Internally Adjustable Core for Hollow Ware Dies

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2 Sheets - Sheet 1
This invention relates to hollow ware items in the brick and clay products industry, such as hollow tile of rectangular section or round tile for land drainage.

More specifically it relates to a core adjusting means for dies on hollow ware extruding machines, whereby the core or cores may be expeditiously adjusted within the funnel or outer portion of die so that the product will issue in proper form straight and true and without defects that might later show up in drying or burning.

In production of hollow ware it is generally noted that however closely the parts of the die are adjusted in conformity with previous practice, and before operation begins, further adjustments are necessary on account of some unforeseen and not easily detected factor in the problem, such as the material for production and its condition, the relation of the die to its parts and to the rest of the machine, such as the extruding augers, their distance from die and central working position and also adjustments made necessary by wear.

It is an object of the present invention to provide a hollow ware die with external adjusting means providing for minute movement of core or cores in all directions, also for squaring core with face, without tools other than wrenches and without dismantling any part from operating position. In fact this result can be secured while the extruder is operating.

This invention is here shown and described in a simple form but it also applies to tile with several cells and of various and diversified forms.

An advantage of this construction is that adjusting means are external, away from contact with material of production, secured by means later described.

A further object of this invention is that replacements can easily be made, also that slight variation in size of these can be taken care of as applies to bridge, by methods shown.

It is a further object to provide a sealing means for a machine part that extends outwardly through an opening in the wall of a pressure vessel, where the opening is larger than the part that extends through it and where the seal may be maintained for adjustments within the limits imposed by the size of the opening and the part, without abating the internal pressure.

The foregoing and other objects that will be apparent to those skilled in the clayworking arts, constitute the purposes of this invention, the scope of which is to be ascertained from the claims herewith.

Drawings accompany and forms a part of this specification in which—

Fig. I is a vertical section of the die holder of a clay machine for making hollow rectangular tile, the machine being represented in part by the end of the clay auger, and the adjustable core being in full lines;

Fig. II is an end view of the die holder casting, containing the adjusting apparatus, the die proper being removed, the bridge being shown in place and the core stem in section, on line II—II of Fig. I;

Fig. III is a view of the die, the core being in place, the stem thereof being in section, and is the complementary part of Fig. II to make it show the remaining parts necessary to complete Fig. I, taken on line III—III of Fig. I;

Fig. IV is a detail showing an alternate method of applying the adjusting screw to the bridge blocks as will be hereinafter explained;

Fig. V is an alternate form of sealing plate, varying from those shown mounted in the foregoing named drawings, which for some reason is preferable to those shown mounted; and

Fig. VI is a fragment of a hollow rectangular tile, the “walls” thereof being the parts that are required to be of even thickness. In a round tile uneven thickness would be spoken of as eccentricity of bore with respect to the circumference. Any variation of wall thickness of course detracts from the service qualities of the hollow ware article and also detracts from its appearance and salability to a degree all out of proportion to degradation of actual quality.

In the drawings, numeral 1 represents a clay machine suitable for brick or tile making, only a tip of the auger being shown. 2 is a die housing which will usually be bolted onto the machine. 3 is a bridge properly sustained in the housing 2, being of sufficient strength to support the core in rigid position as adjusted; and 3 is the die proper that determines the external shape of the hollow ware when clay of the proper texture is extruded between it and the core 4.

In order that the spaces between the core and the inner walls of the die be uniform, it is necessary that the bridge 3 and the centrally disposed core stem 5 shall be accurately placed and rigidly held in position. Accurate placement requires that it be movable in all directions. Alignment of the core with the die is attained by means such as the set-screws 7, see Fig. I, the operation of which will be readily understood. They work against the blocks 3 which are rigidly
attached to the bridge 3 and when proper alignment is secured may lock it firmly in position.

In addition to the tipping movement attained by the screws 1, vertical adjustment of the screws 5 and lateral adjustment by the screws 10, shown in Fig. II. The screws 9 being placed oppositely, are locked each by the other when made tight and the screws 11 serve to hold the lateral adjusting screws 19 against movement when correctly placed.

It will be noted that all of these screw adjustments are in open housings, outside of the clay space; hence can be adjusted while the machine is being operated and actually making tile, any defective ones resulting from incorrect walls being thrown back into the hopper of the clay machine until the product is perfect.

In Fig. IV is shown a substitute for the screw 10, identified by the numeral 110, which is easier to get at since an open end wrench applied to the nut 22 will move the block 8 in either of two directions.

The bridge 3, stem 6 and the core 4 will generally be made of white iron or some other wear resisting material, very difficult to machine and even so will require replacement at relatively frequent intervals due to wear; so I provide blocks such as 80 that interengage with the bridge 3 as diagrammatically shown and which, being to a large extent outside of the zone through which the clay passes, may be made of low carbon steel, machine and case hardened.

In order that these blocks may move in any direction during adjustment and still prevent extrusion of clay through and past the adjusting means by way of openings such as 80, I provide a steel sealing member that seals under influence of the pressure developed inside the housing 2 by the clay machine 1 and which is necessary to make hollow ware by this type of machine.

Two types of sealing device are shown, indicated by numerals 30 in Figs. I, II and IV and an alternative type indicated by numeral 31 in Fig. V.

30 is a flat plate, provided with a median opening that is a close fit on the block 8. It is preferably made with a spring temper. It is held in place by the bolts 10, the latter being shown to have oversize openings and equipped with nuts 15. The nuts 16 may be slackened sufficiently during the adjustment period so that the movement of blocks 8 is not interfered with substantially, and tightened up after the adjustment is completed. The spring temper of this plate makes it self-adjusting when there is a lean to the blocks 8 and it is always held in sealing position against the inside of the housing 2 and/or the die 5. This pressure, it will be understood, is of very considerable amount in pounds per square inch, necessary to extrude the stiff clay.

In the alternate form, see Fig. V, the sealing plate 31 is a cupped plate held against the same surfaces by internal pressure and additionally by preference having enough initial pressure to follow up within the range of movement substantially required of the order of one inch or less.

The collar 21, which supports the seal 31 will be made adjustable as diagrammatically indicated by the setscrews 310, original tension placed in opposing seals so that they will move in and out after the manner of a spring bottom oiler. This latter type of seal is tighter against clay leakage, which is believed to offset its slightly higher initial cost. It is less likely, also, to interfere with hairline adjustment of the core by the means disclosed.

Having disclosed my invention so that anyone skilled in the art to which it appertains may realize its advantages, what I claim as new and desire to secure Letters Patent is:

1. Centering means for a hollow ware clay die and core, comprising a housing for receiving clay from a compressor, a die detachably attached to said housing, said housing provided with apertures for spider arms of a core supporting bridge, a spider armed core bridge being held in said die and said housing, a core support in said die by said bridge, with the arms thereof projecting through said apertures, said apertures larger than said arms, screw means externally of the housing for longitudinal and lateral adjustment of each spider arm independently and a sealing plate mounted on each arm and movable therewith to bear against the inner surface of the housing and seal the aperture through which the arm passes, said sealing being assisted by internal pressure.

2. Die and core means for a clay machine, the core being longitudinally and laterally adjustable with respect to the die, comprising a die member, a core member movably mounted therein, a stem upon which said core is mounted, spider arms made rigid with said stem and projecting normal to its axis, a housing within which said spider and stem are mounted to hold the core in the die, said housing being provided with apertures larger than the spider arms, the said arms passing through said apertures, screw means external of the housing positioned to move and lock each of said spider arms independently, and a pressure sealing plate mounted on each arm, within the housing, to bear against the inside of said housing and seal the aperture around the arm under influence of internal pressure.

3. Core centering and adjusting means for a hollow ware clay die comprising a housing for receiving clay from a compressor, a hollow die attached to said housing, said housing being provided with open end notches on its die receiving face which are closed to form apertures when the die member is attached, a core supporting spider within said housing, a core support in the die by said spider, the spider arms which then tend through said apertures, screw means bearing against the portion of the arms outside the apertures effective to produce axial and lateral adjustment of each spider arm independently, and a sealing plate mounted in clay tight relationship on each arm, the boundaries of which bear against the inside of the housing and tend to seal it tighter under influence of internal pressure.

4. Core centering and adjusting means for a core within a hollow ware die clay machine, comprising a housing for attachment to the delivery end of a clay machine, a hollow die made rigid with said housing, said housing provided with a plurality of spaced lateral openings in the walls thereof, a plural armed core support member, the arms of which project through said openings, the openings being larger than the arms, a core support in said die by said spider, the spider arms which then tend through said apertures, screw means for effecting lateral and axial adjustment of each arm of the core support within its opening and a sealing plate mounted in clay tight relationship on each arm within the housing, with its perimeter bearing against the inner surface of the housing.

5. Die and core means for a clay machine, the
core being universally adjustable within limits imposed by the inside of the die, comprising
a housing member for receiving clay from a compres-
sor, a die detachably attached thereto, a core
positioned within said die, a bridge with spider
arms thereon within said housing, said spider
arms constituting mounting means for said
bridge, core supporting means made rigid with
said bridge to support the same in axial align-
ment with the inside of the die, the said housing
being provided with apertures larger than said
spider arms through which said arms extend,
means externally of the housing for moving the
spider arms within limits imposed by the size of
the apertures and a floating sealing plate
mounted on each arm in clay tight relationship,
the perimeters of the plates bearing against the
inside of the housing and effective to seal the un-
occupied spaces between the spider arms and the
aperture limits.

6. A clay machine for hollow ware comprising
a clay compressor, a housing positioned to receive
clay under pressure from said compressor, a die
detachably attached to said housing, a core sup-
ported in said die and centering means for said
core in said die comprising a plural armed bridge
member to which said core is made rigid, said
arms of said bridge member projecting through
apertures provided in said housing which are
larger than the arms, screw means externally of
the housing for moving each arm laterally and
axially within the limits of the aperture through
which it projects, and a sealing plate mounted
in clay tight relationship on each arm, within
the housing, and positioned to bear against the
inside surface of the housing to seal that part
of the aperture not occupied by the arm passing
through it.

7. A sealing plate for a member adjustable ex-
ternally of a hollow pressure vessel to move an
instrumentality within said vessel, comprising
an adjusting arm that passes through an opening
in the vessel larger in area than the sectional
area of the arm where it is within said opening,
means for adjusting said arm externally of said
pressure vessel, within the limits afforded by the
difference in size between the arm and the open-
ing and a sealing plate for closing the unoccupied
area of the opening, said sealing plate being
mounted on the arm normal to its axis and ex-
tending therefrom sufficiently to cover the open-
ing with the arm in any position, overlapping
the inside of the pressure vessel and bearing
against its inside surface in pressure tight rela-
tionship.

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