July 6, 1948. J. M. CROM 2,444,811

GROUT PROJECTING APPARATUS

Filed June 16, 1944 2 Sheets-Sheet 1

Fig. 1.

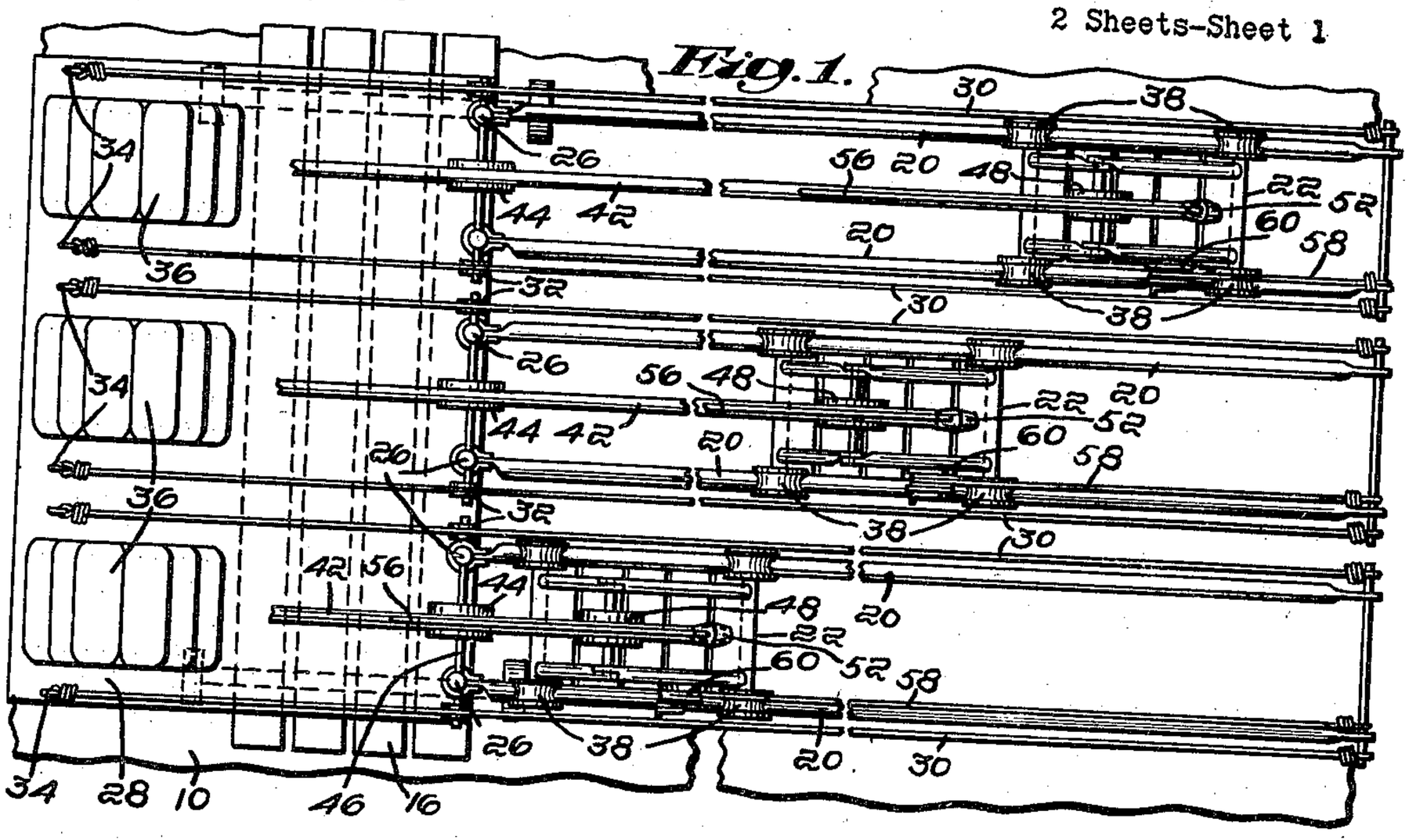

Fig. 2.

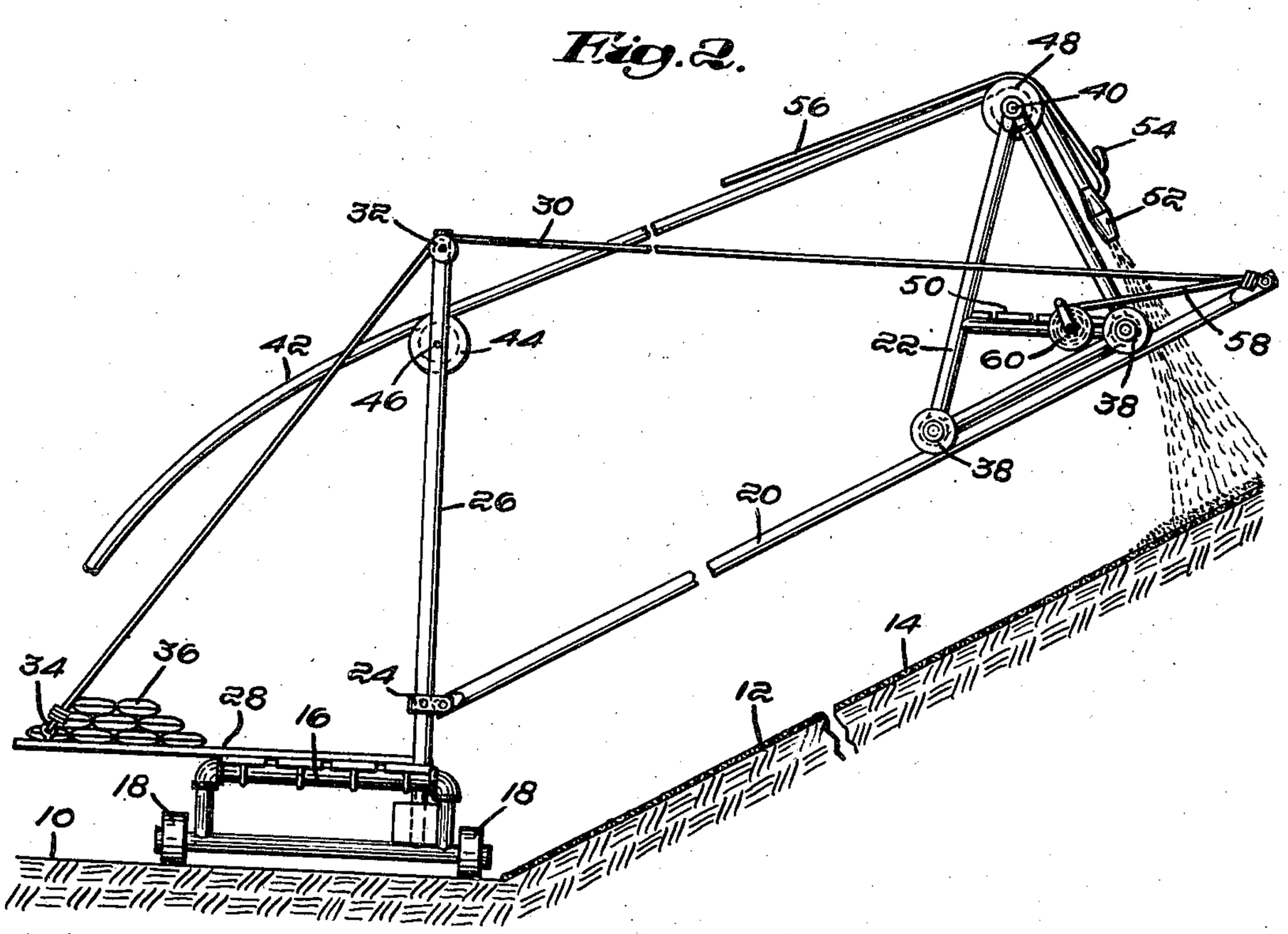

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Fig. 3.

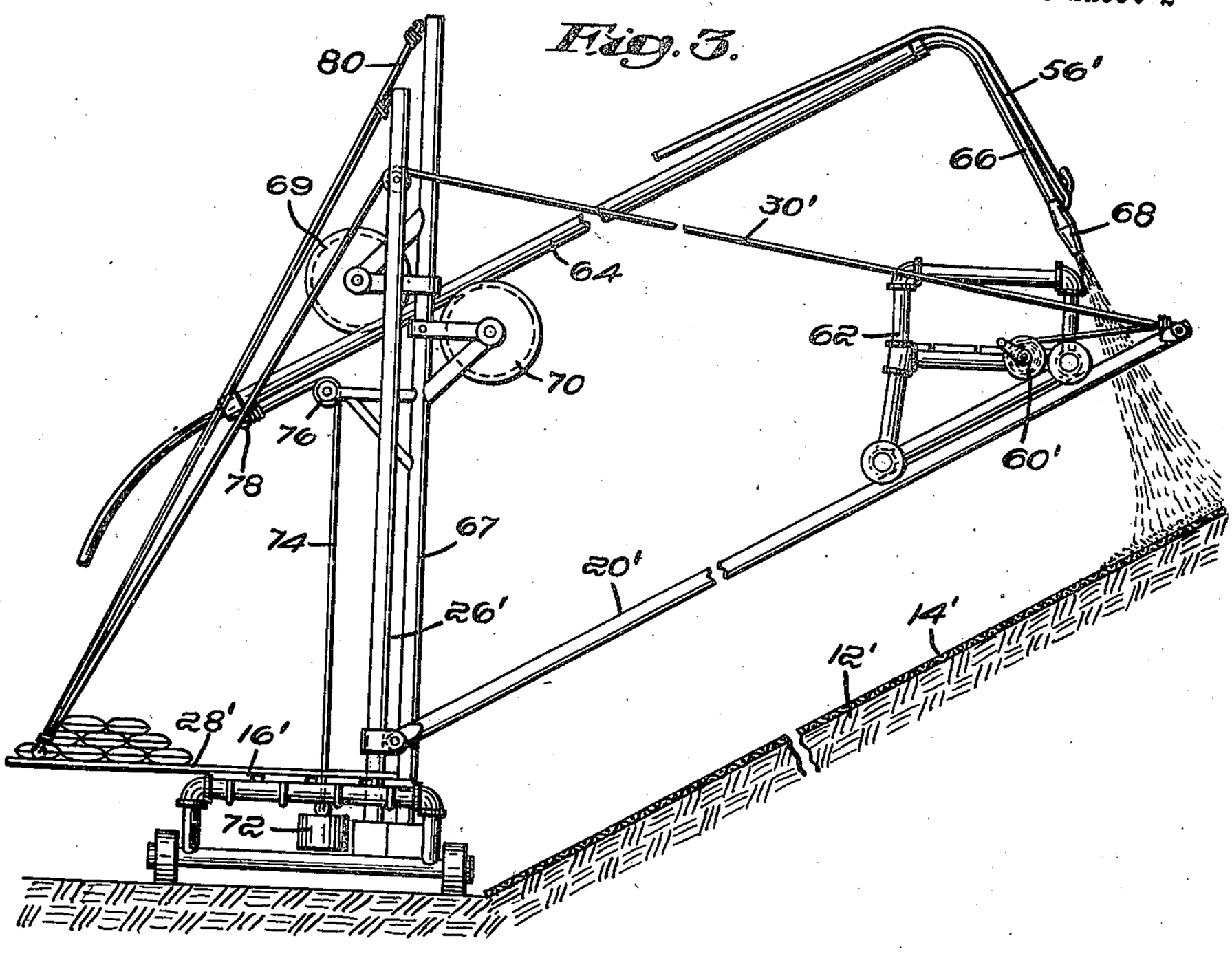
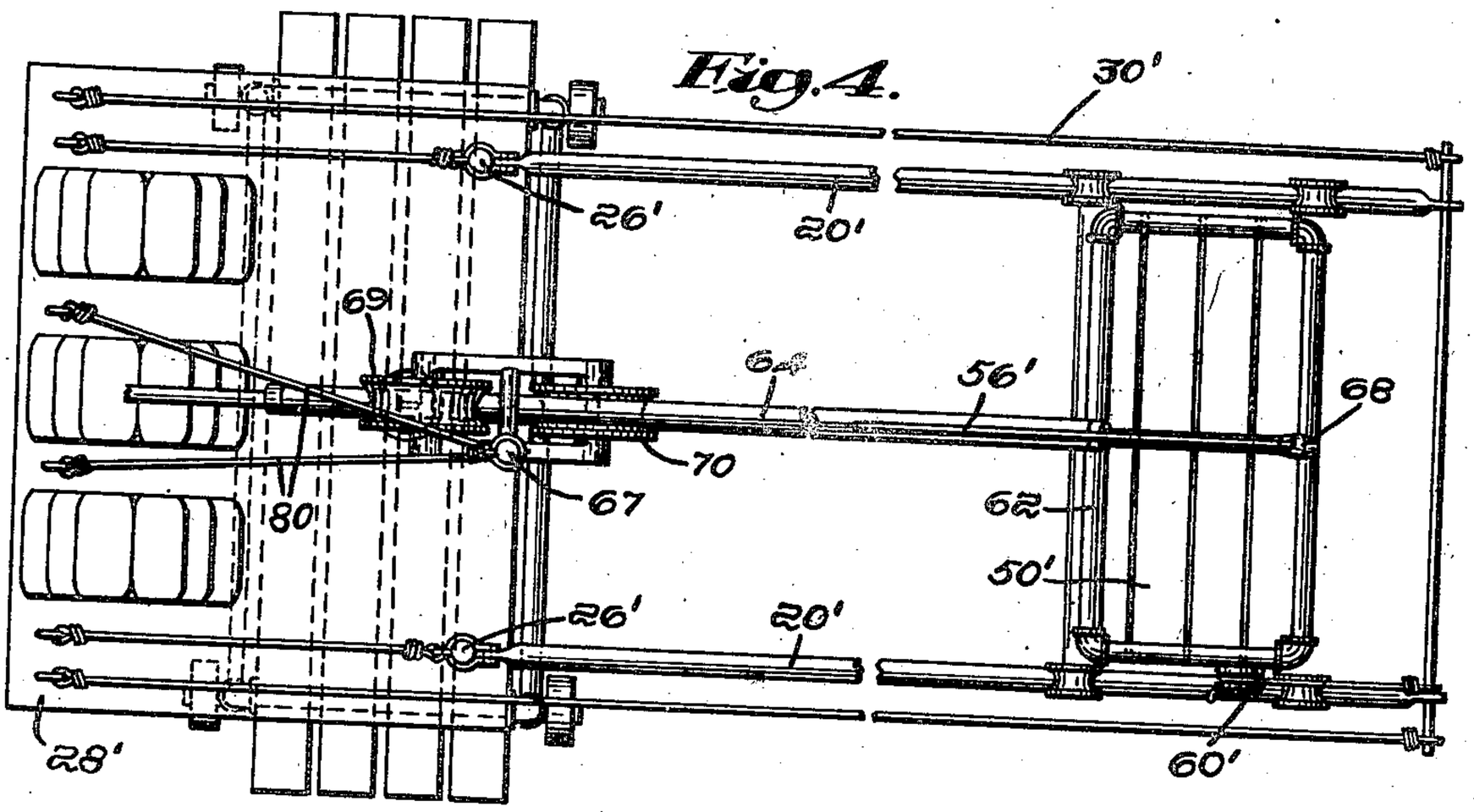


Fig. 4.



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UNITED STATES PATENT OFFICE

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GROUT PROJECTING APPARATUS

John M. Crom, Washington, D. C.

Application June 16, 1944, Serial No. 540,659

6 Claims. (Cl. 61—63)

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This invention relates to an improved apparatus for coating relatively large surfaces by pneumatically projecting semi-liquid compositions thereonto. The apparatus, as herein illustrated and described, is particularly applicable to the projecting of waterproofing compositions onto the bottom and side walls of ditches, dams and the like although its use is not confined to any specific material or constructional work. In my Patent 2,176,891 is described a machine of this nature for automatically coating passages and tunnels whereas my present invention herein disclosed relates to an improved grout projecting apparatus for facilitating the manual distribution and placing of grout and the like pneumatically over and onto various surfaces to be coated.

Excavations and the like for storing and conveying liquids are commonly coated or lined with a semi-liquid cement composition or grout which is pneumatically conveyed through a conduit or hose and forcibly projected into place from a nozzle. The areas to be thus treated are usually of substantial proportions and the manual manipulation of the hose and nozzle over these areas to the extent required for even distribution of the grout is a laborious task. Furthermore, the size of hose and nozzle which an operator can handle in these operations as at present carried out is quite limited as is also the effective area that can be covered by the nozzle spray when the operator works from his usual position on the surface being lined. The air pressure employed in the hose is considerable and a hose of 1½ inch diameter with the nozzle held at a distance of about four feet from the surface being treated has been the maximum capacity heretofore practicable. My improved apparatus not only provides for the employment of a two inch hose and the holding of the nozzle at about eight feet from the point of deposit but furthermore renders the use thereof easier for the operator than the smaller hose as heretofore employed. It will be readily apparent that a two inch hose carries about two times as much material as a 1½ inch hose and that the spraying area covered by the nozzle at a spacing of eight feet is approximately four times that covered at four feet, thereby greatly increasing the efficiency and speed of the coating operation. The novel machine or apparatus which I have invented for use in this operation is adapted not only to support the hose and nozzle for easy manipulation over the area to be treated but also provides a carriage for supporting the operator and conveying him over such area. The production of an apparatus of this nature

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for the purpose described comprises one of the objects of the invention.

My improved grout projecting apparatus as illustrated comprises a vehicle carrying one or more tracks projecting outwardly therefrom and over the area to be treated, and a carriage movable on and along each track for supporting the operator who manipulates the grouting nozzle. Means is also provided in the vehicle for supporting the grout carrying conduits in a manner permitting free movement of the nozzle portions thereof along the tracks adjacent to the carriages. Each operator manipulates the nozzle from his position on the carriage and, since the latter can traverse the entire area to be treated, the operator can with great convenience distribute the grouting material uniformly over such area and at greatly increased speed as above described. Furthermore, by so spacing or staggering the operators transversely across the surface to be treated that they can treat local areas which directly adjoin each other transversely of the surface it is possible completely to line relatively long surfaces, such as ditches, at one passage of the vehicle therealong. The production of such an improved apparatus for the purpose described comprises a further object of the invention.

These and other features of the invention will be best understood and appreciated from the following description of preferred embodiments thereof selected for purposes of illustration and shown in the accompanying drawings in which—

Fig. 1 is a plan view of an apparatus embodying my invention,

Fig. 2 is a side elevation thereof,

Fig. 3 is a side elevation of a modified construction, and

Fig. 4 is a plan view thereof.

Referring first to the form of invention illustrated in Figs. 1 and 2 of the drawing, **10** indicates the bottom surface and **12** one inclined side wall surface of a ditch or excavation to be lined with a waterproof coating. The excavation is first formed and the surfaces finished uniformly as by the apparatus shown in my Patent 2,318,294. Wire mesh **14** is then placed on and along the surface to be treated and the waterproof coating is formed by projecting cementitious composition on and covering the surface and mesh to a predetermined thickness.

One form of improved apparatus which I have invented and which I employ for performing the lining operation comprises a vehicle **16** preferably mounted on wheels **18** for movement longi-

tudinally along and on the bottom surface 10 of the ditch. Mounted on the vehicle and projecting outwardly therefrom over a surface 12 to be lined are one or more pairs of tracks 20 each mounting a carriage 22 thereon for movement therealong. In Fig. 1 of the drawing I have illustrated three such pairs of tracks and the function which they serve is hereinafter described. Each track is pivotally supported at its bottom and on collars 24 secured to a pair of posts 26 carried by the vehicle and having a platform 28 cooperating therewith. The outer end of each track is supported by a pair of cables 30 anchored to the free end of the track extending rearwardly over sheaves 32 on the posts and anchored to the rear side of the platform at 34. Each platform and its track are counterbalanced as by sand bags 36 piled on the rear portion of the platform. The track is inclined to a position parallel with the surface 12 and is ordinarily spaced several feet from such surface. The spacing of the track can be varied if desired by adjusting the collars 24 along the posts and lengthening or shortening the cables 30.

Each carriage 22 is supported on wheels 38 riding on the tracks 20 and comprises a triangular frame extending upwardly and including a shaft 40 at its top portion extending transversely of the track. The grout carrying hose 42 extends upwardly from a point rearwardly of the vehicle 16, over a sheave 44 on a shaft 46 carried by the posts 26, and from thence over a sheave 48 on and movable along the shaft 40, the nozzle end of the hose hanging downward from the sheave 48 to a point adjacent to a platform 50 on the carriage.

The purpose of the platform 50 is to support the operator who can stand thereon and conveniently manipulate the hose nozzle 52 from the forward side of the carriage substantially as shown in Fig. 2. The weight of the hose and nozzle are taken by the sheave 48 and the functions required of the operator comprise the manual directing of the nozzle over the area to be treated and manipulating of the hand valve 54 which controls the mixing water from the hose 56. It will also be apparent that free lateral movement of the hose transversely of the track is permitted by the loose mounting of the sheave 48 for movement on and along the shaft 40. The carriage can be moved upwardly and along the track manually by a cable 58 anchored to the free end of the track and wound about a drum 60 on the carriage.

The apparatus can be employed with one pair of tracks 20 and one carriage 22 in which case the operator adjusts the carriage along the tracks and over the surface 12 to be treated, or a plurality of pairs of tracks and carriages can be employed as illustrated in Fig. 1. In the latter case employing three tracks and carriages, the three carriages are adjusted progressively to staggered positions along the tracks as illustrated and wherein the entire surface 12 can be reached by the nozzles on the carriages as thus positioned. Each operator is required to treat the portion of the surface 12 adjacent to his carriage and the arrangement is such that the entire surface 12 can be lined at one passage of the vehicle therealong and without substantial adjustment of the carriages on their tracks.

In Figs. 3 and 4 I have illustrated a modified form of the invention. This construction employs a vehicle 16', a track 20' and other like parts, substantially as illustrated in Figs. 1 and 2 and indicated by like reference characters primed. In this case the grout carrying conduit is supported independently of the carriage 62, the sole purpose of the latter being to support the operator above the surface 12'. The grout carrying conduit in this case includes a straight and rigid member 64 from the free top end of which projects the flexible hose portion 66 carrying the nozzle 68. The member 64 can be a pipe serving as a portion of the conduit or it can comprise simply a support for carrying the hose therein and therealong.

The member 64 extends upwardly and outwardly from the vehicle above and substantially parallel with the track 20' and is supported on a pedestal 67 on the vehicle. The pedestal is mounted on the carriage for pivotal movement about its vertical axis and carries two grooved wheels 69 and 70 engaging the member 64 above and below whereby permitting the member to move longitudinally of itself and also to swing about the pedestal as a center. The member 64 is counterbalanced by a weight 72, a cable 74 being connected to the weight and extending upwardly therefrom over a sheave 76 and from thence to and attached to the member at 78. The pedestal and member are also supported by anchoring cables 80 attached to the platform 28' and to the top of the pedestal.

The operation of this form of the invention is substantially the same as above described in connection with the form shown in Figs. 1 and 2. The operator stands on the platform 50' and directs the nozzle 68 which hangs by gravity from the top end of the conduit member 64. The weight 72 is adapted so to counterbalance the member that it normally remains in any position of adjustment and can with convenience be either moved longitudinally or swung laterally about the pedestal by the operator. It will be noted that in this form of the invention the vehicle 16' is provided with only one carriage 62 and that this carriage is substantially wider than the carriages 22 shown in Fig. 1. Such construction gives the operator a wide latitude for movement of the nozzle from and forwardly of the carriage so that he can cover a substantial portion of the surface 12' before requiring adjustment of the carriage along its track. It will also be apparent that a plurality of vehicles can be employed with their operators disposed in the arrangement illustrated in Fig. 1 whereby an entire surface can be lined at one passage of the vehicle therealong, in the same manner as a plurality of operators carried on the single vehicle 16 project grout from their respective positions and onto their respective and adjoining areas as illustrated in Fig. 1.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a grout projecting apparatus, a vehicle adapted for movement along a predetermined path, a track carried by the vehicle and projecting laterally therefrom, a carriage on and movable along the track beyond the vehicle, a platform on the carriage for supporting an operator, a grout conducting conduit including a flexible hose rearwardly of and supporting a nozzle on its free end, and means on the vehicle above the track and platform supporting the hose depending therefrom and longitudinally movable relative thereto and with the nozzle supported solely by the hose and freely movable therewith relative to and independently of the carriage, the

nozzle being adapted to be manually guided and directed by an operator on the platform.

2. The apparatus defined in claim 1 in which said means on the vehicle above the track and platform is supported on the carriage.

3. In a grout projecting apparatus, a vehicle, a track carried by and projecting outwardly therefrom, a carriage on and movable along the track beyond the vehicle, a platform on the carriage for supporting an operator, a grout conducting hose, a nozzle on the free end of the hose, a frame on the vehicle including a shaft above the platform and extending transversely of the track, and a sheave on and movable along the shaft and supporting the hose depending therefrom with the nozzle supported solely by the hose and freely movable therewith relative to and independently of the carriage, the nozzle being adapted to be manually guided and directed by an operator on the platform.

4. In a grout projecting apparatus, a vehicle, a track carried by and projecting outwardly from the vehicle, a carriage on and movable along the track beyond the vehicle, a platform on the carriage for supporting an operator, a grout conducting conduit including a nozzle at its free end and a flexible hose adjacent to and supporting the nozzle, a straight and rigid member projecting outwardly from the vehicle along and above the track and supporting a portion of the conduit with said flexible hose depending from the free end thereof above the track and forming the sole support for the nozzle, and means supporting the member on the vehicle for pivotal movement about a vertical axis and movement longitudinally of itself whereby permitting the nozzle to move laterally of the track and follow the carriage in its movement along the track, the nozzle being adapted to be manually guided and directed by an operator on the platform.

5. In a grout projecting apparatus, a wheeled vehicle adapted for movement along a predetermined path, a track supported at its inner end on the vehicle and projecting laterally outward therefrom, a carriage on and movable along the track beyond the vehicle, a platform on the carriage for supporting an operator, a

post extending upwardly from the vehicle, a grout conducting conduit including a flexible hose carrying and forming the sole support of a nozzle on the free end of the hose, and means including the post for supporting the conduit with the hose depending therefrom from a point above the track and with the nozzle supported solely by and at the free end of the hose and freely movable therewith relative to and independently of the carriage, the nozzle being adapted to be manually guided and directed by an operator on the platform.

6. In a grout projecting apparatus, a wheeled vehicle adapted for movement along a predetermined path, a plurality of tracks supported at their inner ends on the vehicle and projecting laterally outward therefrom in spaced and substantially parallel relation, a carriage on and movable along each track beyond the vehicle, a platform on each carriage for supporting an operator, a grout conducting conduit associated with each track and including a flexible hose carrying and forming the sole support of a nozzle on the free end of the hose, and means for supporting the conduits on the vehicle with each hose depending from a point above its track and with its nozzle supported solely by and at the free end of the hose and freely movable therewith relative to and independently of the adjacent carriage, the nozzle being adapted to be manually guided and directed by an operator on the platform.

JOHN M. CROM.

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