April 10, 1951 J. BOUCHER 2,548,464

END DAM FOR CENTRIFUGAL PIPE MOLDS

Filed July 2, 1948 2 Sheets-Sheet 1

Fig. 1

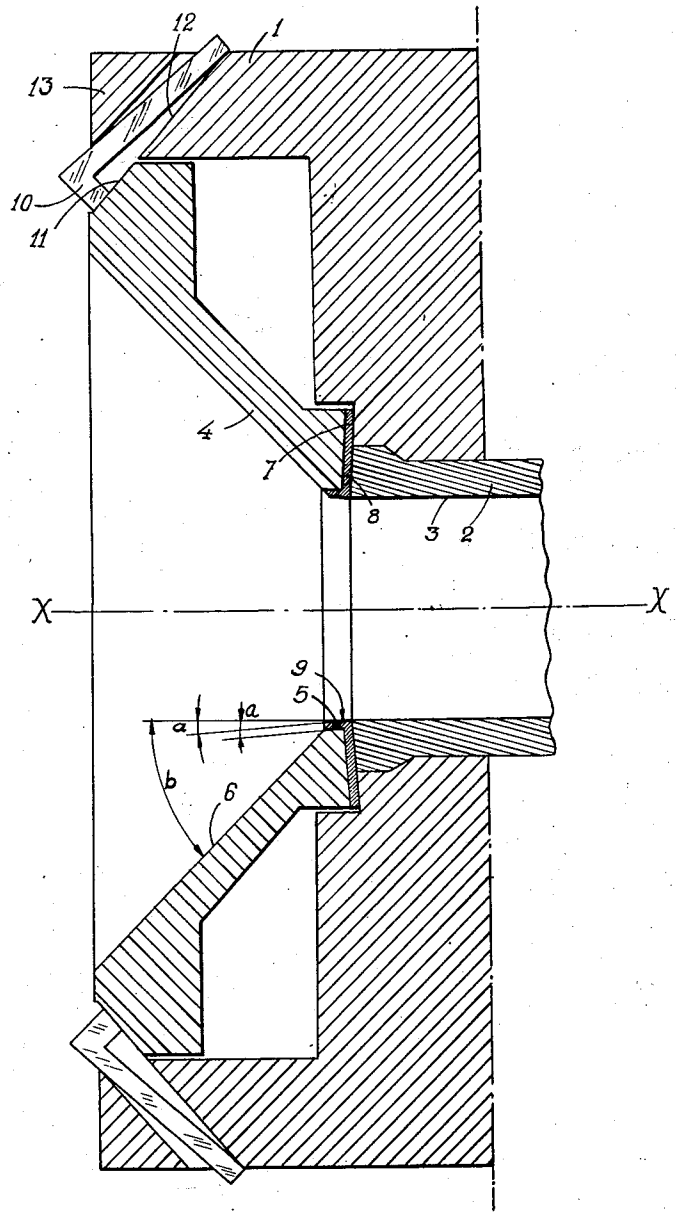

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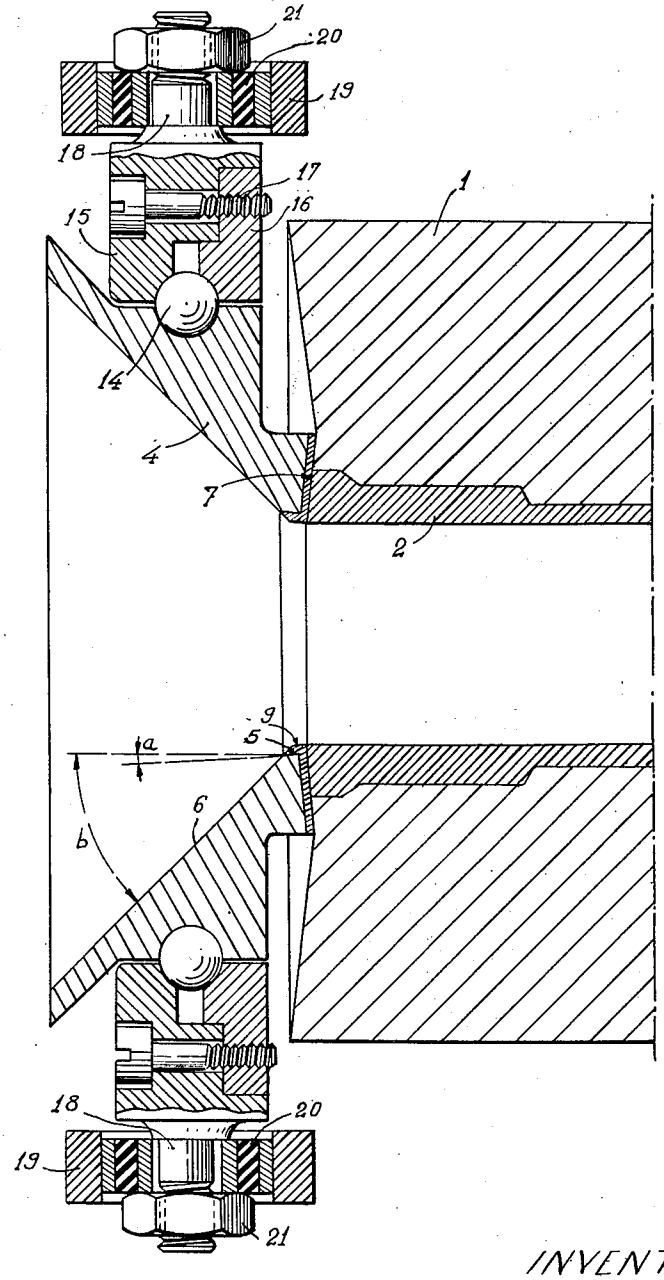
Fig. 2



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2,548,464

END DAM FOR CENTRIFUGAL PIPE MOLDS

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1 Claim. (Cl. 22—113.5)

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A rotative mould for manufacturing centrifuged pipes provided at one end with a bell is already known wherein the end corresponding to said bell is not provided with the usual sand core which has to be replaced after each casting operation, but by a refractory dam which is preferably made of metal and is pressed against the end of said mould, said dam either being fixed to said mould by means of keys, or supported by a device secured to the stationary case which surrounds the mould and relatively to which it can oscillate when it is not locked in the operative position. In any case, said dam is provided with a frusto-conical opening, the small diameter of which is in contact with the mould and is equal to the desired internal diameter of the pipe body.

At the beginning of a centrifuging operation of a pipe, the molten metal is poured into the mould in the vicinity of the dam; the level of the poured metal exceeds in said mould the level of the central opening of said dam and the excess of molten metal, which has not had enough time to be set in rotation, as the rotation of the poured metal begins by the peripherical layer in contact with the mould wall, moves longitudinally and flows out through the dam.

In the known mould, the conicity of the opening of said dam is comparatively slight, so that, at the beginning of a centrifuging operation, the excess of molten metal which flows out longitudinally is forced against the surface of the frusto-conical opening of the dam and given a rotary movement. This rotation produces a centrifugal force which has the effect of forcibly projecting the excess of molten metal outwards at the end of said opening, thereby producing a dangerous swirling of droplets of said molten metal.

Experience has shown that the force and the amount of the projections of swirling metal depend on the conicity of the inner wall of the refractory removable dam.

The present invention has for its object to provide a removable dam for moulds which are intended for casting pipes by centrifuging said dam, which is axially provided with a frusto-conical opening, enabling said projections to be decreased and even eliminated. This result is obtained owing to the fact that the angle of said frusto-conical opening of said dam with respect to the axis thereof is at least equal to 45°.

In the accompanying drawing which is given solely by way of example:

Fig. 1 shows a longitudinal section of a removable dam according to the invention;

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Fig. 2 is a similar view of an example of construction of a dam mounted on an oscillating support.

According to the embodiment shown in Fig. 1, 1 is the rotative mould in which is cast by centrifuging the pipe 2 with its complete cylindrical inner surface 3, the internal part of the engaging portion, i. e. of the bell, being subsequently machined with a tool.

A removable dam 4, which is preferably made of metal and provided with an axial opening formed by two conical surfaces 5 and 6, is pressed against the edge 7 of the mould by means of a refractory circular angle-shaped ring 8, the central opening 9 of which is frusto-conical and has the same angle as the portion 5 of the hole in said dam 4. This metal dam is fixed to the body of the mould 1 by means of keys 10, the heads of which are pressed against the face 11 of the dam and the bodies of which are driven into recesses 12 provided in a collar 13 of the mould.

As hereinbefore stated, the axial opening of the dam 4 is formed by two frusto-conical portions 5 and 6 of different angles of inclination with respect to the longitudinal axis x—x of the mold. The portion 5 is of as short a length as possible and, like the surface 9 of the ring 8, forms a small angle a, less than 10°, with the longitudinal axis XX of the mould. The surface 6 that extends from the edge of surface 5 forms a large angle b of at least 45° with said axis. This angle is preferably between 45 and 50°, the maximum angle being, however, solely determined by the mounting requirements.

According to the embodiment shown in Fig. 2, the movable dam 4 is supported, as known, by means of balls 14 in a case made in two portions 15 and 16 which are connected together by screws 17.

The body of the case is provided with two diametrically opposite journals 18 which rotate in a support 19 fixed to the framework of the machine supporting the mould. Resilient bushings 20 which are held by nuts 21 screwed on the screw-threaded ends of the journals 18 are interposed between said journals and the support 19.

In both examples, the device operates as follows: assuming that the dam 4 is pressed against the rotative mould 1 for a casting operation, the molten metal is applied as known to said mould through an axial pouring trough (not shown) adapted to longitudinally move relatively to said mould. The pouring begins in the vicinity of the dam and the poured metal has a certain speed which comprises a longitudinal component which

is parallel to the axis of the mould and directed towards the dam. Owing to the rotation of the mould, the molten metal is forced against the inner surface of said mould so as to form the engaging portion of the pipe to be cast until the level of metal reaches the height of the edge of the surface **9** of the ring **7** of the movable dam **4**. At this instant, the longitudinal relative movement begins between the pouring trough and the mould **1**, said trough going away from the dam. If this movement is late in beginning, an excess of molten metal which is not yet set in rotation flows longitudinally over the frusto-conical surfaces **9** and **6**.

As set forth it is found that if the angle *b* is less than 45°, the metal is forced against the rotary surface **6** which imparts a rotary movement to it and as hereinbefore stated, escapes in the form of a ring of droplets owing to the action of the centrifugal force.

On the contrary, it has been discovered that as soon as the angle *b* is greater than 45°, the molten metal which flows longitudinally out of the mould, no longer tends to be forced against the rotary surface **6**, but flows freely as from a spillway. It thus becomes possible to collect it in a container provided for this purpose under the end of the mould and dam, but in this case no rotary movement is imparted to the molten metal and consequently there is no projection of swirling metal.

Of course, the invention is in no way limited to the embodiments illustrated and described which have been chosen only by way of example and it can be applied to the casting of any kind of metal, the scope being limited only by the appended claim.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

A dam for the bell end of molds for centrifugally casting bell end pipe, said dam comprising in combination, on the one hand, an annular body having a portion thereof adapted to abut the end of a mold in which pipe is to be cast, said portion having an axial opening, adjacent the abutting mold opening, of frusto conical shape which tapers outwardly of the mold, the angle formed by the generatrices of the wall of said opening with the longitudinal axis of said mold and dam being no greater than 10°, and an additional frusto-cone on the interior face of said annular body, extending outwardly from said axial opening of frusto conical shape, the generatrices of the wall of said additional frusto-cone forming an angle of at least 45° with the longitudinal axis of said dam and mold, and, on the other hand, a flanged frusto-conical bushing of refractory material which lines said axial opening of the dam and the adjacent wall thereof abutting the mold, the smaller diameter of the conical portion of said bushing corresponding substantially in diameter with the internal diameter of the major portion of the pipe to be cast, and the wall of said conical portion forming an angle of no more than 10° with the longitudinal axis of the mold and dam.

JACQUES BOUCHER.

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