rubber, and directly below the front end of the series of idler rollers **14** is a backing wheel **20**, which is on the opposite side of the chute to the backing wheels **19**, the wheel **20** being disposed below the lowermost backing wheel **19**.

The foremost tile T on the platform **13** engages a retarder detent in the form of a bail **21** which is pivoted to bracket arms **22** arranged above the uppermost backing wheel **19**. As shown, the free ends of the bail are hook shaped, as indicated at **23**. The retarder detent acts to engage the upper end portion of the foremost tile on the platform so that the latter does not tip excessively toward the uppermost backing wheel **19**, where it would otherwise lodge with the trailing bottom edge of the tile still on the idler roll **14**. This insures that the tile will drop properly into the chute **15** to form the column of tile therein.

The platform **13** is supported at its outer or rear end by a pair of laterally spaced diagonally disposed tubular braces **24**, the lower ends of which are fixed as by welding to the guide rails **18** respectively and the upper ends of which are fixed to the rear end of the platform **13**.

At the lower end of the chute **15** and over which the tile pass to the trench is a tilting tray **25**, which has a flat bottom wall and laterally spaced upright side walls **26**, to which are fixed rearwardly extending guide or shield panels **27** which serve as guides for the tile passing therebetween. The bottom horizontal frame part **12** has spaced upright side panels **28** arranged in laterally spaced relation. The rear ends of the panels **28** have lower upwardly and rearwardly inclined edges **29**, as shown on FIGURE 1 and the forward ends of the tilt tray side walls **26** have downwardly and forwardly inclined edges **30** to fit generally the edge portions **29**, thereby to enable the tilting tray to dispose itself in juxtaposed relation to the lower end of the chute **15**. Rigid with and rising vertically from the rear end portions of the side walls **26** are bracket arms **31**, to which the lower ends of a yoke **32** are pivoted. The upper end of the yoke **32** is connected by a turnbuckle **33** to an angle iron **34**, which extends across and is fixed at its ends to the upper end portion of the tubular braces **24**.

As shown, a line stabilizing and space maintaining weight **35** is provided with a bail handle **36**. The weight **35** rests upon a cross bar **37**, which spans the horizontal portion of an angled yoke member **38**. At the outer end of the horizontal portion of the yoke are rubber wheels **39**, which are suitably beveled to straddle and ride along the tile. A post **37′** is fixed at its lower end to the bar **37** and extends loosely through a hole in the weight **35**, thereby to retain the weight in position. When the ap-

paratus is not in use the weight **35** can be lifted off its support.

The forward end portion of the yoke **38** inclines upwardly and forwardly and the upper end engages a transverse rod **40**, which is carried by the upper end portion of a vertical yoke **41**. The lower end of the yoke **41** is pivoted to brackets **42**, which extend upwardly from the rear ends of the main frame side panel **28**. Fixed to the cross bar of the yoke **41** is an upwardly inclined bar **43**, the upper portion of which is offset to lie adjacent close to one of the braces **24**. The bar **43** constitutes a handle which can be shifted to any one of three positions. The intermediate position, as shown by solid lines, is arranged between pegs **44** in the respective brace **24** and in that position the weighted rollers **39** are properly positioned for regular tile spacing. By moving the handle **43** to the left of FIGURE 1 and against a peg **45** in the same brace, the weighted rollers **39** are then moved to a position where no spacing betwen the tile is required. Finally, the handle **43** may be moved forwardly into engagement with a peg **46** on the respective brace **24** and when in this position a coil spring brake is applied to a lower tile in the chute to halt further gravitating movement of the tile column. As shown, the brake comprises a wishbone frame **47**, which is fixed to and extends forwardly of the yoke **41** and carries a transversely disposed helical coil spring **48**, which may be pressed against the lower tile of the column to hold it from further gravitational movement.

It will be understood that by adjustment of the turnbuckle **33**, which can be effected when the apparatus is in use or is idle, the tilting tray **25** may be moved from a flat position in full ground engagement, such as indicated on FIGURE 4, to a position, such as shown on FIGURE 6, which causes angle delivery of the tile passing thereover to create a space between adjacent tile. The space between adjacent tile is maintained by the weighted wheels **39** which prevent crowding together of the tile from the thrust of the column of tile in the chute **15**. Since the weighted wheels **39** partially straddle the tile, they also insure proper alignment of the trailing tile line and hold the tile firmly in the groove in the trench. The tilting tray **25** may produce different spacings between the tile, for example from a snug tile fit to a three-eighths inch spacing, dependent upon the amount of tilt imparted to the tray in response to manipulation of the turnbuckle **33**.

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. Tile laying apparatus comprising an upright frame adapted to be hauled along a tile-receiving trench, a downwardly and rearwardly inclined chute on said frame

and along which a column of tile are adapted to gravitate, a platform at the upper end of said chute, and arranged horizontally over which tile are advanced to said chute, a tray adjacent the lower end of and separate from said chute and over which tile travel after leaving the chute, means to adjust said tray for varying the spacing between adjacent tile delivered to the trench, and means to engage the tile in the trench and militate against adjacent tile crowding together due to the thrust of tile in the chute.

2. Tile laying apparatus as claimed in claim **1** in which said platform is inclined downwardly toward said chute and tile are arranged thereon in vertical position, whereby tile are automatically fed by gravity, said apparatus comprising detent means for engaging the foremost tile on said platform to cause same to drop vertically into said chute and militate against excessive tilting of same with the trailing bottom edge still in engagement with said platform.

3. Tile laying apparatus as claimed in claim **2** comprising a series of rollers constituting the floor of said platform, and backing wheels disposed laterally of the upper end of said chute to insure proper delivery of the tile from said platform to said chute.

4. Tile laying apparatus as claimed in claim **1** in which the tray adjusting means comprises means to tilt the trailing end of said tray relative to said chute in an upward direction to cause spacing of an oncoming tile with respect to the next adjacent tile discharged from the apparatus.

5. Tile laying apparatus as claimed in claim **1** in which said tile engaging means comprises a weighted roller riding over the tile delivered to the trench.

6. Tile laying apparatus as claimed in claim **5** comprising lever means shiftable for disposing said weighted roller to a position at which the tile are in juxtaposition and to a position at which tile are spaced from each other thereby to prevent the tile from crowding together and to insure alignment of the trailing tile line.

7. Tile laying apparatus as claimed in claim **6** comprising a brake on said lever means which when the latter is shifted to a predetermined position engages a tile in the lower end of said chute to restrain further movement of the tile therein.

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61—72.3, 72.5