

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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 (72) Inventor WILLIAM GEORGE HEPWORTH



(54) A CENTRIFUGAL PIPE MOULDING MACHINE

(71) We, HUMES LIMITED, a Company incorporated under the laws of the State of Victoria, of Hume House, 185 William Street, Melbourne, in the State of Victoria, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a centrifugal pipe moulding apparatus for the production of concrete pipes. The term "pipe" is used in the Specification and claims for the sake of simplicity and is intended to extend also to tubular bodies other than pipes.

It is hitherto been the practice to load the moulds onto a centrifugal pipe moulding machine and unload the moulds from the machine e.g. by overhead cranes. This practice has the disadvantage that there is a considerable loss of operating time during the loading and unloading of the pipe moulding machine since the pipe moulding machine is necessarily out of action for long periods during loading and unloading operations.

The invention has for its primary object to provide apparatus for expeditiously loading concrete pipe moulds onto a centrifugal pipe moulding machine and for unloading the filled moulds therefrom.

The invention provides a centrifugal pipe moulding apparatus comprising pairs of discs for spinning moulds in the production of concrete pipes, the discs of each pair being mounted for rotation in an axially spaced relationship, the axes of each pair being parallel to each other, means being located adjacent the discs and each providing a surface which serves both for lifting and lowering of the moulds, and being movable from an upper position to a lower position to lower a mould onto the discs and from the lower position to the upper position to lift the mould free of the discs, mould supporting means on one side of the apparatus serving for supporting a mould adjacent to the lowering and lifting means in a manner to permit the mould to roll onto the lowering and

lifting means when the lowering and lifting means is in the upper position, means for moving the lowering and lifting means to lower the mould onto the mould spinning discs to be spun thereby after the mould has rolled onto the lowering and lifting means and to lift the mould free of the mould spinning discs after a pipe is formed therein, and mould receiving means located adjacent to the lowering and lifting means in a position on the side of the apparatus opposite to the mould supporting means and for receiving the mould and the pipe contained therein after the mould has been lifted free of the mould spinning discs and is free to roll off the lowering and lifting means.

In order that the invention may be readily understood reference is made to the accompanying drawings in which:

Figure 1 is a side elevation of apparatus in accordance with the invention

Figure 2 is a plan view of the apparatus, and

Figures 3, 4, 5 and 6 are detail views of part of the apparatus of Figures 1 and 2.

The drawings show lowering and lifting means 10 operatively associated with the mould spinning discs 11 of the centrifugal pipe moulding machine. As shown in Figures 3, 4, 5 and 6 the lowering and lifting means 10 is operable between upper and lower positions to lower a mould 12 onto the mould spinning discs 11 after the mould 12 has rolled onto the lowering and lifting means 10 from mould supporting means 13 located adjacent to the lowering and lifting means 10 and to lift the mould 12 free of the mould spinning discs 11 after the pipe is formed in the mould to a position where the mould 12 and the pipe contained therein is free to roll off the lowering and lifting means 10 onto mould receiving means 14 located adjacent to the lowering and lifting means 10 in a position opposite to the mould supporting means 13.

The mould supporting means 13 is adapted to support the mould 12 in a manner to permit the mould 12 to roll onto the lowering and lifting means 10 when the lowering and lifting means 10 is in the position shown

in Figure 3. For this purpose the mould supporting means 13 may comprise a pair of parallel "roll on" or inlet rails 15 inclined towards the lowering and lifting means 10 with their ends adjacent thereto so that the mould 12 will roll from the mould supporting means 13 onto the lowering and lifting means 10 under the influence of gravity. Chocks 16 may be provided to prevent mould rolling along the rails 15 until the lowering and lifting means 10 is ready to receive a mould.

The lowering and lifting means 10 may comprise a pair of links 17 and 18 located adjacent to the mould spinning discs 11 in a position to engage each end of the mould as shown in Figure 2. One of the links of each pair is pivotally connected to the other link of the pair adjacent to their ends with the free ends of the links being positioned to be guided in the lowering and lifting operation by the frame of the moulding machine or by the mould spinning discs 11.

Means are provided for operating the lowering and lifting means 10 to lower the mould 12 onto the mould spinning discs 11 after the mould 12 has rolled onto the lowering and lifting means 10 and to lift the mould 12 free of the mould spinning discs 11 after the pipe or other body is formed in the mould 12. The operating means shown in the drawings comprises a mechanically operated arm 19 operatively connected to the pairs of links 17 and 18 to actuate them in unison to lower the mould 12 onto the mould spinning discs 11 and to raise the mould 12 from the mould spinning discs 11. The arm 19 and its actuating mechanism is supported by the frame of the apparatus.

The mould receiving means 14 is located adjacent to the lowering and lifting means 10 in a position opposite to the mould supporting means 13 to receive the mould 12 and the pipe contained therein after the mould 12 has been lifted free of the mould spinning discs 11 and is free to roll off the lowering and lifting means 10. The mould receiving means 14 may comprise a pair of "roll off" or outlet rails 21 inclined towards the lowering and lifting means 10. The mould receiving means 14 then includes a retarding resistance to prevent the mould 12 and the pipe contained therein from rolling back onto the lowering and lifting means 10 once the mould 12 has stopped rolling along the rails 21. The lowering and lifting means 10 may be brought into the position shown in Figure 6 to propel the mould 12 and the pipe contained therein in a rolling motion along the rails 21 or the mould 12 and the pipe contained therein may be permitted to roll from the lowering and lifting means 10 onto the rails 21 under the influence of gravity.

If so desired additional pairs of mould spinning discs 11 may be provided as shown

in Figures 1 and 2 of the drawings so that more than one mould can be spun simultaneously. In this case additional lowering and lifting means 10 including pairs of links may be provided to lower and lift the additional moulds.

In the operation of the apparatus the chocks 16 are removed to permit a mould 12 supported by the rails 15 to roll towards the pairs of links 17 and 18. When the mould 12 comes to rest on the pair of links 17 and 18 they are operated by the arm 19 so that they will pivot to incline downwardly to lower the mould 12 onto the mould spinning discs 11.

When the moulding operation is completed the pairs of links 17 and 18 are operated to pivot upwardly to lift the mould 12. When the pairs of links pivot sufficiently to incline upwardly as shown in Figure 6 the mould 12 will roll or be propelled off the links onto the rails 21.

If additional pairs of mould spinning discs are provided one mould may be permitted to roll onto one set of pairs of links and another mould permitted to roll onto the other set of pairs of links.

WHAT WE CLAIM IS:—

1. A centrifugal pipe moulding apparatus comprising pairs of discs for spinning moulds in the production of concrete pipes, the discs of each pair being mounted for rotation in an axially spaced relationship, the axes of each pair being parallel to each other, means being located adjacent the discs and each providing a surface which serves both for lifting and lowering of the moulds, and being movable from an upper position to a lower position to lower a mould onto the discs and from the lower position to the upper position to lift the mould free of the discs, mould supporting means on one side of the apparatus serving for supporting a mould adjacent to the lowering and lifting means in a manner to permit the mould to roll onto the lowering and lifting means when the lowering and lifting means is in the upper position, means for moving the lowering and lifting means to lower the mould onto the mould spinning discs to be spun thereby after the mould has rolled onto the lowering and lifting means and to lift the mould free of the mould spinning discs after a pipe is formed therein, and mould receiving means located adjacent to the lowering and lifting means in a position on the side of the apparatus opposite to the mould supporting means and for receiving the mould and the pipe contained therein after the mould has been lifted free of the mould spinning discs and is free to roll off the lowering and lifting means.

2. An apparatus according to claim 1, wherein the lowering and lifting means is positioned between the mould supporting

in Figure 3. For this purpose the mould supporting means 13 may comprise a pair of parallel "roll on" or inlet rails 15 inclined towards the lowering and lifting means 10 with their ends adjacent thereto so that the mould 12 will roll from the mould supporting means 13 onto the lowering and lifting means 10 under the influence of gravity. Chocks 16 may be provided to prevent mould rolling along the rails 15 until the lowering and lifting means 10 is ready to receive a mould.

The lowering and lifting means 10 may comprise a pair of links 17 and 18 located adjacent to the mould spinning discs 11 in a position to engage each end of the mould as shown in Figure 2. One of the links of each pair is pivotally connected to the other link of the pair adjacent to their ends with the free ends of the links being positioned to be guided in the lowering and lifting operation by the frame of the moulding machine or by the mould spinning discs 11.

Means are provided for operating the lowering and lifting means 10 to lower the mould 12 onto the mould spinning discs 11 after the mould 12 has rolled onto the lowering and lifting means 10 and to lift the mould 12 free of the mould spinning discs 11 after the pipe or other body is formed in the mould 12. The operating means shown in the drawings comprises a mechanically operated arm 19 operatively connected to the pairs of links 17 and 18 to actuate them in unison to lower the mould 12 onto the mould spinning discs 11 and to raise the mould 12 from the mould spinning discs 11. The arm 19 and its actuating mechanism is supported by the frame of the apparatus.

The mould receiving means 14 is located adjacent to the lowering and lifting means 10 in a position opposite to the mould supporting means 13 to receive the mould 12 and the pipe contained therein after the mould 12 has been lifted free of the mould spinning discs 11 and is free to roll off the lowering and lifting means 10. The mould receiving means 14 may comprise a pair of "roll off" or outlet rails 21 inclined towards the lowering and lifting means 10. The mould receiving means 14 then includes a retarding resistance to prevent the mould 12 and the pipe contained therein from rolling back onto the lowering and lifting means 10 once the mould 12 has stopped rolling along the rails 21. The lowering and lifting means 10 may be brought into the position shown in Figure 6 to propel the mould 12 and the pipe contained therein in a rolling motion along the rails 21 or the mould 12 and the pipe contained therein may be permitted to roll from the lowering and lifting means 10 onto the rails 21 under the influence of gravity.

If so desired additional pairs of mould spinning discs 11 may be provided as shown

in Figures 1 and 2 of the drawings so that more than one mould can be spun simultaneously. In this case additional lowering and lifting means 10 including pairs of links may be provided to lower and lift the additional moulds.

In the operation of the apparatus the chocks 16 are removed to permit a mould 12 supported by the rails 15 to roll towards the pairs of links 17 and 18. When the mould 12 comes to rest on the pair of links 17 and 18 they are operated by the arm 19 so that they will pivot to incline downwardly to lower the mould 12 onto the mould spinning discs 11.

When the moulding operation is completed the pairs of links 17 and 18 are operated to pivot upwardly to lift the mould 12. When the pairs of links pivot sufficiently to incline upwardly as shown in Figure 6 the mould 12 will roll or be propelled off the links onto the rails 21.

If additional pairs of mould spinning discs are provided one mould may be permitted to roll onto one set of pairs of links and another mould permitted to roll onto the other set of pairs of links.

WHAT WE CLAIM IS:—

1. A centrifugal pipe moulding apparatus comprising pairs of discs for spinning moulds in the production of concrete pipes, the discs of each pair being mounted for rotation in an axially spaced relationship, the axes of each pair being parallel to each other, means being located adjacent the discs and each providing a surface which serves both for lifting and lowering of the moulds, and being movable from an upper position to a lower position to lower a mould onto the discs and from the lower position to the upper position to lift the mould free of the discs, mould supporting means on one side of the apparatus serving for supporting a mould adjacent to the lowering and lifting means in a manner to permit the mould to roll onto the lowering and lifting means when the lowering and lifting means is in the upper position, means for moving the lowering and lifting means to lower the mould onto the mould spinning discs to be spun thereby after the mould has rolled onto the lowering and lifting means and to lift the mould free of the mould spinning discs after a pipe is formed therein, and mould receiving means located adjacent to the lowering and lifting means in a position on the side of the apparatus opposite to the mould supporting means and for receiving the mould and the pipe contained therein after the mould has been lifted free of the mould spinning discs and is free to roll off the lowering and lifting means.

2. An apparatus according to claim 1, wherein the lowering and lifting means is positioned between the mould supporting



means and the mould receiving means so as to permit the mould to roll onto it from the mould supporting means and roll off it onto the mould receiving means under the influence of gravity.

3. An apparatus according to any one of the preceding claims, wherein each lowering and lifting means comprises a pair of links located adjacent to the mould spinning discs in a position to engage one end of the mould, one of the links of each pair being pivotally connected to the other link of the pair adjacent to their inner ends, the free outer ends of the links being positioned to be guided during one stage of the lowering and lifting operation by the frame of the moulding machine or by the mould spinning discs.

4. An apparatus according to claim 3, including a mechanically operated arm connected to a plurality of the pairs of links to actuate them in unison so as to lower the mould onto the mould spinning discs and to raise the mould from the mould spinning discs.

5. An apparatus according to any one of the preceding claims wherein the mould supporting means comprises an inlet pair of parallel rails inclined towards the lowering and lifting means with their ends adjacent thereto and wherein the mould receiving means comprises an outlet pair of parallel rails also inclined towards the lowering and lifting means and including a retarding resistance to prevent the mould and the pipe contained therein from rolling back onto the lowering and lifting means once the mould has stopped rolling along the mould receiving means.

6. A centrifugal pipe moulding apparatus substantially as herein described with reference to and as illustrated in the accompanying drawings.

For the Applicants
LLOYD WISE, BOULY & HAIG,
Chartered Patent Agents,
Norman House,
105-109 Strand,
London, WC2R OAE.

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