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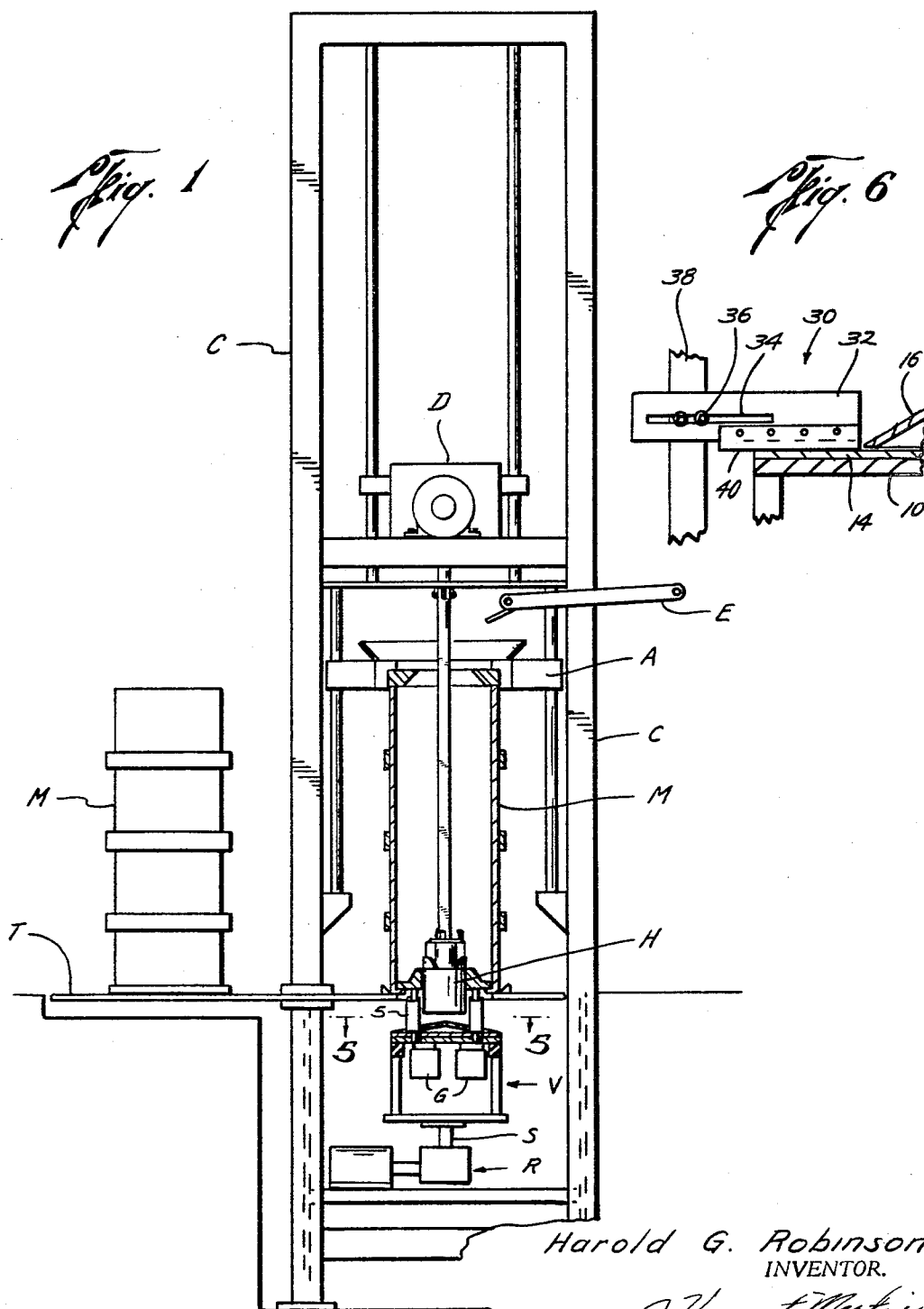
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PROTECTIVE APPARATUS FOR CONCRETE PIPE FORMING MACHINES

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## PROTECTIVE APPARATUS FOR CONCRETE PIPE FORMING MACHINES

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### ABSTRACT OF THE DISCLOSURE

A protective apparatus for use on the vibrating table of a concrete pipe forming machine which includes a cover plate positioned on the vibrating table, a conical distributor plate positioned on the cover plate with its outer edge spaced inwardly from the outer edge of the cover plate and a wiper for wiping mud from the cover plate responsive to rotation of said vibrating table. This abstract is neither intended to define the invention of the application which, of course, is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

The present invention relates to protection of the lower components of a concrete pipe forming machine from spilled concrete mix material and particularly to a protective apparatus for catching and disposing of spilled concrete mix material.

In the forming of bell and spigot or tongue and groove concrete pipe the usual pipe forming machine is provided with a rotating vibrating table which connects to an insert called a curing pallet, positioned in the lower end of the mold in which the concrete pipe is formed. The curing pallet is rotated and vibrated to compact the concrete material mix in the bell or groove end of the pipe since the usual packer head will not form or compact the concrete material mix at the bell or groove end of the pipe. The spigot or tongue ends of the pipe are readily formed by an insert which is incorporated in the top of the mold and are compacted by the usual packer head.

Such forming operations utilizing a vibrating table are accompanied by the spilling of quantities of the concrete material mix or mud, as it is commonly called, onto the top of the vibrating table. Most vibrating table tops are provided with a plurality of annular series of holes by which a connection is made to curing pallets of different sizes. The mud falling on the vibrating table top and particularly the mud which falls through the holes in the table top onto the equipment below must be periodically removed in order to assure proper continued operation of the equipment and to avoid equipment damage. Such removal may require considerable effort and time. It is therefore an object of the present invention to provide a protective apparatus for a concrete pipe forming machine which will greatly reduce the time and effort which is spent in the removal of mud from the vibrating table and the equipment beneath the vibrating table.

Another object of the present invention is to protect equipment of a concrete pipe forming machine below the vibrating table top from spilled concrete material mix.

Another object is to reduce the time normally spent in cleaning concrete.

A further object is to provide a cover assembly for the top of the vibrating table of a concrete pipe forming machine to catch spilled concrete material mix and a means for cleaning such material mix from such cover assembly during pipe forming operations.

Still another object is to provide a protective apparatus to protect parts of a concrete pipe forming machine from spilled concrete material mix and to utilize the movement

of the vibrating table to assist in the removal of such material mix.

A still further object is to provide a pipe forming machine with a light, inexpensive protective cover assembly which will protect the lower components of the machine from spilled concrete material mix.

Still a further object is to provide a protective apparatus which includes a plurality of cover assemblies for the vibrating table of a pipe forming machine, each assembly being used for covering the vibrating table for a particular size of pipe being formed and such assemblies being easily removed and replaced.

These and other objects of the present invention are hereinafter more fully explained and set forth in relation to the drawings wherein:

FIGURE 1 is an elevation view, partly in section, of a concrete pipe forming machine which includes the protective apparatus of the present invention.

FIGURE 2 is a vertical sectional view of the details of the protective apparatus of the present invention.

FIGURE 3 is a plan view of the top of a vibrating table with which the protective apparatus of the present invention is to be used.

FIGURE 4 is a plan view of the cover plate component of the protective apparatus of the present invention.

FIGURE 5 is an enlarged horizontal sectional view of the protective apparatus of the present invention taken along lines 5—5 in FIGURE 1.

FIGURE 6 is a partial vertical sectional view of the wiper assembly used with the cover assembly of the present invention.

Referring more in detail to the drawings:

The pipe forming machine illustrated in FIGURE 1 is of the usual type and provides a turntable T having at least two stations for receiving a mold M in which the concrete pipe is to be formed. The table T may be rotated to position one of its stations between the columns or standards C which provide the support for the drive mechanism D of the packer head H and the upper mold closure A. The packer head H is movable in a vertical direction to extend downwardly through the upper mold closure table A, through the mold M and to be positioned within the curing pallet P. A mixture of materials from which the concrete pipe is to be formed, normally called mud, is supplied to the top of table A by the conveyor E and is distributed into the mold M surrounding the packer head H and its shaft. Beneath the turntable T, a vibrating table V is positioned. The curing pallet P is connected to the vibrating table V by the pins B which are secured to the vibrating table V. Suitable vibrating means G are provided directly connecting to the vibrating table V which impart the desired vibrations to the table V. The vibrating table V is mounted on a shaft S which is rotated by the means R to cause the vibrating table V and the curing pallet P to be rotated during the pipe forming operation. Thus the vibrating table V will cause the curing pallet P to rotate and vibrate during the pipe forming operations to compact and form the mud to the desired shape in the lower end of the mold M.

The top of the vibrating table V, as can be seen in FIGURE 3, is provided with a plurality of annular series of holes, each annular series being used for receiving the pins B to connect one particular size of curing pallet P to the vibrating table V. These holes extend completely through the table top 10 and the pins are adapted to extend therethrough and be secured by a nut 12 on the underside of the table top 10 as best shown in FIGURE 2. Additionally, a series of holes are provided in the top 10 through which the adjusting bolts F for the vibrating means G connect to allow adjustment of the vibrating means G from a position above the vibrating table V. A central opening K in the top 10 is provided to allow

adjustment of the alignment of the shaft S from a position above the table V.

The pipe forming machine operates by filling the mold M with mud and commencing rotation of the packer head H while the vibrating table V commences rotation and vibration of the curing pallet P. Because of this movement of the curing pallet P some of the mud within the mold M falls downwardly onto the top 10 of the vibrating table V. Because of the many holes extending through the top 10, the mud which is spilled will fall onto the vibrating means G and onto the rotating means R. A very considerable amount of time is required to clean the mud from these parts or components beneath the turntable T.

The present invention contemplates the use of a protective apparatus or structure which will catch the spilled mud and protect the vibrating table and the mechanisms and parts therebelow from contact with the mud. The protective apparatus of the present invention includes the cover assembly and the means for wiping the cover assembly free of mud.

The cover assembly includes the cover plate 14 and the conical distributor plate 16 which is positioned on the cover plate 14 as shown. A separate cover assembly is contemplated to be used with each separate size of curing pallet P and for this reason the cover plate 14 is provided with only one of the series of annular holes 18 through which shafts 20 of the pins B extend. A suitable means of orienting the pins B is normally provided in the table V and such means is included in the cover plate 14. The specific means shown includes an orientation hole 22 through which the orientation pin 24 on the pin B extends to prevent rotation of the pin B during pipe forming operations. The plate 14 is also provided with additional holes to receive the heads on the adjusting bolts F for the vibrating means G and a central opening 26 through which the alignment of the shaft S may be adjusted.

The conical distributor plate 16 is made to cooperate with only one of the cover plates 14. It is relatively light gauge material and its upwardly pointed apex is positioned above the center of plate 14. The outer edge of plate 16 is positioned on the plate 14 at a position which approximates the periphery of the outer edges of the pins B. The outer edge of conical plate 16 therefore defines the inner edge of the flat annular space 28 on the cover plate 14.

Both plates 14 and 16 are preferably made from a relatively light gauge sheet metal, for example 16 gauge, so that they will be sufficiently light to be easily changed when the size of pipe being formed is to be changed. The cover assembly will therefore cover all of the holes which extend through the top 10 of the vibrating table V. Thus, any mud which is spilled from the mold M will fall onto the conical member 16. The mud collecting on the conical member 16 will move downwardly and outwardly onto the annular space 28 on the plate 14 responsive to the rotation and vibration of the assembly. The wiper assembly 30 is provided to scrape the mud from the annular space 28. The wiper assembly 30 is stationary and the rotation of the table V will cause the entire annular space 28 to pass under the wiper assembly 30.

The wiper assembly 30 is mounted on a portion of the frame of the pipe forming machine and is adjustable so that it will scrape the annular space 28 of each of the cover assemblies which is used with the pipe forming machine. The wiper assembly 30 includes the arm 32 having the slot 34 through which the bolts 36 secure the assembly to the frame member 38 and the strip 40. The strip 40 is secured to the arm 32 and is of leather or rubber or other suitable material which will maintain wiping engagement with the surface of annular space 28 despite its vibrations and rotation.

The wiper assembly 30 as shown extends substantially radially with respect to the cover plate 14. It is contemplated that the wiper assembly 30 might be positioned at

an angle with respect to the radial direction on cover plate 14 so that the rotation of the cover plate 14 will cause the mud collecting against the wiper assembly 30 to move outwardly to be discharged from the top of the annular space 28.

While the specific structure shown for the cover assembly includes the two components of the cover plate 14 and the conical member 16, it is contemplated that such assembly could be made of a single plate which would cover the holes through the top 10 of the vibrating table V and also provide for the distribution of the spilled mud to the annular space surrounding the position of the pins B so that it may be wiped therefrom by the wiper assembly 30. In the event that a single flat cover plate is to be used to protect against spilled mud without the use of a conical member, it is necessary that the plate not include the central hole 26. The adjustments which are needed for the alignment of the shaft S can then be made only by the removal of such cover plate from the top 10 of the table V. Also, a conical member may be used without using the flat plate providing it is provided with a flattened outer periphery or that the cone extends beyond the outermost of the holes through the top 10 of the table V. In such application of the conical member separately the pins B will extend through holes in such member.

From the foregoing it can be seen that the protective apparatus of the present invention will prevent spilled mud from collecting and settling on the lower components of the pipe forming machine on which it is installed and thereby eliminate the need for cleaning of such components and the consequent loss of machine time resulting from the shutdown of the machine for cleaning. The apparatus further distributes the spilled mud responsive to the movement of the vibrating table of the concrete pipe forming machine to an area where it is readily handled for disposal.

What is claimed is:

1. The combination with a concrete pipe forming machine which includes a mold, a vertically moving packer head, a curing pallet positioned in the lower end of said mold, a vibrating table, means connecting said vibrating table to said curing pallet whereby movement of said table is imparted to said curing pallet, a protective apparatus comprising,

a removable cover positioned on said vibrating table and covering substantially the entire upper surface thereof to prevent spilled mud from falling on such table, and

means removing the mud on said cover responsive to the movement of said vibrating table.

2. The combination with a concrete pipe forming machine which includes a mold, a vertically moving packer head, a curing pallet positioned in the lower end of said mold, a vibrating table, means connecting said vibrating table to said curing pallet whereby movement of said table is imparted to said curing pallet, of a protective apparatus comprising,

a removable cover positioned on said vibrating table and covering substantially the entire upper surface thereof to prevent spilled mud from falling on said table, and

a wiper adapted to remove mud from said cover responsive to movement of said cover and said table.

3. The combination with a concrete pipe forming machine which includes a mold, a vertically moving packer head, a curing pallet positioned in the lower end of said mold, a vibrating table, means connecting said vibrating table to said curing pallet whereby movement of said table is imparted to said curing pallet, of a protective apparatus comprising,

a removable cover plate positioned on said vibrating table and covering the entire upper surface thereof, holes in said cover plate through which said connect-

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ing means extend between said vibrating table and said curing pallet,

a removable conical distributor plate positioned on said cover plate and having its apex extending upwardly approximately above the center of said cover plate, and

means removing the mud falling on said cover plate and said conical plate.

4. The combination with a concrete pipe forming machine which includes a mold, a vertically moving packer head, a curing pallet positioned in the lower end of said mold, a vibrating table, means connecting said vibrating table to said curing pallet whereby movement of said table is imparted to said curing pallet, of a protective apparatus comprising,

a cover plate positioned on said vibrating table and covering the entire upper surface thereof,

holes through said cover plate through which said connecting means extends between said vibrating table and said curing pallet,

a conical distributor plate positioned on said cover plate and having its apex extending upwardly approximately above the center of said cover plate,

the outer edge of said distributor plate positioned on said cover plate and defining the inner edge of an annular surface on said cover plate, and

a wiper engaging said annular surface of said cover plate to scrape the mud collecting thereon responsive to the movement of said vibrating table.

5. The combination according to claim 4 wherein, the outer edge of said conical distributor plate extends outwardly on said cover plate to approximately the outer edge of said connecting means, and the outer edge of said distributor plate is notched to receive said connecting means.

6. The combination according to claim 4 wherein, said cover plate and said conical distributor plate are made from a relatively light gauge sheet metal.

7. The combination according to claim 4 wherein, said wiper is secured to the frame of said machine and the rotation of said vibrating table moves said annular surface on said cover plate under said wiper.

8. The combination with a concrete pipe forming machine which includes a mold, a vertically moving packer head, a curing pallet positioned in the lower portion of said mold, a vibrating table positioned below said cur-

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ing pallet, means imparting a vibration to said vibrating table, means connecting said vibrating table to said curing pallet whereby vibrations of said table are imparted to said curing pallet, of a protective apparatus comprising.

a cover plate positioned on said table and covering the entire top of said table,

holes in said cover plate whereby said connecting means extend through said plate to said curing pallet,

a conical member positioned above said plate and having its apex spaced above the center of said plate and its outer periphery in engagement with said plate at a diameter approximating the outer periphery of said connecting means,

said cover plate having an annular exposed upper surface surrounding said cone,

a wiper assembly being adjustable in length to wipe the annular exposed surface of said plate whereby mud falling from said mold will be deflected by said cone onto the annular exposed surface of said cover plate and wiped therefrom by said wiper to protect the vibrating table and the means imparting vibrations to said table from said mud.

9. The combination according to claim 8 wherein said wiper assembly comprises,

an arm extending over and spaced from said annular surface of said cover plate,

a flexible strip secured to said arm on engaging said upper surface, and

means securing said arm whereby rotation of said vibrating table will rotate said annular surface of said cover plate under said wiper assembly and said strip will wipe spilled mud from said surface responsive to said rotation.

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