

Aug. 19, 1969

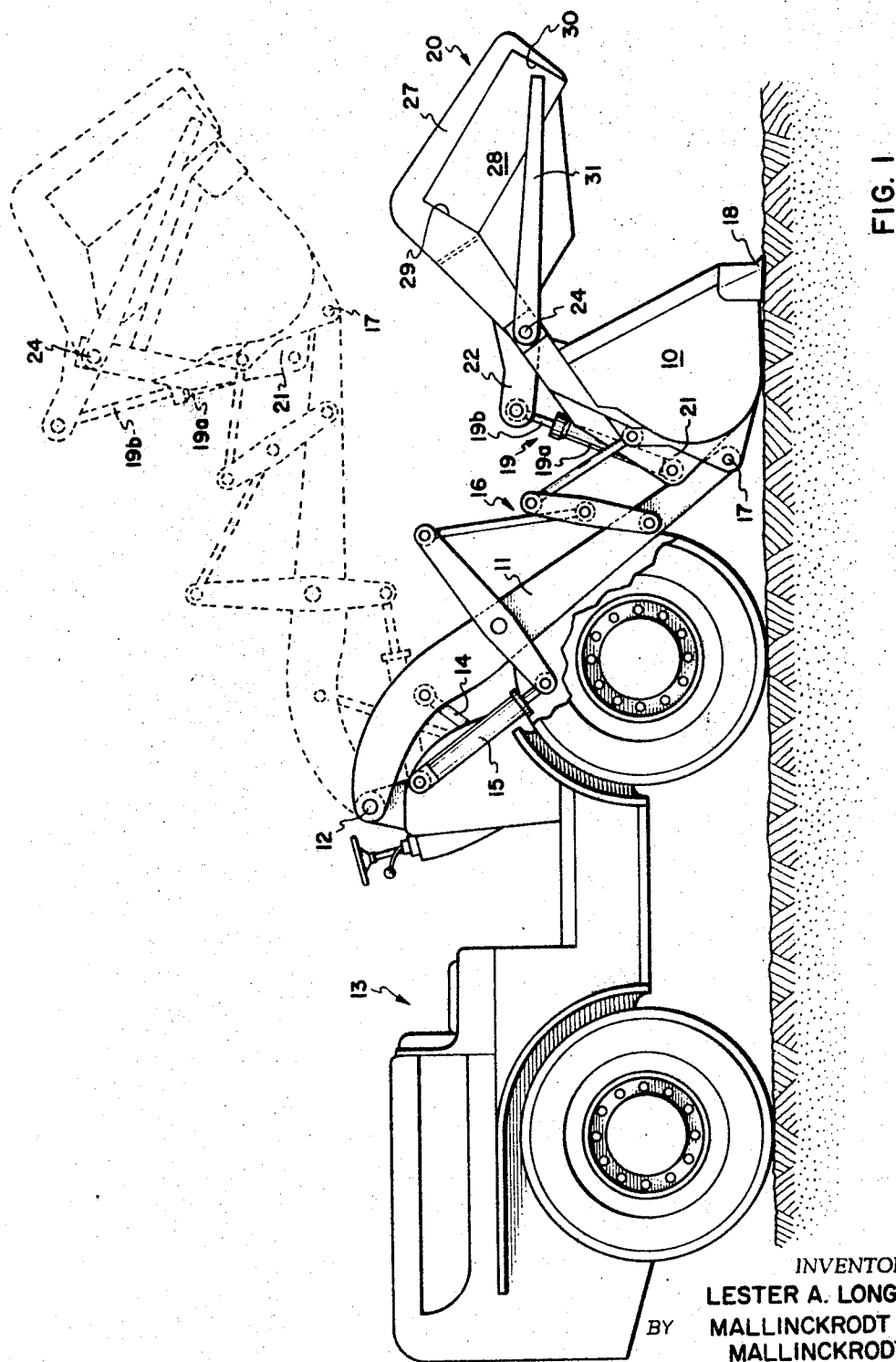
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3,461,968

SCREENING LOADER

Filed April 28, 1966

3 Sheets-Sheet 1



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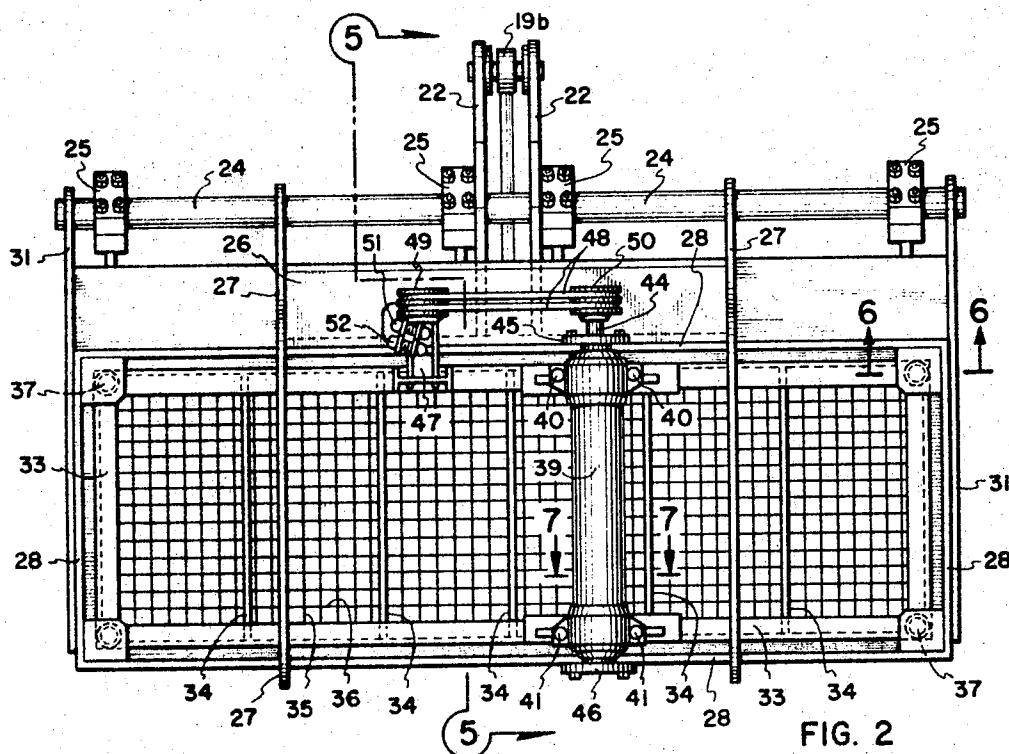


FIG. 2

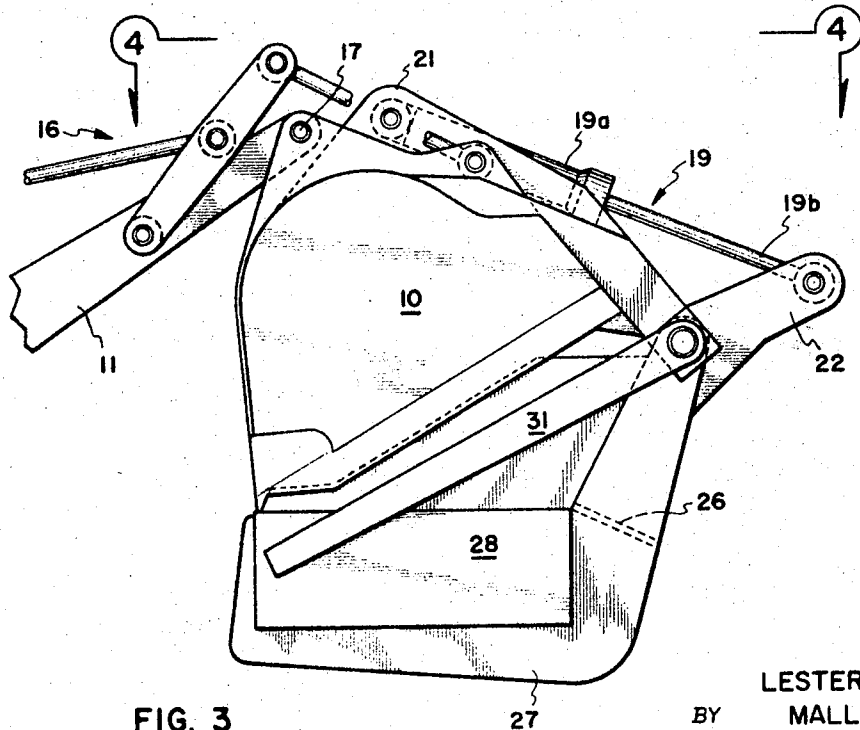


FIG. 3

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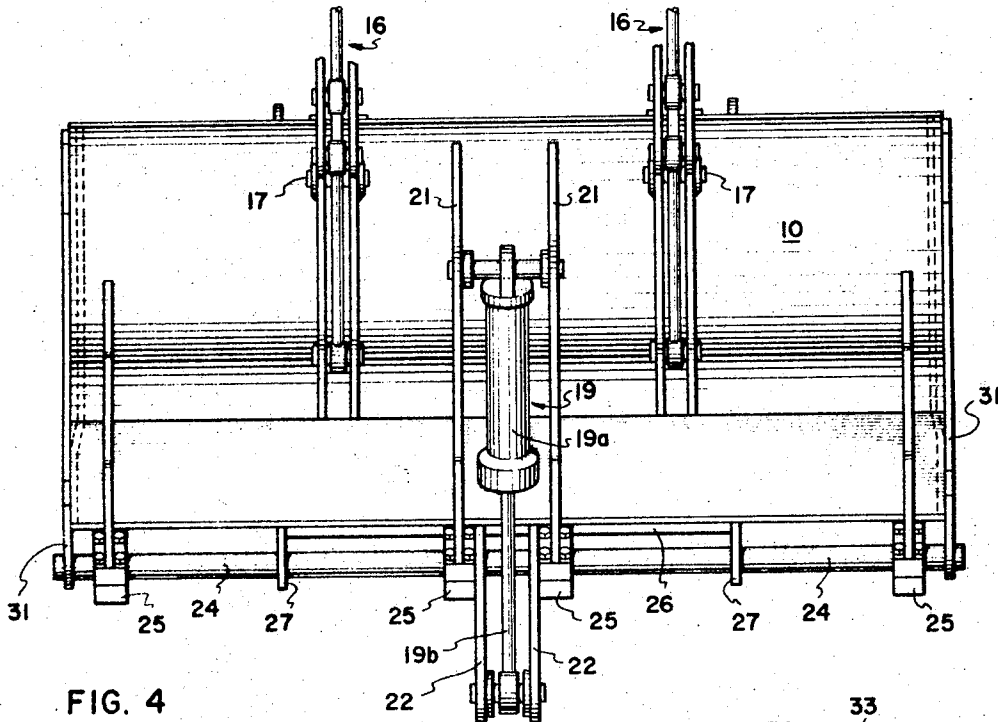


FIG. 4

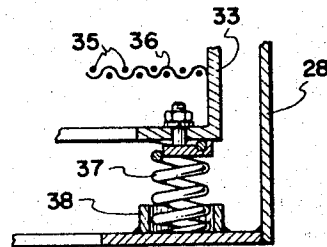


FIG. 6

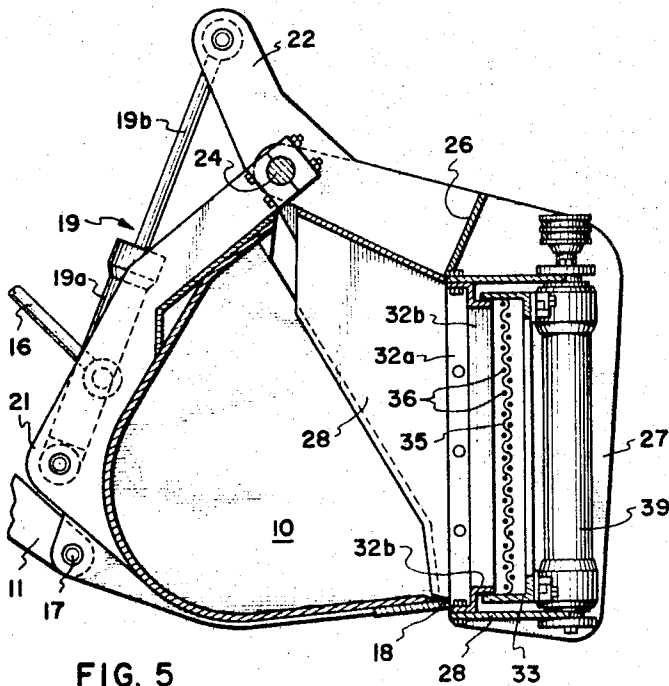


FIG. 5

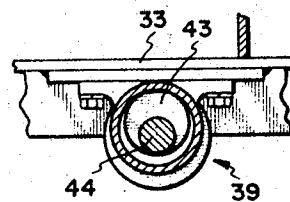


FIG. 7

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SCREENING LOADER

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6 Claims

ABSTRACT OF THE DISCLOSURE

A mobile screening machine wherein a scoop of open trough formation is arranged to scoop up material to be screened and to screen the scooped material through a hinged screening cover for the scoop. This cover carries a screen arranged to be vibrated when the scoop is elevated and turned upside down.

This invention relates to machines for picking up earth material and for screening it as it is dumped.

In the usual pipeline construction operations a trench is excavated, a line of pipe is laid in place and the trench is backfilled. However, because of the damage that can occur to the pipe line if large rocks and boulders are dropped into the trench and allowed to come in contact with the pipe, the specifications for such a job normally limit the particle size of the material that can be used as backfill. For this reason it has heretofore usually been necessary to haul away the material excavated as the trench was cut and to haul in screened sand or other suitable backfill material in order to comply with the job specifications.

It is an object of the present invention to provide an attachment that will enable a single machine, operated by one man, to pick up the material excavated during the trenching, to vibrate and screen the material while dumping a large proportion of it back into the trench, and to dump the rocks and remaining larger particles outside the trench.

In U.S. Patent No. 3,072,257 there is shown a bulldozer equipped with a special member that can be used in conjunction with the usual blade as a bucket to pick up material and deposit it on a screen extension of the member. In this patented construction a rocking motion is imparted to the entire assembly, including the blade itself, to perform the desired screening of the material.

The present invention provides a means for screening the material picked up by a loader that does not involve rocking of a blade, but that does involve apparatus particularly useful with conventional scoops arranged to load and dump dirt. No change is required in the control linkage normally used for operating such a scoop, and vibrating mechanism applied to a screen forming a portion of a cover for the scoop is operated completely independently of any manipulation of the scoop.

Principal features of the present invention include a scoop of open trough formation adapted to be conventionally mounted on a tractor or other vehicle that can be operated in the usual fashion during loading operations; a cover for the open face of the scoop; a screen forming a portion of the cover; and an eccentric-type vibrator connected to the screen. The vibrator is advantageously powered by a hydraulic motor. The vibrator and the motor for it are carried by the cover and the cover can be either installed on a conventional, but slightly modified scoop, or on a scoop built specially to accommodate the cover.

There is shown in the accompanying drawings a specific embodiment of the invention representing what is presently regarded as the best mode of carrying out the generic concepts in actual practice. From the detailed description

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of this presently preferred form of the invention, other more specific objects and features will become apparent.

In the drawings:

FIG. 1 is a side elevation of a machine of the invention, including a tractor equipped with a loader scoop having a screening cover, the scoop being shown in a lowered open position in full lines and in a raised carrying position in broken lines;

FIG. 2, a front elevation with the cover closed and the scoop lowered;

FIG. 3, a side elevation showing the scoop in a vibrating and screening position, its actuating and support members being shown fragmentarily;

FIG. 4, a fragmentary top plan view showing the scoop and its actuating and support members in the position of FIG. 3;

FIG. 5, a fragmentary vertical section taken on the line 5-5 of FIG. 2;

FIG. 6, a section taken on the line 6-6 of FIG. 2 to show the spring mounting of the screen; and

FIG. 7, a similar view taken on the line 7-7 of FIG. 6 to show the vibrator construction.

Referring now to the drawings:

In the illustrated preferred embodiment a scoop 10 is shown mounted on the end of a support arm 11 that is pivoted at 12 to a tractor 13. The scoop is operated in conventional manner, usually by the driver of the tractor, through actuation of hydraulic cylinders 14 that raise and lower the support arm 11 and by hydraulic cylinders 15 that act through a linkage 16 to pivot the scoop about its connection 17 with the support arm.

The scoop has the usual cutting blade 18 at its forward open edge so that it can be used to cut into earth being loaded. After the scoop has been loaded it is raised and pivoted through actuation of cylinders 14 and 15 to the carrying position shown in dotted lines in FIG. 1, and the tractor is moved to where the material is to be dumped. This may be a trench in which a pipe line has been installed, for example.

Before cylinders 14 and 15 are again actuated to lower and tip the scoop so that the material therein can be dumped, another hydraulic cylinder 19 is actuated to close a material-screening cover, shown generally at 20. This can be done before, after, or while the material is being transported.

Cylinder 19 has its housing 19a pivotally connected between a pair of flanges 21 that are fixed to a lower portion of the rear of the scoop and its rod 19b pivotally connected between a pair of crank arms 22 that are fixed to a shaft 24 journaled through spaced brackets 25 on the rear of the scoop. The flanges 21 and brackets 25 can either be formed integral with the scoop or they can be attached, as by welding.

The other ends of the crank arms 22 are fixed to a header plate 26 that extends between a pair of spaced support arms 27, the arms 27 also have one of their ends fixed to shaft 24 and they are curved to reach over a peripheral frame member 28 that forms a support housing of the cover. The support arms are then each fixed to the opposite sides of frame member 28 at 29 and 30. Similarly, another set of support arms 31 has one of its ends fixed to each surface of frame 28 and its other end fixed to shaft 24.

Actuation of cylinder 19 to retract rod 19b will cause crank arms 22 and shaft 24 to rotate. This will then swing the sets of support arms 27 and 31 and the frame member 28 fixed thereto away from the open mouth of the scoop. Conversely, expulsion of rod 19b will swing the frame member into position adjacent to, surrounding, and substantially engaging the mouth of the scoop.

A box-like shear plate 32, FIG. 5, has a leg 32a fixed to the frame member 28 such that a portion of the leg 32a

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is adapted to engage the cutting blade of the scoop when the cover is closed. When the scoop is dumped, material therein slides down the inside of the scoop, over the cutting edge 18 and is guided into the cover instead of passing between the scoop and the cover. Another offset leg 32b extends inwardly from leg 32a and inside a screen supporting frame 33.

Braces 34, FIG. 2, are provided between opposite sides of frame member 28 to reinforce the frame member and to provide additional support for the screen as it is vibrated in a manner to be described.

Screen supporting frame 33 fits inside frame member 28 and carries a screen made of interlaced rods 35 and 36. Supporting frame 33 is then fixed at each of its corners to one end of a coil spring 37, FIG. 6, the other end of which is held within a cup-like compartment 38 provided for the purpose on frame 28.

A vibrator 39, FIGS. 2 and 5, is fixed to supporting frame 33 at 40 and 41, so that as it is operated the frame and screen carried thereby are vibrated on springs 37 and between the frame 28 and the leg 32b of shear plate 32. As material is vibrated and dumped from the scoop through the screen the shear plate 32 acts as a shield and prevents material falling between the supporting frame 33 and the member 28 where it could lodge to prevent effective vibration.

Vibrator 39 includes an outer housing that is fixed to supporting frame 33 and that surrounds an eccentric 43, FIG. 7, on a shaft 44. Shaft 44 is journaled for rotation within brackets 45 and 46, FIG. 2, that are fixed to opposite sides of frame 28 so that rotation of shaft 44 will impart vibratory movement to the screen.

Shaft 44 is rotated by a fluid motor 47, that is fixed to and carried by frame 28, through drive belts 48 that pass around a double pulley 49 on the output shaft of the motor and a double pulley 50 fixed on shaft 44. Fluid for motor 47 is supplied and exhausted through flexible conduits 51 and 52 that are coupled into the usual hydraulic or pneumatic system of the tractor or other vehicle on which the scoop is mounted. Controls for the motor are positioned to be operated in conventional fashion by the vehicle operator.

In operation, the cover 20 is pivoted open by actuation of hydraulic cylinders 19 and cylinders 15 and 15 are actuated to position the scoop to pick up material to be screened, see FIG. 1. Thereupon, the scoop is raised and the cover closed, as shown in broken lines, and the vehicle is moved to where the material is to be dumped. Cylinders 15 are then actuated to tilt the scoop so that the screen portion of the cover will be beneath the normally open face of the scoop, see FIG. 3, and motor 47 is operated to vibrate the screen.

Material passed through the screen falls into the trench or other receiving area and material too large to pass through and not reduced in size by the vibration is held in the scoop to be dumped elsewhere after the cover has again been pivoted to its open position.

Whereas this invention is here described and illustrated with respect to a certain form thereof, it is to be understood that many variations are possible without departing from the subject matter particularly pointed out in the following claims, which subject matter I regard as my invention.

I claim:

1. A mobile screening machine, comprising a vehicle;

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a scoop carried by the vehicle for scooping up material from a supply of same, raising it to an elevated position, and dumping it, said scoop being of open trough formation and having a forwardly disposed, bladed edge portion extending longitudinally of the trough; a material-screening cover for said scoop, including an open frame adapted to snugly engage said scoop along said bladed longitudinal edge thereof and backwardly therefrom, and a screen closing the opening of said frame and mounted in said frame for vibration relative thereto; means for vibrating said screen relative to said frame; means pivoting said frame adjacent to the back longitudinal edge portion of the scoop for backward and forward hinge movement relative to the open top of the trough to open and close said trough for scooping and screening purposes, respectively; means mounting said scoop on said vehicle for maneuvering the scoop from scooping to screening positions and vice versa; and means for moving said cover from trough-opening to trough-closing positions and vice versa.

2. A mobile screening machine in accordance with claim 1, wherein the screen is resiliently supported in the frame, and the means for vibrating the screen is an eccentric device mounted in said frame.

3. A mobile screening machine in accordance with claim 2, wherein the eccentric device is powered by a motor also mounted on the frame.

4. A material-screening scoop attachment for tractors, comprising a scoop of trough formation having a forwardly disposed, bladed edge portion extending longitudinally of the trough; a material-screening cover for said scoop, including an open frame adapted to snugly engage said scoop along said bladed longitudinal edge thereof and backwardly therefrom; and a screen closing the opening of said frame and mounted in said frame for vibration relative thereto; means for vibrating said screen relative to said frame; means pivoting said frame adjacent to the back longitudinal edge portion of the scoop for backward and forward hinge movement relative to the open top of the trough to open and close said trough for scooping and screening purposes, respectively; means for moving said cover from trough-opening position to trough-closing positions and vice versa; and means adapted for attachment to a tractor for maneuvering the scoop from scooping to screening positions and vice versa.

5. A material-screening scoop attachment in accordance with claim 4, wherein the screen is resiliently supported in the frame, and the means for vibrating the screen is an eccentric device mounted in said frame.

6. A material-screening scoop attachment in accordance with claim 5, wherein the eccentric device is powered by a motor also mounted on the frame.

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ANTONIO F. GUIDA, Primary Examiner

U.S. Cl. X.R.

87—117.5; 209—241

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,461,968 Dated August 19, 1969

Inventor(s) Lester A. Longley

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, lines 3 into 4, "Radio Corporation of America, a corporation of Delaware" should read --Longley Construction Co., Inc., a corporation of Nevada--.

SIGNED AND
SEALED

FEB 17 1970

(SEAL)

Attest:

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Attesting Officer

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Commissioner of Patents