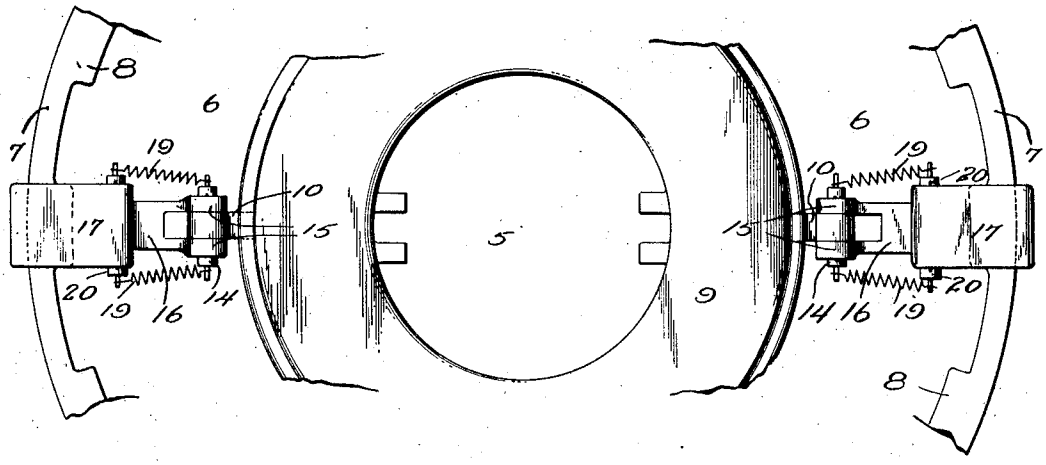
W. K. GLENNON AND C. WATTLEWORTH.

MOLD BREAKING APPARATUS.

APPLICATION FILED AUG. 17, 1917.

1,364,840. **Patented Jan. 4, 1921.**

FIG. 1.



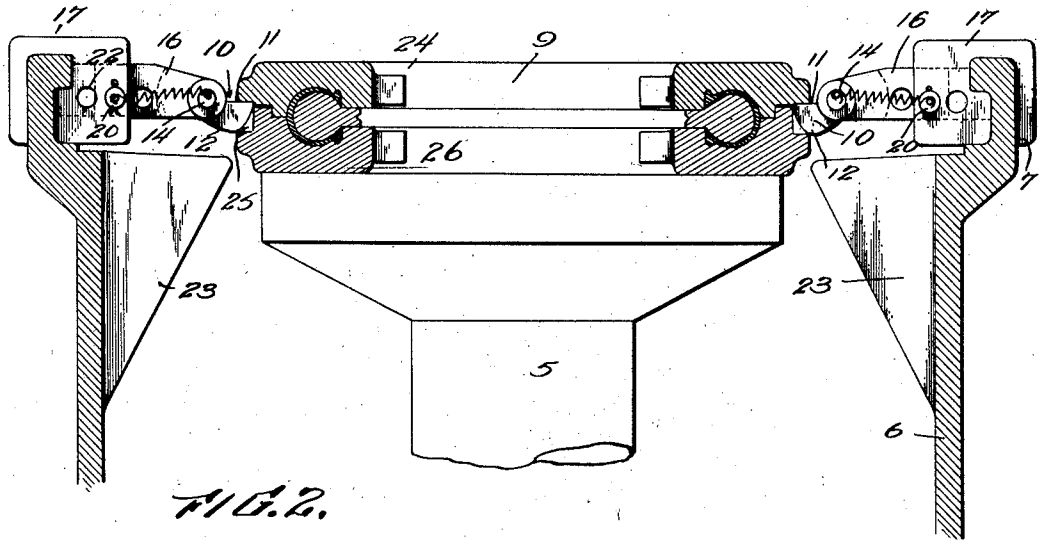
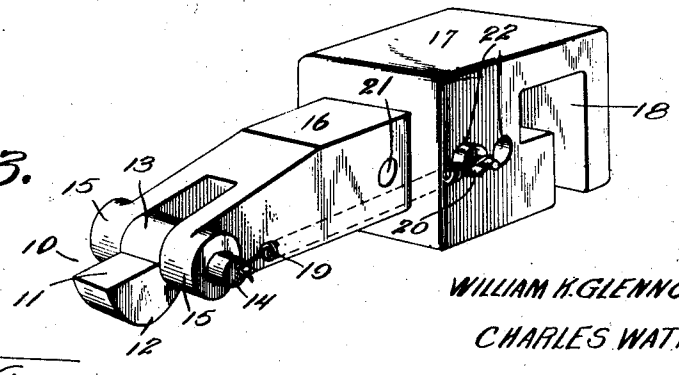


FIG. 2.

FIG. 3.



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UNITED STATES PATENT OFFICE.

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MOLD-BREAKING APPARATUS.

1,364,840. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed August 17, 1917. Serial No. 186,743.

To all whom it may concern:

Be it known that we, WILLIAM K. GLENNON and CHARLES WATTLEWORTH, respectively citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Mold-Breaking Apparatus, of which the following is a specification.

This invention relates to a device for breaking apart mold sections when it is desired to remove the molds from the hydraulic press in which the sections have been forcibly mated.

In accordance with the present practice, a plurality of molds is placed upon the plunger head of a hydraulic ram which simultaneously compresses all of the molds against a press head which is temporarily fastened over the mouth of the press-well in which the hydraulic plunger operates. When the articles contained within the mold have accomplished their "curing" period, the press head is removed from the well mouth and the hydraulic plunger is employed to elevate the various molds in succession to the top of the press-well. Here they are removed and their sections pried apart through the medium of manually wielded crowbars, or like instruments.

The labor of separating the sections of a mold is arduous, owing to the very considerable force with which the sections are mated by the hydraulic press, and it is with the provision of means for obviating the necessity of this manual labor, while also saving, at once, the time lost thereby, that this present invention is concerned.

As a principal object, it is contemplated by this invention to provide means of an automatic nature which may be adapted to engage between halves of a mold as the latter is being removed from the depths of the press-well in order to pry the mold halves apart without interfering with the regular course of their removal from the press.

It is a further object to produce a mold breaking apparatus which may be automatically reset into operative position with relation to successive molds, after each successive prying apart of the molds has taken place.

It is also an object of this invention to provide means of an automatic nature adapted to engage between the halves, or parts, of a mold, such means being positioned upon the side of a press-well and being accompanied by mold-centering arms, also secured to the side of the press-well in order that the molds rising from the well may be automatically centered with respect to the mold breaking device.

The above and additional objects of a similar nature, which will be hereinafter more specifically treated, are preferably accomplished by such means as are illustrated in the accompanying drawings, described in the following specification and then more particularly pointed out in the claims which are appended hereto and form a part of this application.

With reference to the drawings, wherein there has been illustrated a preferred embodiment of the invention as it is reduced to practice, and throughout the several views of which, similar reference numbers designate corresponding parts:

Figure 1 is a fragmentary plan view looking down into the press-well, showing the mold breaking apparatus of this invention in operation;

Fig. 2 is a vertical sectional view of the same subject matter.

Fig. 3 is a perspective view of one of the mold breaking instruments *per se*.

The present invention broadly includes a cam wedging element which is adapted to be automatically interposed between the mold sections in such a manner that the pressure upon the element by the lower section serves to pry the upper mold section from the lower, owing to the fact that upward movement of the cam wedging element is accomplished at a faster rate than the upward movement of the lower mold part, although the cam movement is produced by the rise of the mold engaged thereby as the latter is elevated toward the top of the press-well by means of the customary hydraulic plunger.

In Fig. 2 the plunger of a hydraulic press is designated by the numeral 5, such plunger being operable within the press-well 6. The latter is provided with an annular top 7 which is formed upon its inner periphery with a series of uniformly spaced lugs 8. The fixed press head employed with the hydraulic apparatus has not been illustrated, but it may be mentioned that such head is locked upon the well top 7 by means of fa-

miliar breech locking connections in which the inturned lugs or extensions 8 form the locking elements, until the press head has been partially rotated in order that its own locking extensions may register with the spaces between the fixed lugs 8. Upon the platen of the hydraulic plunger 5 there are piled a number of molds 9 which are forced, *en masse*, against the press head when compression of the molds is desired.

The apparatus of my invention is of such nature that it may be employed upon the present type of hydraulic press without any necessity for alteration in the latter, aside from the addition of the necessary mechanical elements brought forward by the mold-breaking device proposed herein. The active mold breaking element is comprised in a pair of wedge or cam members denoted by the numeral 10, each being formed with a flat edge surface 11 adapted to engage against the lower periphery of the upper mold section and having the curved edge 12 which is adapted to be fulcrumed upon the lower mold section. Each cam member is provided with an off-center shoulder 13 which is transfixed by the pivot 14 mounting the cam between the arms 15 of the yoke 16. This latter is of a bar formation and is slidably and adjustably mounted within the anchoring base 17.

The anchoring base for the cam bar 16 is formed with an internal bayonet groove 18 whereby the base may be given an interlocking anchorage upon the well top 7, in a manner similar to the anchorage of the press head thereon. A pair of contractile coil springs 19 connect in off-center fashion between the trunnion or pivot 14 and the base element 17, and form a yieldable control of such nature that the cam member 10 is normally offered with its flat edge 11 uppermost, in the manner illustrated in Figs. 2 and 3. Adjusting pins 20 serve to anchor the springs 19 upon the base block 17, as well as adjustably securing the whole arm 16 thereto in such manner as to adapt it for use with molds of differing diameters. These adjusting pins are adapted to pass through registered apertures 21 and 22 of a series of edge apertures provided in both the yoke element 16 and the base block. A pair of the mold breaking devices is usually sufficient when provided at the opposite extremities of one of the diameters of the mouth of the press-well. Arranged immediately below each of the anchor blocks 17 is a triangular web piece 23, the pair of such pieces serving to center the successive molds upon the face of the hydraulic plunger 5 as the latter raises the molds successively to the well mouth. These web pieces are required in order that the successive molds may be properly centered with respect to the mold breaking device arranged to operate automatically thereon.

In operation, the top section 24 of the rising mold 9 first engages with the cam member 10 when the latter is in the normal position illustrated in Fig. 3, and forces this member through a revolution of three hundred and sixty degrees as the rising movement of the plunger 5 continues, the positioning springs 19 serving to return the cam 10 to its normal position as the upper mold section 24 passes thereby. The completion of this revolution of the cam member brings the latter automatically into the annular channel 25 which is provided between the upper mold section 24 and the lower half 26, with the rounded edge 12 of the cam member engaging the annular surface of the mold half 26 which forms one of the walls of the channel 25. Meanwhile, the rise of the hydraulic plunger has not been interrupted, the continuing lift thereof serving to exert an upwardly rotational pressure upon the rounded portion of the cam or wedge element which is directly transmitted to the upper mold section in such manner that the latter is lifted from engagement with the lower mold half. No breaking force is required other than the power which is given by the hydraulic plunger and which is necessary to lift the molds to the top of the well, the cam member 10 being so constructed that its rate of rotational travel is always faster than the linear lifting travel of the plunger which forms the actuating force for the cam.

As soon as the mold 9 passes the oppositely engaged breaking cams 10, the latter are vertically off center and are then forced to complete the partial revolution, initiated by the first mold acted upon, through the medium of the springs 19, the disengaged mold half being allowed to settle back upon the lower half since it cannot be again mated therewith by its own weight to such an extent that the upper section may not readily be lifted off by the laborer stationed at the mouth of the press-well. The next mold in the pile continues to rise until the breaking cams engage its central channel in a similar manner, and separate the halves of this mold in turn.

From the foregoing it will be apparent that means have been provided by the present invention whereby the objects previously presented may be advantageously obtained, the true scope of the invention being hereinafter delineated in the appended claims.

What we claim is:

1. A device for separating the members of a sectional traveling mold, comprising a member adapted to automatically engage between the mold sections upon movement of the mold in the direction of its axis, and

arranged to fulcrum therebetween upon further axial movement of the mold.

2. A device for breaking apart the sections of a mold, including an automatically operated cam engaging between the sections of the mold to separate the sections as the mold is moved in the direction of its axis.

3. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of cam means engageable between the halves of each mold to separate such halves, as the molds are moved vertically by said press.

4. An apparatus of the type described, including, the combination with movable molds on an hydraulic press, of means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are moved by the press, to separate the halves of each mold in succession, without interrupting the movement of said press.

5. An apparatus of the type described, including, the combination with movable molds on an hydraulic press, of automatic means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are moved by the press, to separate the halves of each mold in succession, without interrupting the movement of said press.

6. An apparatus of the type described, including, the combination with movable molds on an hydraulic press, of cam means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are moved by the press, to separate the halves of each mold in succession, without interrupting the movement of said press.

7. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of a yieldably controlled cam member engageable between the halves of each mold to separate such halves, as the molds are moved vertically by said press.

8. An apparatus of the type described, including, the combination, with vertically movable molds on an hydraulic press, of yieldably controlled automatic cam means engageable between the halves of each mold to separate such halves, as the molds are moved vertically by said press.

9. An apparatus of the type described, including, the combination, with vertically movable molds on an hydraulic press, of yieldably controlled cam means engageable between the halves of each mold to separate such halves, as the molds are moved vertically by said press.

10. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are lifted by the press, to separate the halves of each mold in succession, without interrupting the movement of said press; and yieldable means controlling the action of the first said means.

11. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of automatic means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are lifted by the press, to separate the halves of each mold in succession without interrupting the movement of said press; and yieldable means controlling the operation of said automatic means.

12. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of cam means stationed along the path of travel of said molds and operable upon each mold in turn, as the latter are lifted by the press, to separate the halves of each mold in succession, without interrupting the movement of said press; and yieldable means controlling the operation of said cam means.

13. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of wedge elements mounted for rotation at the mouth of the hydraulic press, such wedge elements being controlled to enter between the halves of each mold as the latter are lifted to the mouth of the press, and to separate said mold halves as an incident to the continuous discharge of the molds from the press.

14. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of automatically controlled wedge elements mounted for rotation at the mouth of the hydraulic press to enter between the halves of each mold as the latter are lifted to the mouth of the press, and to automatically separate said mold halves as a result of the continuous discharge of the molds from the press.

15. An apparatus of the type described, including, the combination with vertically movable molds on an hydraulic press, of cam-surfaced wedge elements mounted for rotation at the mouth of the hydraulic press, such wedge elements being automatically controlled to enter between the halves of each mold as the latter are lifted to the mouth of the press, and to automatically separate said mold halves as a result of the continuous discharge of the molds from the press.

16. An apparatus of the type described including, the combination with vertically movable molds on an hydraulic press, of blocks

secured to the mouth of said press; means carried by said blocks and engageable between the halves of each of the press molds for separation thereof as the molds are lifted to the mouth of the press; and means for centering the molds with respect to the first said means.

17. An apparatus of the type described including, the combination with vertically movable molds on an hydraulic press, of blocks removably securable to the mouth of said press; wedge elements rotatably mounted by said blocks and engageable between the halves of each mold to separate them as the latter are lifted to the mouth of the press; and means arranged in conjunction with said wedge elements to center the molds thereon as they move theretoward.

18. An apparatus of the type described including, the combination with vertically movable molds on an hydraulic press, of blocks removably securable to the mouth of said press; cam elements mounted by said blocks and automatically engageable between the halves of each mold to separate them as the latter are lifted to the mouth of the press; and means arranged below the mouth of the press to center the molds as they rise toward said wedge elements.

19. An apparatus of the type described including, the combination with vertically movable molds on an hydraulic press; of cam elements rotatably mounted by said blocks and automatically engageable between the halves of a mold to raise the upper mold half at a speed greater than that of the lower half of the mold; and means arranged in conjunction with the cam elements to center the molds thereon as they move theretoward.

20. An apparatus of the type described including, the combination with movable molds on an hydraulic press, of cam elements; means for mounting the elements for rotation at the mouth of the press; means for yieldably controlling the rotation of said cam elements; means for centering the molds of the press with respect to said cam elements; and means for adjusting the cam elements at the mouth of the press for operation upon molds of differing sizes.

21. An apparatus of the class described including the combination with vertically movable sectional molds on a press member, of cam means engageable between the sections of each mold to separate such sections as the molds are moved vertically by the press.

In testimony whereof we have signed our names in the presence of two subscribing witnesses.

WILLIAM K. GLENNON.
CHARLES WATTLEWORTH.

Witnesses:
B. J. McDANEL,
R. S. TROGNER.