

July 26, 1932.

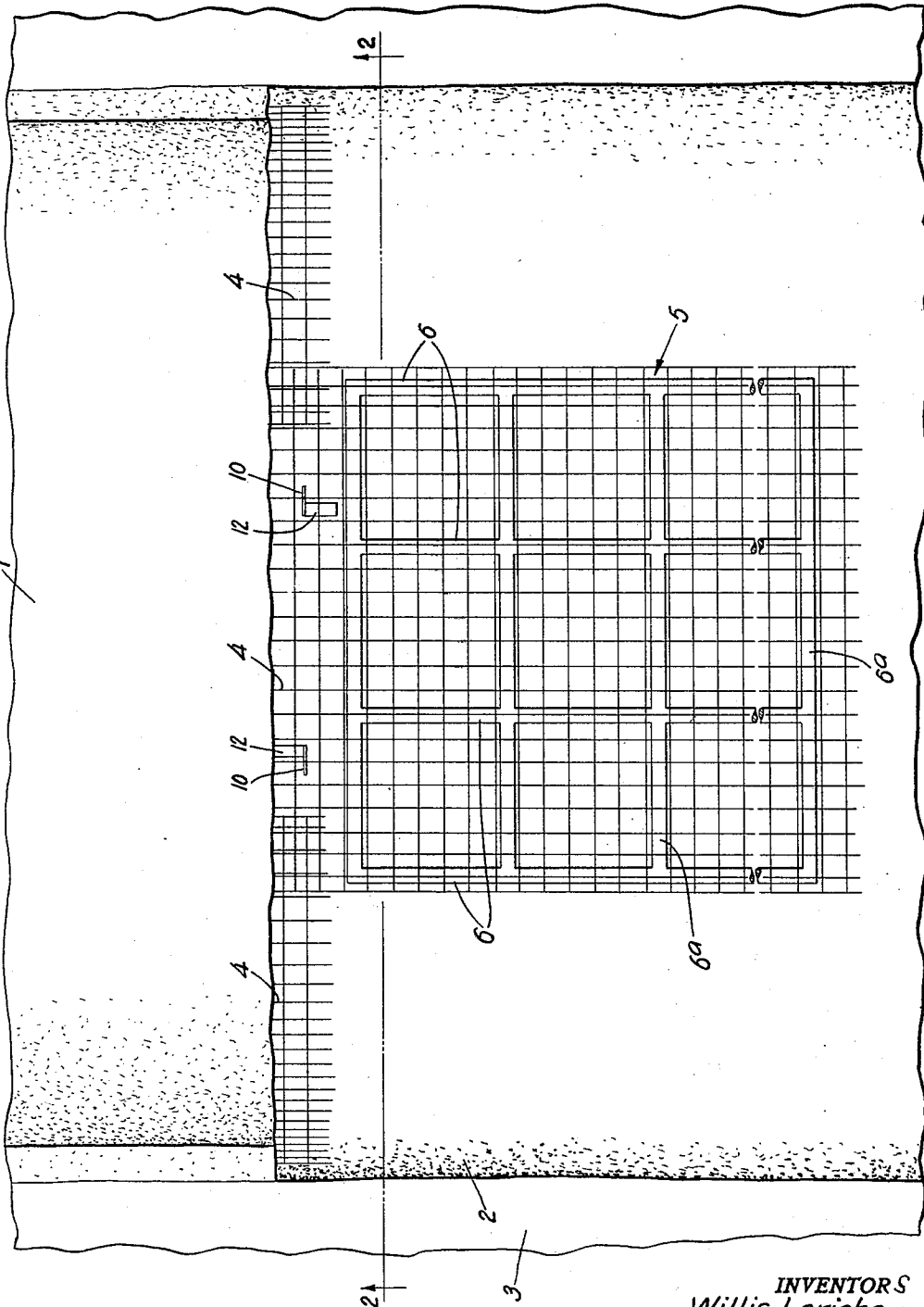
W. LERICHE ET AL

1,869,265

LINING DITCHES AND THE LIKE

Filed March 28, 1931

2 Sheets-Sheet 1



INVENTORS
Willis Leriche and
Ira V. Beasley.
BY Louis L. Ansard
THEIR ATTORNEY

July 26, 1932.

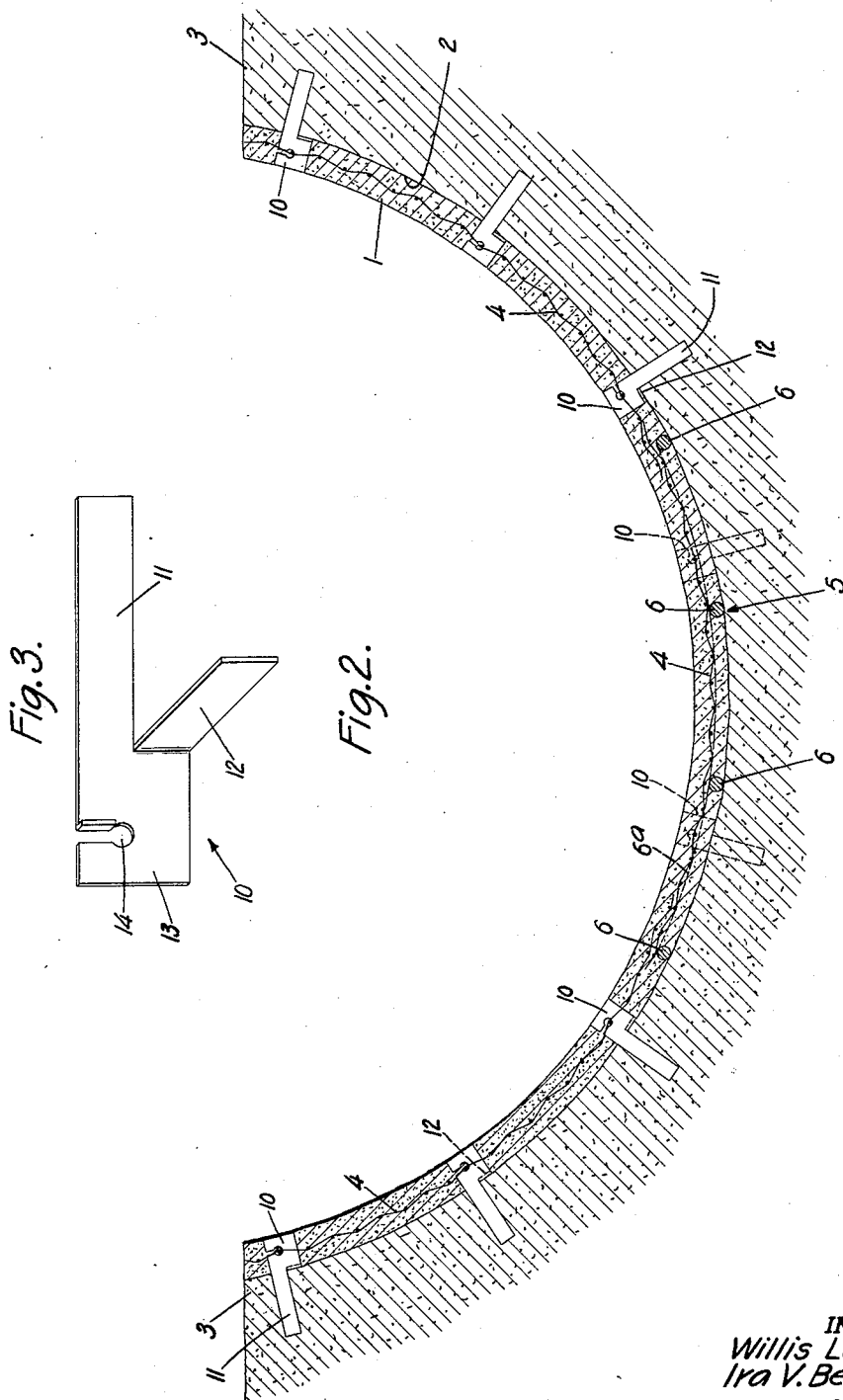
W. LERICHE ET AL

1,869,265

LINING DITCHES AND THE LIKE

Filed March 28, 1931

2 Sheets-Sheet 2



INVENTORS
Willis Leriche and
Ira V. Beasley.
BY Louis L. Ansard
THEIR ATTORNEY

UNITED STATES PATENT OFFICE

WILLIS LERICHE, OF ALLENTOWN, PENNSYLVANIA, AND IRA V. BEASLEY, OF YUKON, OKLAHOMA, ASSIGNORS TO CEMENT-GUN CONTRACTING COMPANY, A CORPORATION OF DELAWARE

LINING DITCHES AND THE LIKE

Application filed March 28, 1931. Serial No. 526,047.

This invention relates to lining ditches and more particularly to a method of lining ditches and means for carrying out the method. Although the invention is particularly adapted for use in lining ditches, it should be understood that it may be utilized in connection with the formation of a layer of cementitious material or the like applied to a support or backing and containing reinforcement in form of openwork sheets.

An important application of the invention is in lining circular segment ditches, such as irrigation ditches in which the cementitious material is applied directly against the dirt. It is not practicable to use ordinary concrete in lining such ditches, inasmuch as the building of the necessary forms renders the cost prohibitive. Advantageous use may, however, be made of "Gunitite" composed of cement and sand in the proper portions and blown into position by a "cement-gun", the material being hydrated just prior to its application to the backing or inside surface of the ditch.

In lining ditches with material such as "Gunitite", reinforcing material in the form of openwork sheet material, such as wire mesh, is placed in the ditch and straightened along the direction of the ditch. Before applying the "Gunitite" it is necessary, due particularly to the slight thickness of the "Gunitite" lining, to position the reinforcing sheet material with considerable accuracy. Heretofore it has been general practice to obtain the spacing by lifting the mesh with a hook and spacing it by eye or by fastening the reinforcing sheet in position at intervals by suitable spacing devices secured to the backing as by driving them into the ground. Great difficulty has, however, been encountered in effecting the proper spacing of the reinforcing material particularly in the lower part of the ditch.

An important object of the invention is to provide a method whereby such difficulties will be obviated. A further object of the invention is to provide means for carrying out the method.

According to a preferred form of carrying out the invention use is made of a spacer

interposed between the reinforcement and the inner surface of the ditch, for example at the bottom of the ditch. This spacer is shaped to conform with the cross section of the ditch and serves to support the reinforcement at a distance from the bottom of a ditch corresponding with the thickness of the spacer or spacing device. In its broad aspect the invention contemplates the application of the cementitious material to the inner surface of the ditch at the rear of the spacing device, forward movement of the spacing device to separate it from the deposit of lining material previously made, and application of cementitious material in the area vacated by the spacer to bring the lining up to the rear edge of the spacer in its new position, this series of steps being repeated as many times as necessary in order to produce the desired results.

Other objects and advantages will appear upon consideration of the following description and of the drawings, in which:

Fig. 1 is a top plan view illustrating the method of lining a ditch according to the present invention;

Fig. 2 is a sectional view taken along line 2-2 of Fig. 1; and

Fig. 3 is a view illustrating one form of spacing and gauging device.

Referring to the drawings, 1 indicates a completed portion of the lining of a ditch 2 in material 3 such as the ground. The finished lining 1 is preferably formed of suitable cementitious material, such as "Gunitite", and is reinforced by suitable means, here shown as openwork sheet material such as wire mesh.

From the edge of the finished lining the openwork sheet material or wire mesh 4 extends in stretched relation along the ditch and the spacing of the reinforcing material in the lower part of the ditch from the inner surface of the ditch is determined by a spacing device 5 in the form of a frame of suitable thickness interposed between the reinforcing material and the bottom of the ditch. The spacing forms, which should correspond in shape with the bottom of the ditch and in thickness with the desired spac-

ing, is preferably made up of a plurality of round longitudinal members 6 and round transverse members 6a forming a grating with rectangular openings, all of the members or rods being of the same diameter and being connected together in such a manner that the connections between the rods are of the same thickness as the rods. The spacer 5 may be of considerable length and supports the wire mesh in such a manner as to assist in preserving its shape against pressure from above. It should be understood that the frame may be constructed in other ways, for example the frame might be of plate construction.

For convenience the wire mesh 4 is illustrated as held at one end by a portion of finished lining 1, but it will be understood that in starting the lining of the ditch the wire mesh may be held at the starting point in any suitable manner.

Assuming that the wire mesh is held at the starting point by suitable means such as a section of finished lining 1, the lining of the ditch may be carried out in a manner now to be described. The spacer 5 is positioned with its rear edge or end a suitable distance from the holding means to maintain the wire mesh between the holding means and spacer in the proper position. However, as illustrated the wire mesh extends beyond the side edges of the spacer 5 and the spacing of the wire mesh from the inner surface of the ditch is obtained by means of spacing devices 10.

The spacing devices 10 may be of any suitable form but preferably each of them includes a shank 11 for insertion in the ground or other backing material, an offset 12 of considerable area which limits the insertion of the shank, and an upper portion 13 which serves to gauge the thickness of the lining and by means of a wire receiving opening 14 serves to determine the position of the wire mesh. Insertion of a wire of the mesh into the opening 14 is facilitated by a slot connecting the opening with the edge of the gauging portion. The specific form of spacing device disclosed herein is described and claimed in our copending application Serial No. 526,046, filed March 28, 1931.

It should also be understood that when desired spacing devices, such as 10, may be used in connection with the part of the wire mesh at the rear of spacing device 5.

Upon completion of the preparatory work for this short section of the ditch, the lining material is blown against and through the wire mesh by suitable means such as a "cement-gun" and this operation is continued until the "Gunit" thus formed reaches the upper edges or gauging edges of the gauging portion 13 of the spacers 10 wherever they are used.

Then the spacing device 5 is advanced a suitable distance preparatory to applying

material to another section of the ditch vacated by the spacer or frame 5, this movement being effected by any suitable means which may include wires attached to the spacer 5 and extending forwardly beneath the mesh for some considerable distance before passing upwardly therethrough to facilitate the application of power. The exposed wire mesh at the rear of the spacer 5 is then prepared as before with the use of spacing devices such as 10 and additional cementitious material applied as before. These steps may be repeated as many times as is necessary to line the ditch throughout its length.

It should be understood that various changes may be made in the method of the present invention and that various features may be used without others without departing from the true spirit and scope of the invention.

Having thus described our invention, we claim:—

1. The method of forming on a backing a layer of cementitious material or the like containing a reinforcement of openwork sheet material, which includes stretching the reinforcement over said backing, holding it stretched, moving a spacing device between the reinforcement and the backing, and securing the reinforcement in adjusted position behind the spacing device as the latter is advanced preparatory to the application of the cementitious material to the area vacated by the traveling spacing device.

2. The method of forming on a backing a layer of cementitious material containing a reinforcement of openwork sheet material, which includes arranging the reinforcement over said backing, moving a spacing device between the reinforcement and the backing, and applying cementitious material to fill the space between the backing and the reinforcement as it is vacated by the traveling spacing device and to cover the reinforcement thereby holding it in the position determined by the spacing device adjacent to its rear edge.

3. The method of forming on a backing a layer of cementitious material containing an openwork sheet of reinforcing material, which includes stretching the sheet over the backing, moving a spacing device between the sheet and the backing, securing the sheet to the backing at intervals in the spaced relation determined by said spacing device adjacent to the rear edge thereof, and applying the cementitious material to fill the space between the backing and the sheet and also cover the latter.

4. The method of forming on a backing a layer of cementitious material containing a reinforcement of openwork sheet material, which includes stretching the reinforcement over the backing, moving a spacing device

between the central part of the reinforcement and the backing, securing the reinforcement at opposite sides of the path of the spacing device to the backing at intervals in a predetermined spaced relation corresponding with the spacing determined by said spacing device adjacent to the rear edge thereof, and applying the cementitious material to fill the space between the backing and the reinforcement and also cover the latter.

5. The method of forming on a support a layer of cementitious material of the like containing reinforcement of openwork sheet material, which includes placing a sheet of openwork material over said support, placing a spacing device under said sheet adjacent to the point at which the application of cementitious material is started, applying cementitious material substantially up to the rear end of said spacing device, advancing the spacing device to another position, and again applying cementitious material up to the rear end of the spacing device.

6. The method of forming on a backing a layer of cementitious material or the like containing reinforcement of openwork sheet material, which includes placing reinforcement over said support, placing between said reinforcement and said backing a spacing device extending part way across the reinforcement, applying cementitious material to the reinforcement and backing substantially up to the rear edge of the spacing device, advancing the spacing device along a path extending along the reinforcement, securing to the backing in the desired spaced relation with respect thereto the reinforcement at the sides of the space between the rear edge of the spacing device and the cementitious material previously applied, and applying cementitious material to the reinforcement and backing to bring it substantially up to the rear edge of the spacing device not only in the region behind said spacer but also in the space at the sides of this region occupied by the reinforcement.

7. The method of lining a ditch with cementitious material or the like containing wire mesh reinforcement, which includes placing wire mesh in the ditch and stretching it lengthwise of the ditch, placing between the wire mesh and the bottom of the ditch a supporting spacer shaped in accordance with the bottom of the ditch and of desired thickness, securing the wire mesh at the sides of the ditch in the desired relation with respect thereto, applying the cementitious material to the sides and bottom of the ditch until the material is brought up to the rear edge of the spacer, and moving the spacer to a new position in advance of the lining.

8. The method of lining a ditch with cementitious material or the like containing

wire mesh reinforcement, which includes placing wire mesh in the ditch and stretching it along the same, placing between the wire mesh and the bottom of the ditch a supporting spacer shaped in accordance with the bottom of the ditch and of desired thickness, securing the wire mesh at the rear of the spacer in desired relation with respect to the inner surface of the ditch, applying the cementitious material to the sides and bottom of the ditch until the cementitious material is again brought up the rear edge of the spacer, and moving the spacer to another position in advance of the cementitious material previously deposited.

In testimony whereof we affix our signatures.

WILLIS LERICHE.
IRA V. BEASLEY.