Feb. 21, 1933. R. G. ALLEN 1,897,993

CHARGE SEVERING MECHANISM

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Fig. 2.

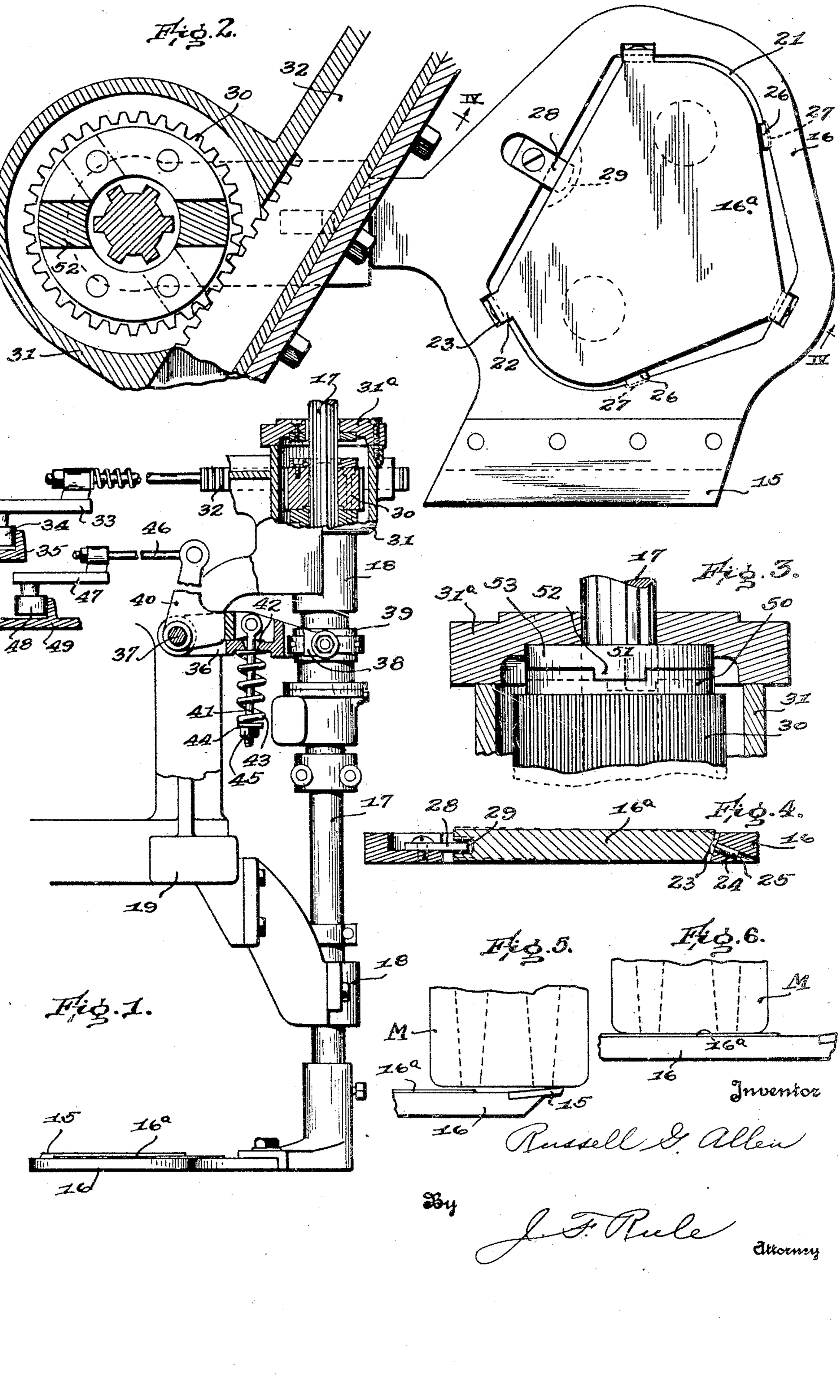

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Inventor

Russell G. Allen

By

J. F. Rule

Attorney

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Fig. 7.

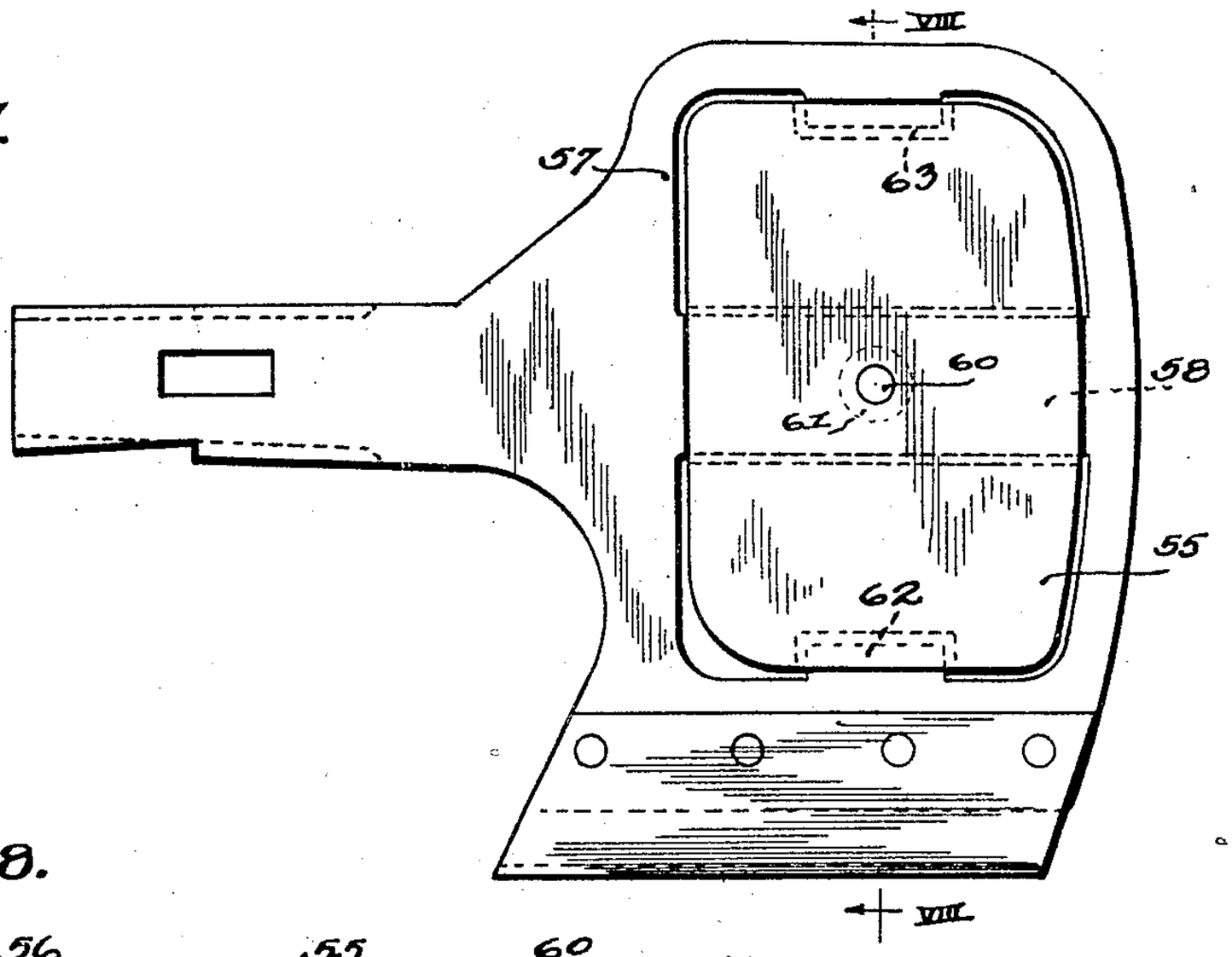


Fig. 8.

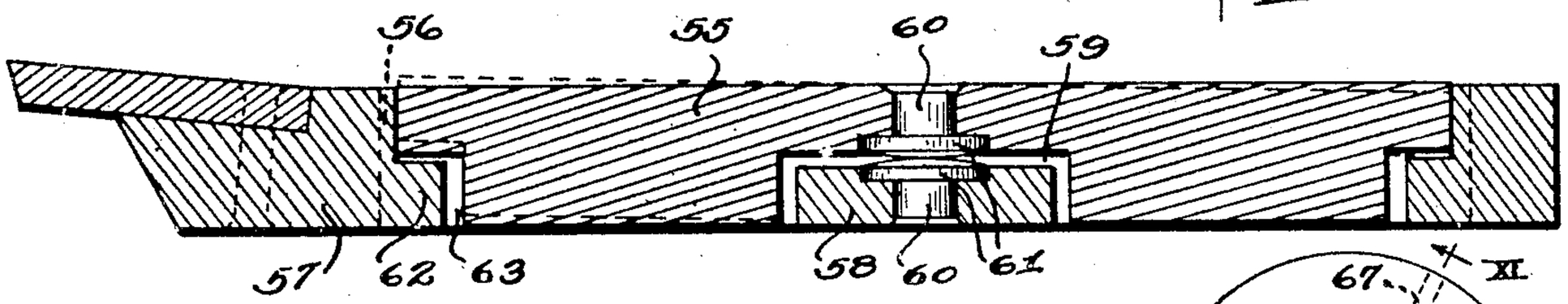


Fig. 9.

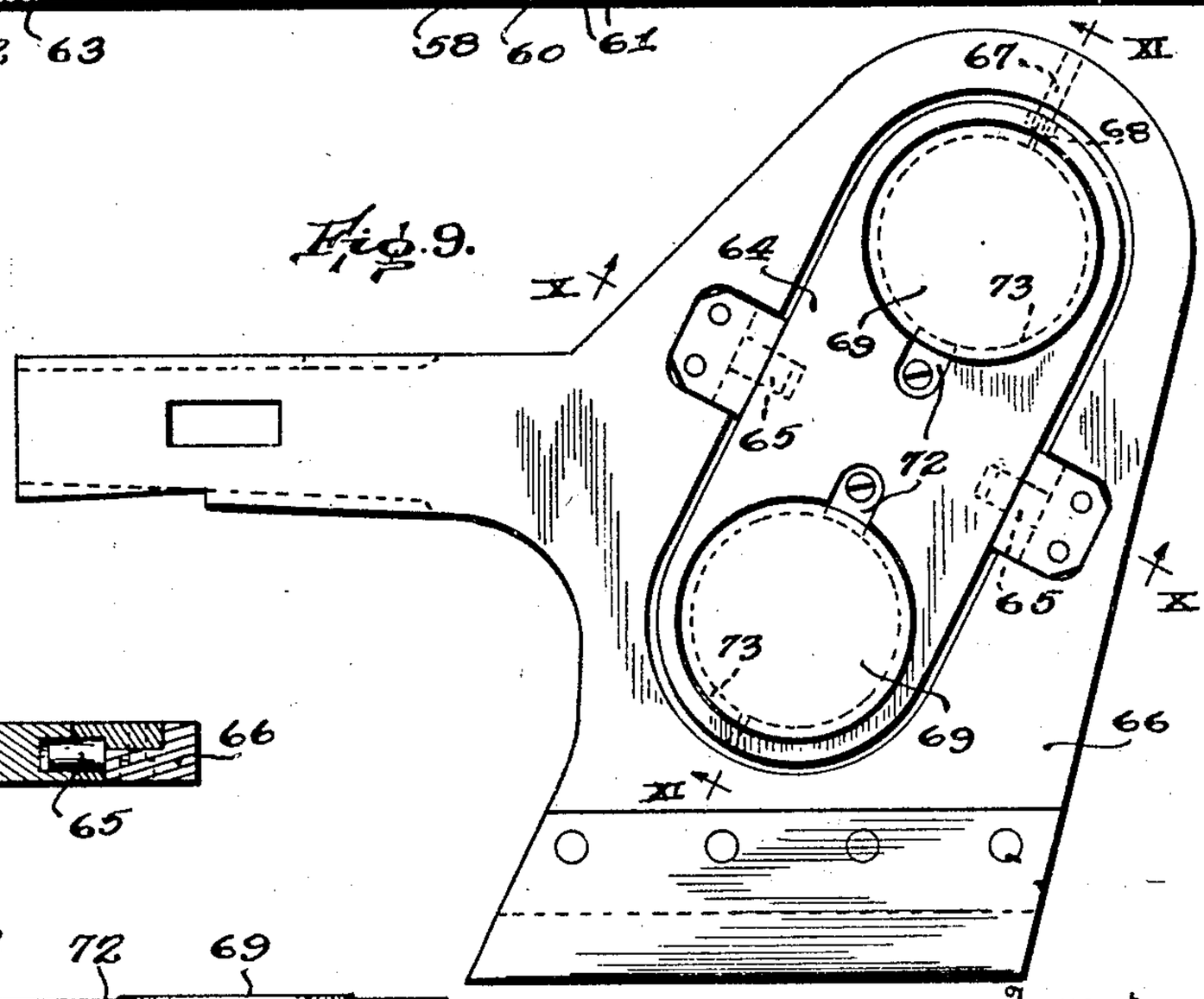
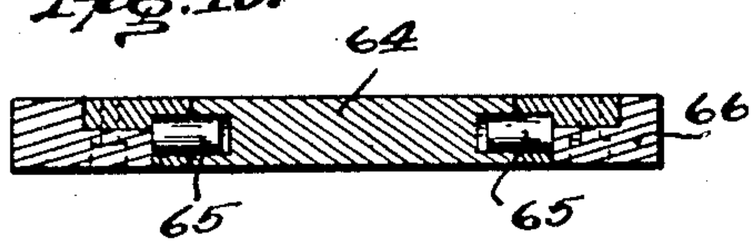


Fig. 10.



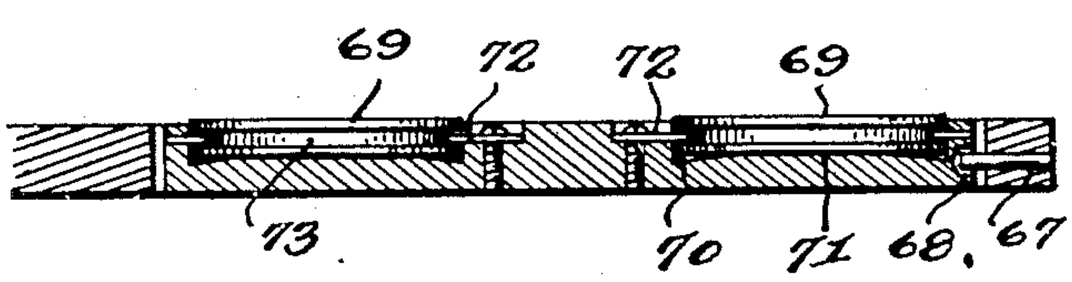


Fig. 11.

Inventor

Russell G. Allen

By

J. F. Rule

Attorney

Patented Feb. 21, 1933 1,897,993

UNITED STATES PATENT OFFICE

RUSSELL G. ALLEN, OF ALTON, ILLINOIS, ASSIGNOR TO OWENS-ILLINOIS GLASS COMPANY, A CORPORATION OF OHIO

CHARGE SEVERING MECHANISM

Application filed April 11, 1931. Serial No. 529,416.

The present invention relates to improvements in charge severing mechanism for glassware forming machines and relates particularly to that type of charge severing mechanism or cut-off employed in connection with machines in which the molds employ suction in gathering mold charges of molten glass from a supply body.

In the manufacture of blown articles of glassware by means of automatic forming machines in which mold charges of molten glass are gathered by suction into blank molds, it is customary to employ horizontally swinging cut-off knives individual to the molds for the purpose of severing the gathered mold charges from a supply body of molten glass. Ordinarily, each knife and its holder are disposed in the same plane, the knife being arranged on the forward margin of the holder. Also the holder usually consists of a solid plate which slides over and in contact with the bottom surfaces of the mold immediately following the charge severing operation and comes to rest in position to close the mold cavity or cavities preparatory to the application of air under pressure which compacts or compresses the glass in the blank mold. Some difficulty has been encountered in maintaining the holder in true parallel relation to the mold bottom with the result that in many instances only a portion of the holder actually contacts with or is properly positioned relative to the mold. Such a condition allows portions of the glass to be forced out of the mold into a space between the knife and mold and frequently results in the formation of a blank in which the bottom portion is distorted to a degree preventing its transformation into a finished article of the desired quality, without resorting to methods not adaptable to modern glassware forming machines. It has also been found that where the knife and knife holder are disposed in the same plane and the actual charge severing operation is followed by a sliding movement of the holder over and in contact with the mold bottom, as well as with the mold charges, the gathered glass is frequently quite deeply chilled due to the long period of contact with the knife holder. Operating conditions in modern automatic machines do not permit of a sufficient period of reheating to avoid the detrimental effects of such deep chilling of the bottom portions of the blanks.

An object of the present invention is the provision of means for materially reducing the necessary period of contact between the knife holder and gathered mold charges to thereby prevent excessive chilling of the glass such as is due to prolonged contact thereof with the cut-off mechanism. To this end the cutting edge of the knife is disposed in a plane above the knife holder so that only by moving the holder upward at a predetermined time following completion of the charge severing operation is the said holder brought in contact with the gathered glass and mold bottom.

Another object is the provision of a self aligning knife holder which due alone to pressure thereof against the blank mold will automatically align itself with the bottom of the mold immediately upon being lifted to a mold cavity closing position. To this end the holder includes what may be termed a "floating" baffle plate which is of sufficient area to close the mold cavity or cavities when in proper position and mounted for multi-directional movement relative to the holder proper.

A further object is the provision of novel means brought into operation by swinging movement of the knife across the bottom of the mold for quickly moving the holder upward into contact with the corresponding mold at a predetermined time following completion of the charge severing operation.

Other objects will be in part apparent and in part pointed out hereinafter.

Fig. 1 is a fragmentary sectional elevational

view showing a charge severing mechanism constructed in accordance with the present invention.

Fig. 2 is a sectional plan view showing a portion of the knife oscillating mechanism and a floating baffle plate in the knife holder.

Fig. 3 is a detail sectional elevational view showing a portion of the mechanism for controlling upward movement of the knife and its holder with respect to the corresponding mold.

Fig. 4 is a sectional view through the knife holder and floating baffle plate taken substantially along the line IV—IV of Fig. 2.

Fig. 5 is a fragmentary elevational view illustrating the manner in which the cut-off knife severs mold charges while maintaining the knife holder out of contact with the mold.

Fig. 6 is a view similar to Fig. 5 showing the next succeeding position in which the knife holder has been brought into contact with the bottom of the mold.

Fig. 7 is a detail plan view showing a modified form of baffle plate.

Fig. 8 is a sectional view taken substantially along the line VIII—VIII of Fig. 7.

Fig. 9 is a detail plan view of another form of baffle plate.

Fig. 10 is a transverse sectional view taken substantially along the line X—X of Fig. 9.

Fig. 11 is a sectional view taken substantially along the line XI—XI of Fig. 9.

In one form of the invention (Figs. 1 to 6, inclusive) the cut-off mechanism includes a knife 15 carried by a holder 16 which is suitably attached to the lower end of a vertical rock shaft 17, said shaft being journaled in vertical bearings 18 provided at the outer end of a frame 19 which may constitute part of a rotary mold carriage (not shown). The rock shaft 17 is oscillated at regular time intervals by mechanism to be described presently, for the purpose of imparting a horizontal swinging movement to the knife whereby it is caused to sever mold charges of molten glass in the mold "M" from a supply body (not shown).

The knife and holder therefor are of such construction that the holder and a "floating" baffle plate 16ª on the latter are held out of contact with the mold and gathered glass during the actual charge severing operation and for a short interval of time thereafter, after which said baffle plate is moved vertically upward into contact with the mold and gathered glass. Also, the baffle plate 16ª is so mounted in the holder 16 that upon being moved upwardly into contact with the mold, it automatically adjusts itself to a position in which it is accurately aligned with or squared against the bottom of the mold. For this purpose the floating baffle plate 16ª is suitably supported in a vertical opening 21 provided in the knife holder 16, said plate being of substantially triangular formation and provided at three points with lateral extensions 22 terminating in inclined curved bearing surfaces 23 having sliding bearing contact with convex heads 24 carried by pins 25 which are suitably supported in the holder 16. It is apparent that such mounting of the baffle plate permits multi-directional movement and ready alignment thereof with the bottom of a mold immediately upon moving the plate into firm contact with the mold. Relative movement between the baffle plate 16ª and the holder 16 is limited by fingers 26 carried by said plate and projecting into recesses 27 provided in the wall of the vertical opening 21, in said holder. A retaining plate 28 or finger, is separably connected to the holder 16 and projects into a recess 29 formed in one vertical wall of the baffle plate for the purpose of holding the latter against accidental displacement.

Oscillation of the rock shaft 17 for the purpose of moving the knife into and out of operative position with respect to the blank mold "M" is obtained by mechanism including a gear 30 or pinion (Figs. 1, 2 and 3) splined to the upper end of the rock shaft 17 and enclosed in a housing 31, said gear meshing with a horizontal rack bar 32. This rack bar has yielding connection to a slide 33 which carries a cam roll 34 running in a stationary continuous cam 35, the latter shaped to reciprocate the slide and rack bar so that rotary movement is given the gear 30 at regular time intervals.

Lengthwise movement of the rock shaft 17 for the purpose of alternately raising and lowering the knife and holder therefor with respect to the blank mold "M", is obtained by mechanism including a lever 36 which is pivoted to a horizontal hinge pin 37 and has a forked outer end 38 suitably connected to a collar 39 carried by the rock shaft. A bell crank lever 40 (Fig. 1) is pivoted to said hinge pin 37 and has one end yieldingly connected to said lever 36 by means of a spring device including a rod 41 pivoted at one end to said bell crank lever and extending through an opening 42 in the other lever and carrying a coil spring 43. This spring 43 is confined between the first named lever 36 and a retaining plate or disk 44 which is adjustably held on said rod by a nut 45. The tension of the spring and consequently the pressure of the holder against the mold may be regulated by adjustment of the nut on the rod. The bell crank lever 40 is also connected through a rod 46 to a slide 47 which carries a cam roll 48 running in a stationary continuous cam 49, the latter shaped to rock the levers 36 and 40 at regular time intervals and in timed relation to movement of the rack bar 32 which imparts swinging movement to the knife.

Upward movement of the cut-off knife

and holder therefor prior to completion of the charge severing operation is prevented by mechanism which in the present embodiment of the invention, is arranged within the gear housing 31. This mechanism consists of a plate 50 attached to or forming a part of the gear 30 and having a pair of aligned diametrically opposed channels or grooves 51 which face upwardly and are designed to provide seats for a pair of downwardly facing diametrically opposed tongues 52 on a plate 53 which is attached to the cover or closure 31ª for the gear housing. The tongues 52 occupy such positions with respect to the upwardly facing grooves 51 or channels, that when the cut-off knife reaches the limit of its cutting stroke (Figs. 2 and 6) wherein the baffle plate 16ª may be raised and thereby close the mold cavities, said tongues and grooves are in perfect alignment and are immediately brought into mesh as shown in Fig. 3.

In operation, the mold "M" gathers mold charges from a supply body of molten glass (not shown) and immediately thereafter is lifted a short distance above said supply body. The cam 49 rocks the levers 36 and 40 to such a position that the rock shaft 17 is lifted causing the high surface of the plate 50 to contact with the tongue or tongues 52 on the plate 53 as shown in dotted lines in Fig. 3. Due to the shape of the cam 49 the levers 36 and 40 are separated slightly to build up extra pressure on the spring 43. The knife is so adjusted that when the plates contact as just described, it is in correct cutting relation to the corresponding mold. The shaft 17 is then rocked causing the knife to sweep across the bottom of the mold thereby separating the gathered mold charge and supply body of glass. At the end of the cutting stroke of the knife the tongues and grooves register. The spring 43 immediately and quickly expands, causing upward movement of the rock shaft. This action firmly yet yieldingly presses the baffle plate or plates into snug contact with the mold bottom.

In another form of the invention (Figs. 7 and 8) the baffle plate 55 is arranged in a vertical opening 56 formed in the knife holder 57, said plate overlying a transverse centrally disposed rib 58 which extends into a downwardly facing channel 59 in the plate. Vertically aligned pins 60 are arranged centrally in the rib 58 and baffle plate 55 and are provided at their inner ends with convex heads 61 which together provide a single point bearing for the baffle plate. Thus the plate is free for multi-directional movement relative to the holder and as in the preceding form aligns itself with the bottom of the corresponding mold immediately upon being pressed against the mold bottom. The transverse rib 58 limits rocking of the plate in one direction while flanges 62 formed on the end walls of the opening 56 and extending into recesses 63 in the adjacent ends of the baffle plate limit the extent of rocking movement about axis extending substantially parallel with the length of the rib 58.

In another form of the invention (Figs. 9, 10, and 11) a baffle plate carrier 64 is mounted on pintles 65 disposed centrally between the ends of the carrier and suitably supported on the knife holder 66. Rocking of the carrier about the pintles 65 is limited by a stop pin 67 mounted at one end of the holder 66 and projecting into a recess 68 formed in the adjacent vertical wall of the plate carrier. Baffle plates 69 individual to the mold cavities are mounted in upwardly facing recesses 70 in the plate carrier. The bottoms 71 of these recesses 70 are of convex form and provide a curved bearing surface permitting multi-directional movement of said baffle plates relative to the plate carrier. Stop fingers 72 carried by the plate carrier and projecting into annular grooves 73 in the periphery of said plates, limit the independent movement and prevent accidental displacement of the said baffle plates. Thus it will be seen that in this form the baffle plate carrier is free to move relative to the knife holder 66 for the purpose of bringing the baffle plates 69 into position to close the mold cavities. If necessary in order to completely close the lower ends of the mold cavities, the baffle plates 69 themselves may move to various angles relative to the baffle plate carrier as indicated above.

Modifications may be resorted to within the spirit and scope of the appended claims.

What I claim is:

1. In combination, a blank mold having a downwardly opening cavity therein adapted to receive mold charges, charge severing mechanism including a horizontally disposed knife holder, a knife mounted on one margin of the holder and inclined to the plane of the holder with its cutting edge disposed in a plane above the holder, means for swinging the holder and knife horizontally and thereby moving the knife across the lower end of the mold and bringing the holder beneath the mold, and means for then causing a relative movement between the mold and holder to close said mold cavity.

2. In combination, a blank mold having a downwardly opening cavity adapted to receive mold charges, charge severing mechanism comprising a knife, a holder on which the knife is mounted, the holder being disposed in a plane below the cutting edge of the knife, a baffle plate carried by the holder, means for moving the holder transversely of the mold and thereby moving the knife across the lower end of the mold and carrying the baffle plate to a position beneath the mold, and means for then causing relative vertical

movement between the mold and said holder by which the mold and baffle plate are brought into contact with each other.

3. In combination, a blank mold having a downwardly opening cavity adapted to receive mold charges, charge severing mechanism comprising a knife, a holder on which the knife is mounted, the holder being disposed in a plane below the cutting edge of the knife, a baffle plate mounted upon and for a multi-directional movement relative to the holder, means for swinging the holder and with it the baffle plate and knife and thereby moving the knife across the lower end of the mold and positioning the baffle plate beneath the mold, and means for then effecting relative vertical movement between the baffle plate and mold and thereby closing the mold cavity.

4. In combination, a blank mold having a downwardly opening cavity adapted to receive mold charges, charge severing mechanism including a rock shaft arranged alongside the mold, a knife holder attached to one end of the rock shaft, a knife carried by said holder and having its cutting edge disposed in a plane other than that of the holder, means for rocking the shaft to thereby swing the knife across the lower end of the mold, and means for then imparting lengthwise movement to the shaft for bringing said holder into position to close the mold cavity.

5. In combination, a blank mold having a downwardly opening cavity adapted to receive mold charges, charge severing mechanism including a rock shaft arranged alongside the mold, a knife holder attached to one end of the rock shaft, a knife carried by said holder and having its cutting edge disposed in a plane other than that of the holder, means for rocking the shaft to thereby swing the knife across the lower end of the mold, means for then imparting lengthwise movement to the shaft for bringing said holder into position to close the mold cavity, and a baffle plate separate from and carried by the knife holder for contact with the lower end of the mold.

6. In combination, a blank mold having a downwardly opening cavity adapted to receive mold charges, charge severing mechanism including a knife, a knife holder, a baffle plate mounted upon and for multi-directional movement relative to said holder, means for moving the knife holder, knife and baffle plate as a unit and thereby imparting charge severing movement to the knife and positioning the baffle plate beneath the mold, and means including a pair of levers and a yielding connector therebetween for moving the knife holder and baffle plate upward and thereby bringing the baffle plate into operative engagement with the blank mold.

7. In combination, a suction type blank mold having a downwardly opening cavity, charge severing mechanism including a rock shaft disposed alongside of said mold, a knife and holder therefor attached to the lower end of said shaft, means for rocking the shaft to move the knife and holder across the lower end of the mold, means including a spring device tending to move the holder vertically upward into engagement with the mold, and automatic means for holding the shaft against vertical movement during swinging of the knife and holder and releasing the shaft to the lifting influence of the spring device upon completion of said swinging movement.

8. In combination, a suction blank mold having a downwardly opening cavity, charge severing means including a vertical rock shaft arranged alongside of the mold, a knife and holder therefor attached to the lower end of the shaft, said knife having its cutting edge disposed in a plane above the holder, means for rocking the shaft to move the knife across the lower end of the mold and bring the holder to a position spaced below the latter, means including a spring device for imparting vertical movement to the shaft and holder to bring the latter into contact with the mold, said last named means operating to tension the spring device to apply a lifting force to the rock shaft prior to completion of the swinging movement of the knife and holder, and means for holding the shaft against movement under influence of the spring device during swinging of the knife and releasing the shaft for vertical movement by said spring after completion of the knife swinging operation.

9. In combination, a suction blank mold having a downwardly opening cavity, charge severing means including a vertical rock shaft arranged alongside of the mold, a knife and holder therefor attached to the lower end of the shaft, said knife having its cutting edge disposed in a plane above the holder, rack and gear mechanism including a gear splined to the shaft for rocking the latter and thereby swinging the knife across the lower end of the mold and bringing the holder to a position spaced directly below the latter, means for holding the shaft against upward movement during swinging of the knife across the lower end of the mold and releasing the shaft for upward movement upon completion of said swinging of the knife, and means including a spring device for moving the shaft vertically upward upon completion of the knife swinging movement.

10. In combination, a suction blank mold having a downwardly opening cavity, charge severing means including a vertical rock shaft arranged alongside of the mold, a knife and holder therefor attached to the lower end of the shaft, said knife having its cutting edge disposed in a plane above the holder, rack and gear mechanism including a gear splined to the shaft for rocking the latter and thereby swinging the knife across the

lower end of the mold and bringing the holder to a position spaced directly below the latter, means for holding the shaft against upward movement during swinging of the knife across the lower end of the mold and releasing the shaft for upward movement upon completion of said swinging of the knife, said means including a pair of plates arranged for relative movement about the axis of the rock shaft, means whereby rocking of the shaft causes said relative movement of the plates, tongues and grooves formed on the plates and arranged to hold the shaft against upward movement during swinging of the knife across the lower end of the mold and release the shaft for upward movement after the knife has completed its swinging movement, and mechanism including a spring device for causing said upward movement of the shaft.

11. In combination, a suction blank mold having a downwardly opening cavity, charge severing means including a vertical rock shaft arranged alongside of the mold, a knife and holder therefor attached to the lower end of the shaft, said knife having its cutting edge disposed in a plane above the holder, rack and gear mechanism including a gear splined to the shaft for rocking the latter and thereby swinging the knife across the lower end of the mold and bringing the holder to a position spaced directly below the latter, means for holding the shaft against upward movement during swinging of the knife across the lower end of the mold and releasing the shaft for upward movement upon completion of said swinging of the knife, said means including a pair of plates arranged for relative movement about the axis of the rock shaft, means whereby rocking of the shaft causes said relative movement of the plates, tongues and grooves formed on the plates and arranged to hold the shaft against upward movement during swinging of the knife across the lower end of the mold and release the shaft for upward movement after the knife has completed its swinging movement, and mechanism including a lever and a spring connector between said lever and shaft for causing upward movement of the shaft.

12. In combination, a suction blank mold having a downwardly opening cavity, charge severing means including a vertical rock shaft arranged alongside of the mold, a knife and holder therefor attached to the lower end of the shaft, said knife having its cutting edge disposed in a plane above the holder, rack and gear mechanism including a gear splined to the shaft for rocking the latter and thereby swinging the knife across the lower end of the mold and bringing the holder to a position spaced directly below the latter, means for holding the shaft against upward movement during swinging of the knife across the lower end of the mold and releasing the shaft for upward movement upon completion of said swinging of the knife, said means including a pair of plates arranged for relative movement about the axis of the rock shaft, means whereby rocking of the shaft causes said relative movement of the plates, tongues and grooves formed on the plates and arranged to hold the shaft against upward movement during swinging of the knife across the lower end of the mold and release the shaft for upward movement after the knife has completed its swinging movement, mechanism including a lever and a spring connector between said lever and shaft for causing upward movement of the shaft, and means for varying the effectiveness of the spring connector.

13. Charge severing mechanism comprising a knife holder, a knife attached to one margin thereof, a baffle plate carried by the holder and mounted for multi-directional movement relative to the holder, means for moving the knife holder, baffle plate and knife as a unit in a direction substantially in the plane of the baffle plate, and means for moving said unit in a direction perpendicular to said plane.

14. Charge severing mechanism comprising a knife holder, a knife attached to one margin thereof, said holder having a vertical opening therein, and a baffle plate arranged within said opening and mounted for multi-directional movement about a point located centrally of the plate.

15. Charge severing mechanism comprising a knife holder, a knife attached to one margin thereof, said holder having a vertical opening therein, a baffle plate arranged within said opening and mounted for multi-directional movement about a point located centrally of the plate, and means for securing the plate against accidental removal from the holder.

16. Charge severing mechanism comprising a knife holder having a vertical opening therein, a knife disposed along one edge of the holder, a baffle plate carrier movably arranged in said opening, and a baffle plate carried by and mounted for multi-directional movement relative to the carrier.

17. Charge severing mechanism comprising a knife holder having a vertical opening therein, a knife disposed along one edge of the holder, a baffle plate carrier movably arranged in said opening, said carrier having a recess in its upper side, said recess formed with a convex bottom wall, and a baffle plate loosely positioned in the recess and having a flat lower side contacting with the convex bottom wall.

18. Charge severing mechanism comprising a knife holder having a vertical opening therein, a knife disposed along one edge of the holder, a baffle plate carrier movably ar-

ranged in said opening, said carrier having a recess in its upper side, said recess formed with a convex bottom wall, a baffle plate loosely positioned in the recess and having a flat lower side contacting with the convex bottom wall, and means for holding the plate against accidental removal from the carrier.

Signed at Alton, Illinois, this 6th day of April, 1931.

RUSSELL G. ALLEN.