

April 18, 1933.

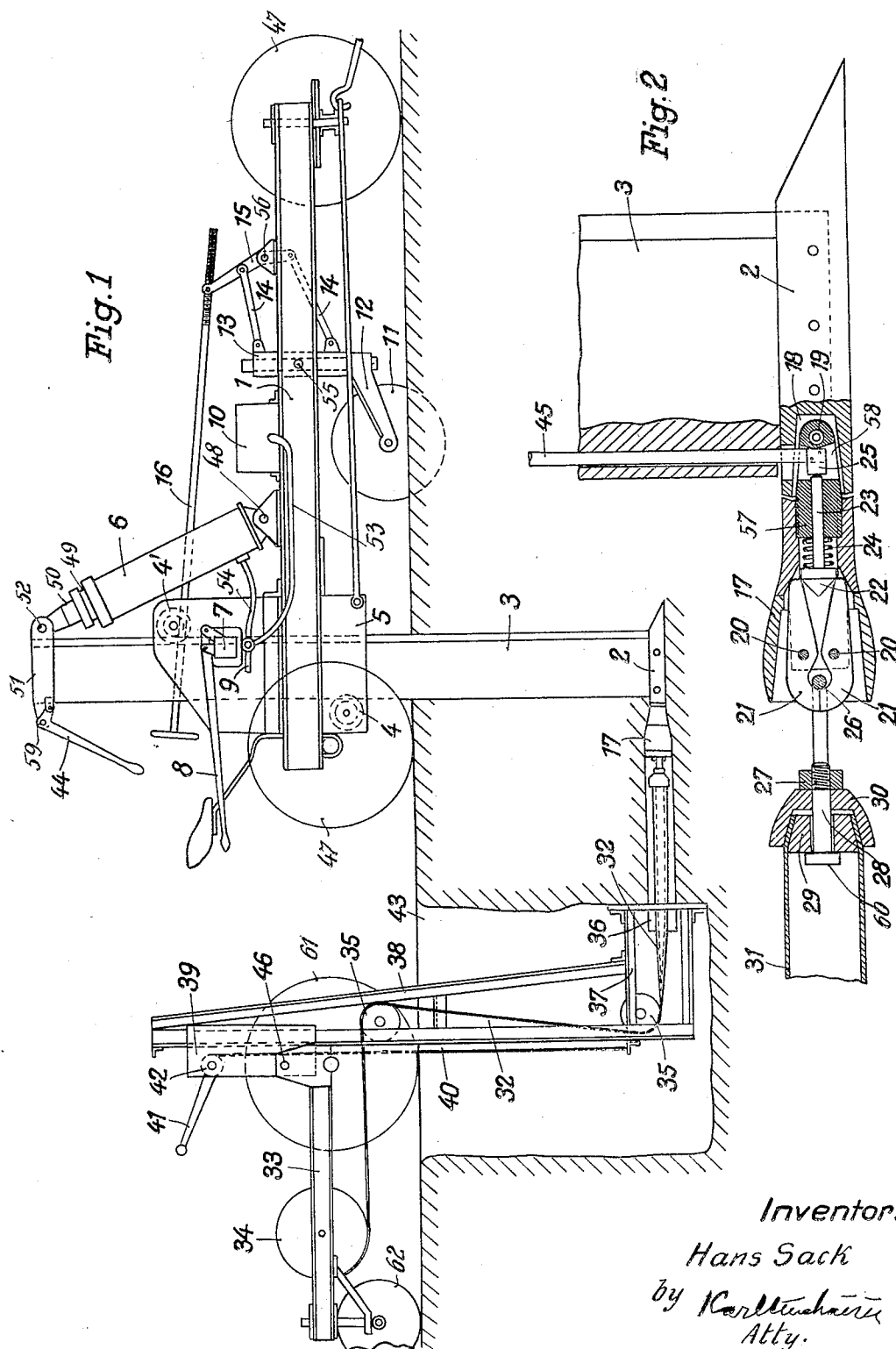
H. SACK

1,904,666

APPARATUS FOR LAYING DRAIN PIPES OR CABLES

Filed Nov. 17, 1930

2 Sheets-Sheet 1



Inventor:

Hans Sack

by *Karl Kuchner*
Atty.

April 18, 1933.

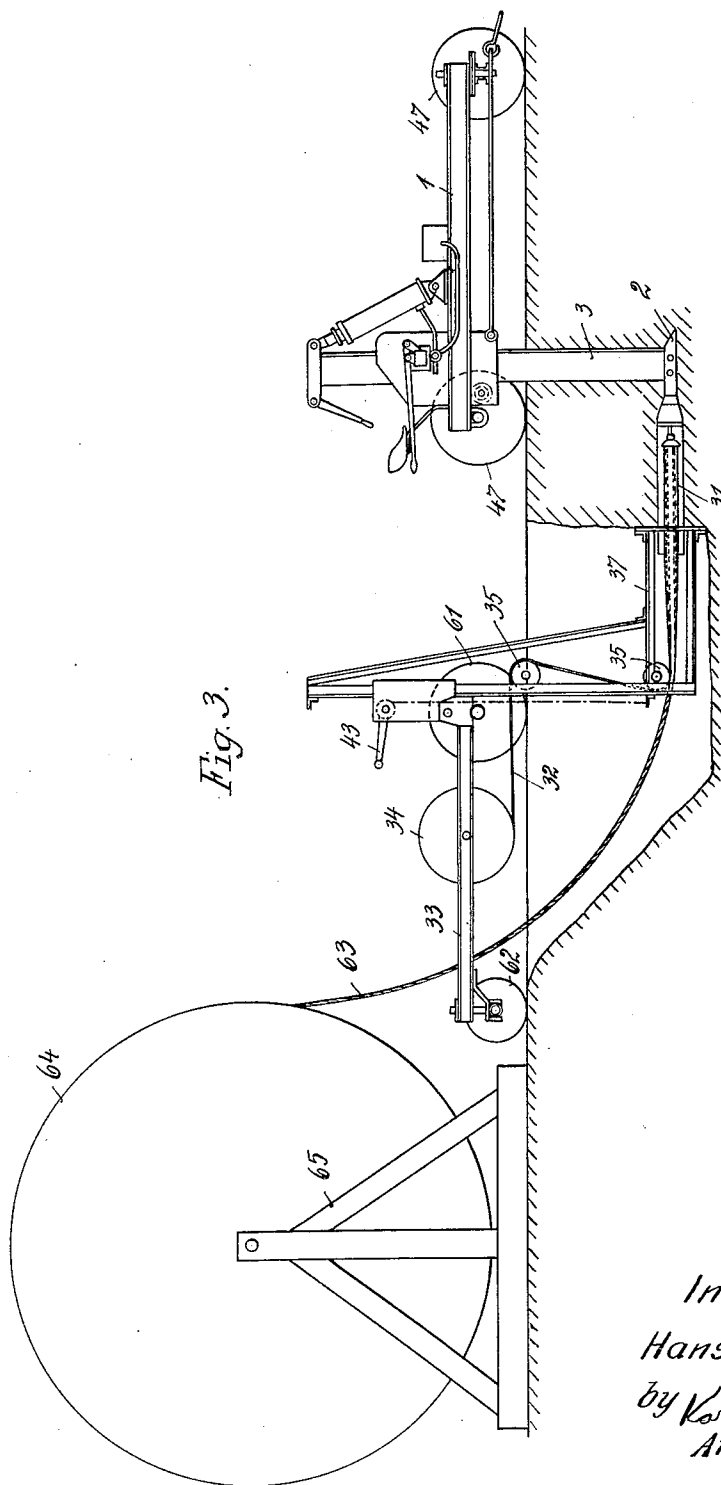
H. SACK

1,904,666

APPARATUS FOR LAYING DRAIN PIPES OR CABLES

Filed Nov. 17, 1930

2 Sheets-Sheet 2



Inventor:
Hans Sack
by *Korlshausen*
Atty.

UNITED STATES PATENT OFFICE

HANS SACK, OF LEIPZIG, GERMANY

APPARATUS FOR LAYING DRAIN PIPES OR CABLES

Application filed November 17, 1930, Serial No. 496,223, and in Germany April 9, 1930.

My invention relates to apparatus for laying drain pipes or cables by means of a mole plow. It is an object of my invention to simplify and to facilitate the laying of pipes or cables in sandy or loose soil, in which the passages cut by the mole plow will not hold. It has already been suggested to push or draw clay pipes into the mole passages but this method is unsatisfactory, because the short pipes soon become disaligned. My apparatus or machine is so designed that the difficulties connected with the old apparatus are eliminated.

To this end, I draw a flat strip of flexible material into the passage cut by the mole plow, and on this strip I place drain pipes or cables by hand, or, preferably I mold the flat strip into a pipe while drawing it into the passage. By these means I obtain a pipe in the passage which is not influenced by the sandy or loose character of the soil, and which either serves as a drain pipe or as a protecting sheath for a cable.

In the drawings affixed to this specification and forming part thereof I have illustrated diagrammatically and by way of example a machine embodying my invention in which the strip of flexible material is molded into a pipe or cable sheath but it is understood that my machine may also be applied for laying a flat strip in the passage cut out by the mole plow.

In the drawings—

Fig. 1 is an elevation of the complete machine,

Fig. 2 is a partly sectional elevation of its mole plug, drawn to a larger scale, and Fig. 3 is a partly sectional elevation showing my machine combined with a cable-laying apparatus.

The machine comprises two units, the mole plow 1, and a supply car 33.

The mole plow 1 is of the usual type. 47, 47 are wheels on which the frame of the plow is supported, 3 is a vertical knife coulter, and 2 is the mole plug at the lower end of the knife coulter. 4 and 4' are rollers supported in side plates 5 of the plow frame for guiding the knife coulter 3 in vertical direction.

Means for raising and lowering the knife

coulter 3 include a cylinder 6 which is pivotally mounted on the plow frame with its lower end at 48, a second cylinder 49 which is fitted to slide in the cylinder 6, and a piston 50 which is fitted to slide in the cylinder 49, and is pivotally connected to a cross head 51 at the upper end of the knife coulter at 52. 7 is a pump, with an operating lever 8, for supplying liquid under pressure to the cylinder 6 from a tank 10 on the plow frame. 53 is the suction, and 54 is the delivery pipe of the pump 7, and 8 is a valve for reversing the share 3.

11 is a circular coulter at the end of an arm 12. The arm 12 is secured on a rocking frame 13 which is pivoted in the plow frame at 55. 14, 14 are links connected to a rocking lever 15 which is fulcrumed at 56, and 16 is a threaded spindle for imparting rocking motion to the lever 15. The circular coulter 11 serves for destroying weeds in advance of the knife coulter 3, and is raised from the ground when the plow is not operated.

18 is a recess in the rear end of the mole plug 2, 19 is a pin in the recess, 57 is a threaded sleeve which is mounted to rock on the pin, and 17 is a shell-like tube which is secured on the thread of the sleeve 57. 58 is a slot in the sleeve 57, 25 is a dog which is mounted to slide in the slot, 45 is a rod extending upwards from the dog 25 through the knife coulter 3, and 44 is a handle which is fulcrumed on the cross head 51 at 59 for shifting the rod 45. In the position illustrated in Fig. 2, the dog 25 restrains a spindle 23 which is fitted to slide in the sleeve 57 and is equipped with a tapering head 22 at its rear end, and a spring 24 tending to push it to the rear.

21, 21 are gripping jaws which are mounted to rock about pins 20, 20 in the rear end of the shell-like tube 17, and 26 is an eye which is engaged and retained by the jaws 21 when their front ends are spread apart by the tapering head 22. 28 is a threaded spindle forming an extension of the eye 26, 27 is a nut on the thread of the spindle, and 60 is a square head at the rear end of the spindle 28. 30 is a hollow chuck which is placed on the spindle 28 behind the nut 27, 29 is a mandrel

which is also placed on the spindle 28 in front of the square head 60, and 31 is the tubular end of a sheet-metal strip 32 which is carried on a supply cylinder 34 on the car 33. The end is held between the chuck 30 and the mandrel 29, the cooperating faces of these parts being tapered, and is clamped in the chuck by the pull acting on the eye 26 through the jaws 21.

The supply car 33 is supported on wheels 61 and 62 and is equipped with a vertically sliding frame 38 which is fitted between side plates 39 on the car 33, and adapted to be raised and lowered by a cable 40, a drum 42, and a crank 41 on the drum. 46 is a pivot on the frame of the car 33 about which the side plates 39, together with the frame 38, are tilted when the car 33 is not in operation.

36 is a die at the front end of a structure 37 at the lower end of the frame 38, and 35, 35 are rollers by which the strip 32 from the supply cylinder 34 is conducted to the die 36. In the die which may be of any suitable type, the strip 32 is bent into the tube 31.

In operation, a trench 43 is excavated and covered by boards or the like for supporting the front wheels 61 of the supply car 33, the supply car is run into a position above the trench, the frame 38 is lowered into the trench and the end 31 of the strip 32 is clamped in the chuck 29, 30 at the rear end of the mole plug 2. The plow 1 is now moved forward while at the same time the knife coulter 3 with the mole plug 2 is raised so that the passage for the reception of the drain pipe is made with a gradient. At the end of the passage the dog 25 is moved out of engagement with the front end of the spindle 23 by means of the handle 44 and the rod 45 so that the spindle is free to move in forward direction. The pull exerted on the rear ends of the jaws 21 by the eye 26 moves apart the rear ends, while the front ends of the jaws push the tapering head 22 on the spindle 23 to the front, breaking the connection of the mole plug 2 with the eye 26. The chuck 29, 30, with the eye 26, is left in the ground.

Preferably the pipe 31 is molded with an overlap at the edges of the strip. Normally a single die 36 is sufficient but for larger pipes the molding of the strip may be performed in several stages by means of a plurality of molds and fashioning rollers.

Instead of sheet metal, any other suitable material, for instance, asphalted roofing felt may be used, particularly in soils containing humic acids. However, in such cases I may use strips of sheet metal with a suitable covering layer of paint or the like.

Referring now to Fig. 3, the mole plow 1 with the coulter 3, the mole plug 2, the means for molding the pipe 31 and the supply car 33 are designed as described with reference to Figs. 1 and 2. In this machine, however, means are provided for placing a cable in the

pipe 31. The cable 63 is carried on the usual cable drum 64 which is mounted to rotate in stands 65, and its free end is attached to the chuck 30, Fig. 2, by any suitable means, not shown.

It will be understood that in the manner described I obtain a drain pipe in the passage which supports its walls, or a sheath for a cable which does the same, and that the difficulties encountered in the mole means performed heretofore are eliminated by my apparatus.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:

1. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for drawing into said passage a flat strip of flexible material, and means arranged at the level of said passage for molding said strip into a pipe.

2. A machine for laying pipes comprising a mole plow, a mole plug on said plow, hydraulic means for raising and lowering said plug, means operatively connected to said plug for drawing into the passage cut by said plug a flat strip of flexible material, and means arranged at the level of said passage for molding said strip into a pipe.

3. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for drawing into said passage a flat strip of flexible material, a clutch for connecting said strip to said plow, and means for throwing out said clutch.

4. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for drawing into said passage a flat strip of flexible material, a clutch for connecting said strip to said plow, said clutch being so designed as to be opened by the pull exerted on said strip, and means for locking said clutch against opening.

5. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for drawing into said passage a flat strip of flexible material, a chuck adapted to receive the end of said strip, a clutch for connecting said chuck to said plow, and means for throwing out said clutch.

6. A machine for laying pipes comprising

a mole plow, a mole plug on said plow, a member mounted to rock on said plug, a chuck adapted to engage a flat strip of flexible material, a clutch on said rocking member, and
5 means for connecting said chuck to said clutch so as to be engaged and released by said clutch.

7. A machine for laying pipes comprising a mole plow for cutting a mole passage, means
10 operatively connected to said plow for drawing into said passage a flat strip of flexible material, a supply car, means on said supply car for receiving a supply of said strip, a frame adapted to be displaced vertically on
15 said supply car, and strip-guiding means on said frame.

8. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for
20 drawing into said passage a flat strip of flexible material, a supply car, means on said supply car for receiving a supply of said strip, a frame adapted to be displaced vertically on said supply car, strip-guiding means on said
25 frame, and means, also on said frame, for molding said strip into a pipe.

9. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for draw-
30 ing into said passage a flat strip of flexible material, a supply car, means on said supply car for receiving a supply of said strip, a frame adapted to be displaced vertically and to be rocked about a horizontal axis on said
35 supply car, and strip-guiding means on said frame.

10. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for draw-
40 ing into said passage a flat strip of flexible material, a supply car, means on said supply car for receiving a supply of said strip, a frame adapted to be displaced vertically and to be rocked about a horizontal axis on said
45 supply car, strip-guiding means on said frame, and means, also on said frame, for molding said strip into a pipe.

11. A machine for laying pipes comprising a mole plow for cutting a mole passage, means
50 operatively connected to said plow for drawing into said passage a flat strip of flexible material, and means arranged at the level of, and held in a fixed position with respect to, said mole passage for molding said strip into
55 a pipe.

12. A machine for laying pipes comprising a mole plow for cutting a mole passage, means operatively connected to said plow for draw-
60 ing into said passage a flat strip of flexible material, means arranged at the level of said passage for molding said strip into a pipe, and means for drawing a cable through said pipe.

65 In testimony whereof I affix my signature.
HANS SACK.