Feb. 17, 1931. D. F. McRAE 1,792,855

METHOD OF LAYING AND PROTECTING UNDERGROUND PIPE LINES

Filed Oct. 19, 1929

Fig. 1.

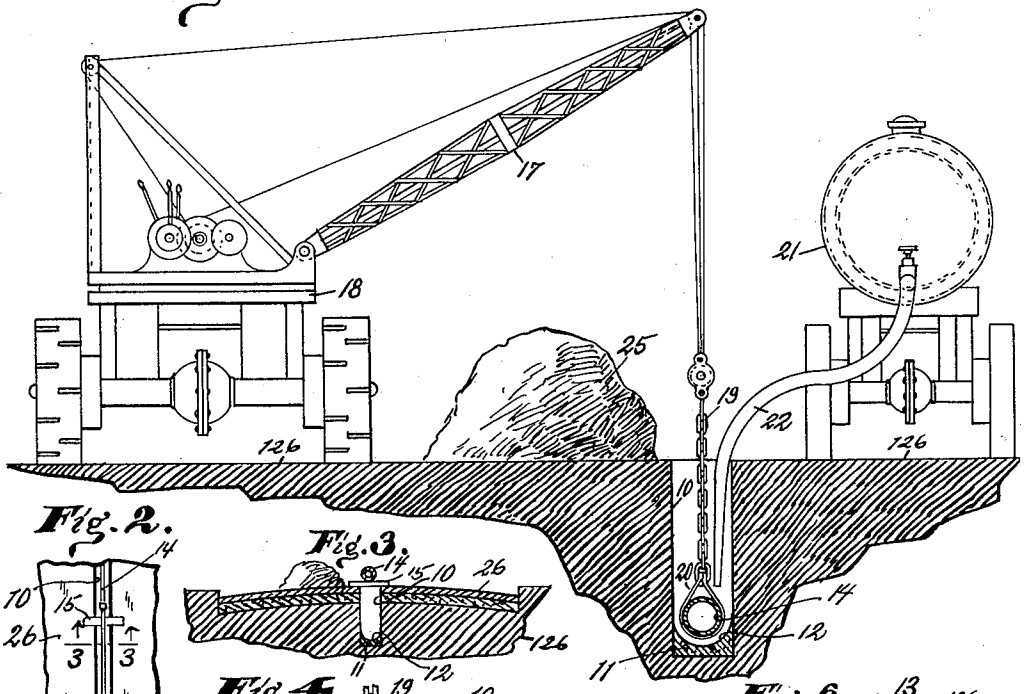


Fig. 2.

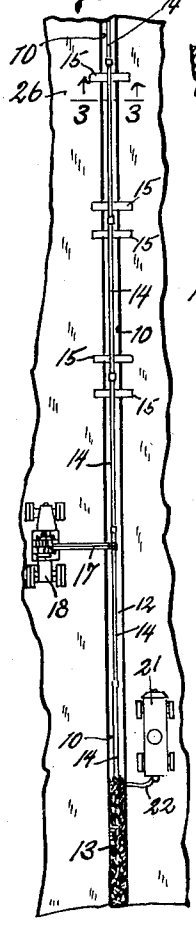


Fig. 3.

Fig. 4.

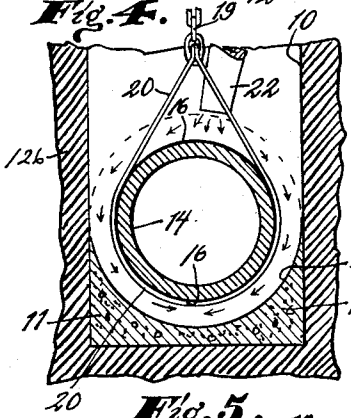


Fig. 6.

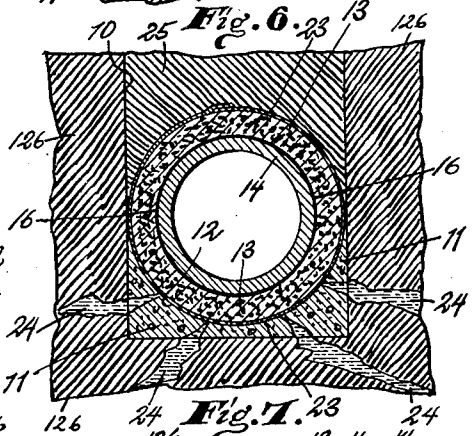


Fig. 5.

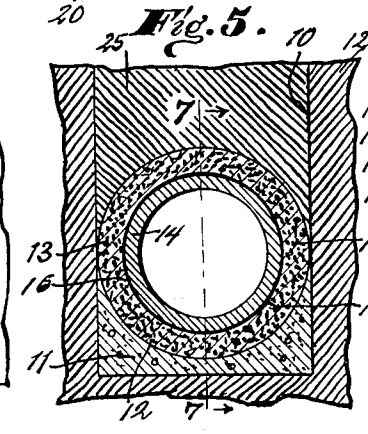
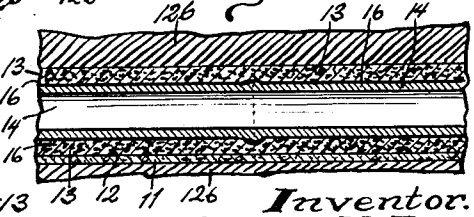


Fig. 7.



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UNITED STATES PATENT OFFICE

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METHOD OF LAYING AND PROTECTING UNDERGROUND PIPE LINES

Application filed October 19, 1929. Serial No. 400,756.

This invention relates to a method of laying and protecting pipe-lines, and the principal object is to prevent deterioration of the metal so as to prolong the period of time in which pipe-lines can be of service. To that end I provide a method of laying pipe-lines and enclosing them in casings so as to thoroughly protect them from rust, electrolysis and other destructive forces and elements so that their periods of usefulness are extended indefinitely and thereby accomplish many beneficial results, including economy in the industry, a saving in labor and preventing unnecessary tearing-up of paved streets.

As is well known, metal underground pipelines in some cases rarely last more than four or five years, especially where they are exposed to a chemical decomposition by electricity and severe soil conditions, and such an exposure usually occurs in city streets that are laid at great expense and expenditure of time and labor with the expectation that they will remain in good condition for a period of twenty years or more. However, such an expectation cannot be realized because such well laid streets have to be dug up at various intervals to replace pipe-lines that have been destroyed by rust, electrolysis or other causes, and the principal object of my invention is to provide a method of laying pipe-lines and protecting them so they will last indefinitely and be in a relatively perfect state of preservation far beyond the life of any city or county street or road so that a thoroughfare need never be torn up to replace metal pipe-lines.

Another object of this invention is to provide a method of laying and preserving pipelines that will be economical, which is accomplished by prolonging the life of the pipelines so they need not be replaced at frequent intervals, and also in the foregoing respect the method is obviously a great labor saver.

Another object is to provide a method of laying and protecting a metal pipe-line that includes suspending the line a predetermined distance above a fixed bed into which heated asphaltum is poured to enclose the metal pipeline and form a casing around it that effectively protects the metal from rust, electrolysis or other destructive elements or forces.

Another feature of invention is shown in the forming of a semi-cylindrical bed in the ditch and covering it with a water-proof covering so as to exclude water from the bed so that the heated asphaltum will not harden too quickly.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

The accompanying drawing illustrates the invention and method of operation.

Fig. 1 is a semi-diagrammatic sectional view of a pipe-line being laid in a ditch and enclosed in a casing of asphaltum, showing a derrick for suspending the pipe-line a predetermined distance above the ditch bed and a thermo-tank ready to pour liquid asphaltum into the bed to cover the pipe line.

Fig. 2 is a semidiagrammatic plan view of a pipe-line partly supported on skids above the ditch, and the other part lowered into the ditch and covered with the asphaltum and diagrammatically indicating the derrick and tank in use.

Fig. 3 is a fragmental cross section through a street on a small scale showing a ditch with a prepared bottom bed, and a skid supporting a line pipe above the bed.

Fig. 4 is an enlarged fragmental sectional view analogous to the bottom portion of the ditch shown in Fig. 1, showing the pipe-line suspended a predetermined distance above the semicylindrical top surface of the bed, and also showing the discharge end of a nozzle ready to pour liquid asphaltum into the bed and around the pipe, the arrows indicating the direction of flow of the asphaltum and indicated by the dotted line the position of the asphaltum when cooled and rounded up.

Fig. 5 is a sectional view analogous to Fig. 4 showing the pipe-line enclosed in a cylindrical casing of asphaltum and the ditch refilled with dirt.

Fig. 6 is a view analogous to Fig. 5 showing a water-proof paper covering for excluding water from the leads into the ditch bed with the paper extended entirely around the asphaltum casing.

Fig. 7 is a fragmental longitudinal section on the line 7—7, Fig. 5.

My method consists in digging a ditch or trench 10 at a desired place in a street 26 or ground 126 of proper length, depth and width by such means as are usually employed for such purposes. Then I prepare a bed 11 in the bottom of the ditch that can be formed of any suitable substance such as sand, cement or dirt, that is taken out of the ditch, and in forming the bed I provide it with a semi-cylindrical upper surface 12 that is of the same curvature as the outer surface of the casing 13 in which I enclose the pipe-line 14.

Having prepared the ditch or bed I then place skids 15 over it at intervals on which I string the pipe-line 15 after the sections are properly connected. Then I prepare the pipe-line 14 for enclosing it in a casing by first removing all foreign substances from its outer surface and then paint it with a suitable sizer or primer coat of paint 16 that is preferably formed of charcoal ground in oil. Then beginning at one end of the pipe-line and progressively working toward the other I lift the pipe-line and remove the skids so it can be lowered into the ditch. The pipe is lifted and lowered by means of a derrick 17 that is preferably mounted on a self-propelled vehicle 18 so it can be moved along the ditch to pick up the line for removing the skids and then lowering it into the ditch where it is held a predetermined distance above the semicylindrical surface of the bed in a properly aligned position.

While the pipe is so suspended I pour a heated liquid, preferably melted asphaltum, over and around the pipe-line to form a casing 13 that effectively protects the metal pipe from rust, electrolysis and other elements and forces of a destructive nature.

The derrick chain 19 is connected to the pipe-line so as to support it by a saddle 20 that is progressively moved along the pipe-line in advance of the filled portion, and it supports the pipe until the asphaltum has sufficiently hardened to support the encased pipe without the assistance of the derrick.

Preferably the heated asphaltum is poured into the ditch from a thermos tank 21 so that the liquid asphaltum can all be poured at about the same temperature, it being understood that in large contracts I employ a suitable number of tanks that are charged at a main preparation plant. It is also understood that where it is not convenient to employ thermos tanks the asphaltum can be heated at the ditch by means well understood in the art.

In pouring the heated asphaltum I prefer to employ a hose 22 so that its discharge end can be lowered into the ditch adjacent the pipe and bed.

Where there is either water or excessive moisture in the ditch I place a water-proof paper or cover 23 in the bed with side portions extending a considerable distance up the side walls of the ditch so that the liquid asphaltum will not be affected by the water or moisture to form steam pockets in the pipe casing.

After the top surface of the asphaltum has sufficiently cooled it is rounded up so as to form a relatively perfect cylindrical casing around the pipe and then the extended side portions of the paper when used can be folded down over the rounded up asphaltum, as indicated in Fig. 6. Also as shown in this figure the water pockets or leads 24 are completely cut off from the asphaltum by the waterproof paper or cover 23.

The tools for rounding up the top surface of the asphaltum into cylindrical form are not shown in the drawing as they form no part of this invention.

After the pipe-line is effectively enclosed in its asphaltum casing the ditch 10 is refilled with the removed dirt 25.

In Fig. 2 I show a fragmental portion of a street 26 with a pipe-line being placed in a ditch and encased in asphaltum, the upper portion of the figure showing the pipe-line supported on skids centrally over the ditch, and the lower portion showing the skids removed and the pipe-line supported in the ditch while being encased by the derrick, as described; and in Fig. 3 I show a fragmental cross section through the street 26 with the pipe-line supported on the skids ready to be lowered.

In practice the ditch is dug and the bed formed as stated, then by means of the derrick 17 the pipe-line is lowered progressively from one end toward the other and held suspended as necessary to enclose it in a casing of asphaltum that is applied, as described.

I claim as my invention:

1. A method of laying pipe-lines so as to protect them from destructive elements and forces consisting of first digging a ditch and preparing a bed in the bottom thereof that has a semicylindrical top surface, then preparing a pipe-line by cleaning and painting it with charcoal ground in oil, then lowering said pipe-line and suspending it at a predetermined distance above said bed, then pouring heated asphaltum from a thermos tank into said bed so as to completely cover said pipe-line, and then rounding up the top surface of the asphaltum when it has sufficiently cooled so as to form a cylindrical casing around the pipe-line.

2. A method of laying metal pipe-lines so as to protect them from destructive elements and forces consisting of first digging a ditch and preparing a bed in the bottom thereof that has a semicylindrical top surface, then placing skids across the ditch at convenient intervals, then stringing sections of

pipe on said skids and uniting them into a pipe-line, then cleaning said pipe-line and painting it with charcoal ground in oil, then suspending said pipe-line by means of a derrick so that the skids can be removed, then lowering said pipe-line to a predetermined distance above said bed, then pouring heated asphaltum into said bed until said pipe-line is completely enclosed in an asphaltum casing, and continuing to support said pipe line by said derrick until the asphaltum has sufficiently cooled and hardened to support said pipe line, and then disconnecting the derrick and refilling said ditch.

3. A method of laying metal pipe-lines so as to protect them from destructive elements and forces consisting of first digging a ditch and preparing a bed in the bottom thereof having a semicylindrical top surface, then placing skids across said ditch at predetermined intervals, then connecting the sections of a pipe-line and laying said line on said skids, then cleaning said line and painting it with charcoal ground in oil, then lifting said line with a derrick and removing said skids, then lowering said line to a predetermined distance above said bed, then pouring heated asphaltum from a thermos tank into said bed to cover said pipe-line, then rounding up the top surface of the asphaltum when sufficiently cooled so as to form a cylindrical casing around said pipeline, and then refilling said ditch.

4. A method of laying metal pipe-lines so as to protect them from destructive elements and forces consisting of first digging a ditch and preparing a bed in the bottom thereof having a semicylindrical top surface, then placing a covering of water-proof paper over said bed so as to exclude moisture therefrom, then placing skids across said ditch at predetermined intervals, then connecting the sections of a pipe-line and laying said line on said skids, then cleaning said line and painting it with charcoal ground in oil, then lifting said line with a derrick and removing said skids, then lowering said line to a predetermined distance above said bed, then pouring heated asphaltum from a thermos tank into said bed to cover said pipe-line, then rounding up the top surface of the asphaltum when sufficiently cooled so as to form a cylindrical casing around said pipeline, and then refilling said ditch.

In witness whereof, I have hereunto affixed my signature.

DONALD FORBES McRAE.