May 2, 1961 J. A. KIDDER 2,982,246

FISH EGG INCUBATOR TRAY CARTRIDGE LATCHING SYSTEM

Filed March 11, 1960 2 Sheets-Sheet 1

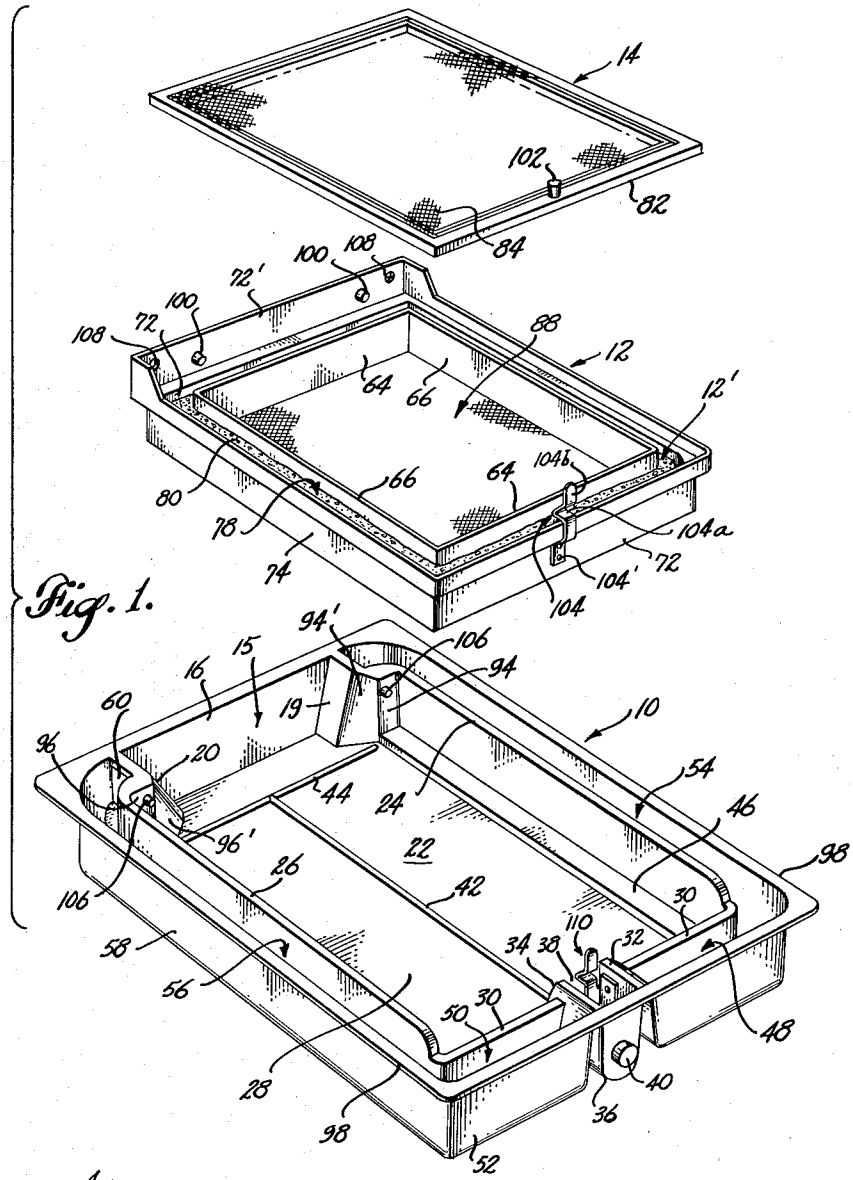


Fig. 1.

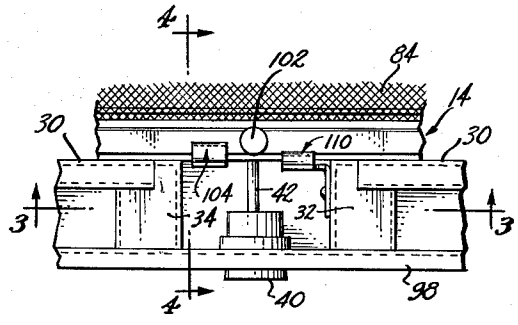


Fig. 2.

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Fig. 4.

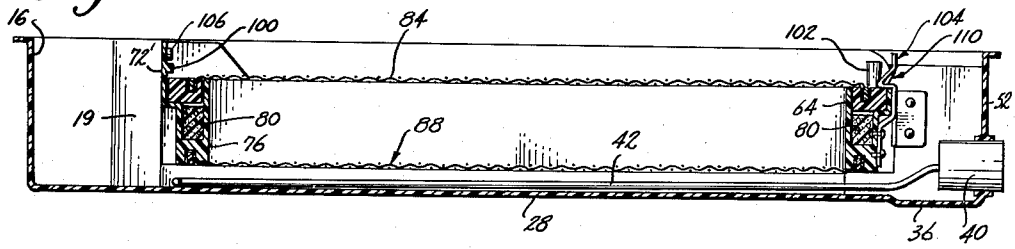


Fig. 5.

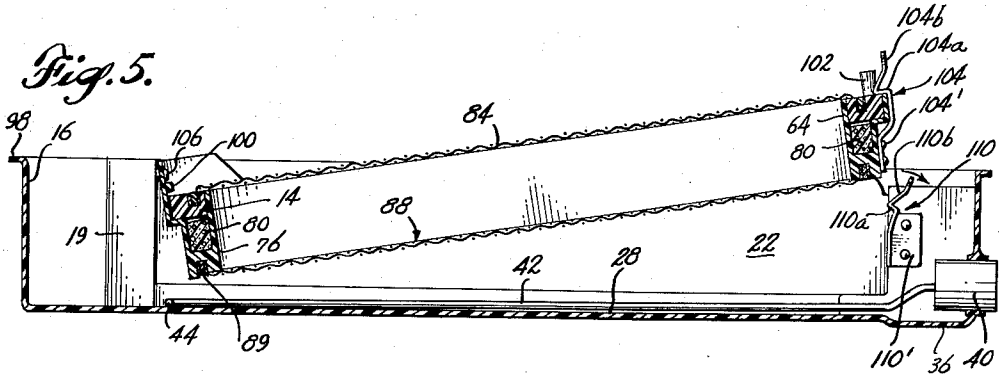
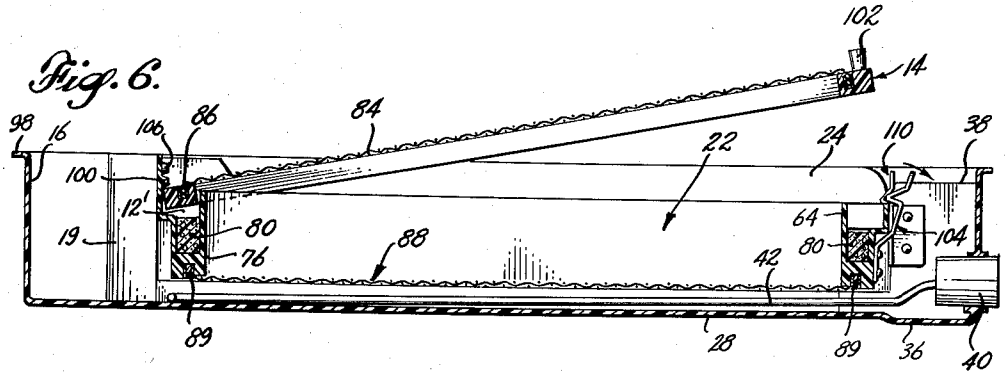


Fig. 6.



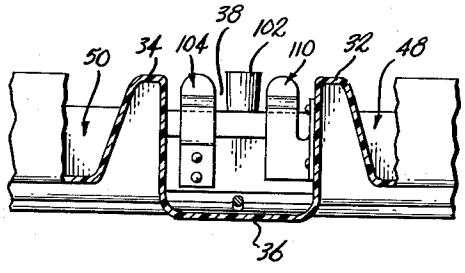


Fig. 3.

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FISH EGG INCUBATOR TRAY CARTRIDGE LATCHING SYSTEM

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8 Claims. (Cl. 119—3)

This invention relates to improvements in fish egg incubator devices of the tray type which include a removable egg holder cartridge. While the invention is herein illustratively described by reference to the presently preferred form thereof, it will be recognized that certain modifications and changes therein with respect to details may be made without departing from the essential features involved.

Certain features of construction and operation of the illustrative incubator of the present case are disclosed and claimed in the companion application Serial No. 14,259, filed March 11, 1960, of Clarence F. Brittain and Marvin E. Jones, entitled Fish Egg Incubator.

The existing technique of incubating in holder trays stacked one above another has proved to be a convenient and successful technique which is particularly appealing because of the minimal floor space required and the versatility of arrangement which it makes possible in a hatchery building. Fresh water continuously supplied to the top tray in the stack cascades successively down through the trays in a continuous flow which keeps the batches of eggs immersed in water which is intended to circulate uniformly through them. The invention disclosed in said co-pending application was in part directed to an improved water-channeling holder tray construction capable of safely holding more eggs and fry than previous trays of equivalent size or bulk and of eliminating the substantial losses encountered in previous trays. Moreover, with the improved water channelling system water spillage was avoided despite flow rate variations and despite removal of intermediately situated trays in a stack or column. A readily removable buoyant egg holder cartridge normally retained in a holding chamber in the tray was also an important feature of the improvements disclosed in said application.

An object of the present invention is to provide an improved and inexpensive means for securely latching the holder cartridge to the tray, and a similar improved means for latching the holder cartridge cover to the cartridge.

Simplicity of construction, ease of operation, and a durable, reliable latching means for the holder cartridge and its cover comprise additional objects.

A related object is such a latching arrangement which will be particularly suited for use in an incubator structure of molded fiber-reinforced plastic construction.

Still another object is an arrangement wherein the latching elements are situated in a conveniently accessible location, yet where they will not interfere with nor become accidentally disengaged during normal handling of the tray.

Convenient removability of the cartridge cover without moving the cartridge and convenient removability of the entire cartridge without disturbing the secured position of the cover thereon constitute additional specific objectives.

In accordance with this invention one or more abutments on one end of the tray structure project into the holding chamber and cooperate with complemental abutments on the adjacent end of the holder cartridge lodged in said chamber, thereby to prevent direct lifting of such end of the cartridge from the holding chamber. Such abutments are interengageable and disengageable by endwise approach and withdrawal movement of the holder cartridge in relation to said one end of the tray structure. A resiliently deflectable first latch element mounted on the opposite end of the tray structure normally overlaps and latchingly engages the holder cartridge at its opposite end to secure the same in the holding chamber. Manual deflection of the first latch element permits direct lifting of the adjacent end of the cartridge clear of the holding chamber walls, and thereupon permits endwise withdrawal of the opposite end of the holder cartridge from the opposite end of the tray structure in order to effect disengagement of said abutments for completion of the unlatching operation.

Similar complemental abutments are carried respectively by a holder cartridge body member and cover frame member at one end, and are normally interengaged to prevent direct lifting of the cover at that end. At the opposite end of such cartridge a resiliently deflectable second latch element carried by one of the latter members normally engages the other member to fasten such members together. In order to remove the cover, the second latch element is manually deflected, and that end of the cover raised from its seated position, whereupon endwise withdrawal of the cover, with the upraised end leading, disengages the abutments. A reverse procedure is followed to reapply and latch the cover in place.

These latching and unlatching operations and related cartridge and cover relative movements are quickly and easily effected and in each case require but one moving part for each latch means.

These and other features, objects and advantages of the invention will become more fully evident from the following description thereof by reference to the accompanying drawings.

Figure 1 is an exploded isometric view showing the incubator with the holder cartridge removed from the tray and with the holder cartridge cover removed from the holder cartridge.

Figure 2 is a fragmentary top view of the front end of the incubator.

Figure 3 is a sectional view taken on line 3—3 in Figure 2.

Figure 4 is a longitudinal sectional view of the assembled incubator taken on line 4—4 in Figure 2.

Figure 5 is a view similar to Figure 4 with the holder cartridge being removed from the tray.

Figure 6 is a view similar to Figure 4 with only the holder cartridge cover being removed.

Referring to the drawings, the incubator generally comprises the tray 10 and the associated holder cartridge 12 having a removable cover 14. Preferably the tray components are largely of molded glass fiber and plastic construction.

The tray 10 is preferably of rectangular proportions somewhat longer than wide, and of a relatively shallow depth in relation to its length and width dimensions. At one end, which may be considered its rear end, the tray has a water reception pocket or well 15 which extends across the major width of the tray and for a small fraction of its length. One side of this well is formed by the tray's end wall 16 whereas the transversely spaced opposite ends of the well are formed by short inwardly sloping walls 19 and 20 which lie transverse to the wall 16, hence extend longitudinally of the tray. The side of the well opposite the end wall 16 opens into the general interior space or holder compartment 22, opposite sides of which are formed by the barrier walls 24 and 26 and

the bottom of which is formed by the tray bottom 28. The end of the holder compartment 22 opposite the reception well 15 is formed by a weir wall 30 of a lesser height than the barrier side walls 24 and 26, and is of a substantially uniform height along its full length. This weir wall 30 is interrupted intermediate the sides of the tray and is connected to the adjacent end wall of the tray by transversely spaced dividers 32 and 34 which extend downwardly to or preferably below the level of the tray bottom and are joined by a depressed extension 36 of the tray bottom in order to form a clean-out pocket 38 which opens into the holding chamber 22 and has an apertured end wall designed to receive a drain plug 40. This drain plug carries a longitudinally extending rod 42, across the projecting end of which is secured a scraper 44. By drawing this scraper from its initial position adjacent the well 15 toward the drain plug end of the tray, accumulated sediment is drawn to the clean-out pocket, from which it is discharged through the drain plug opening.

At opposite sides of the holder compartment 22, supporting ledges 46 extend along the intersections of the tray bottom 28 and barrier side walls 24 and 26, respectively. These ledges extend the length of the compartment 22 and serve as elevating supports for opposite sides of the holder cartridge 12. A water distribution space is thus formed between the bottom of the holder cartridge 12 and the tray bottom 28. Water enters this space from the reception pocket 15 and wells up through the holder cartridge in a uniform manner over substantially the entire area of the latter.

Water discharging over the end weir 30 is collected in the transverse channel spaces 48 and 50 which are formed between the tray's end wall 52 and the respectively adjacent portions or sections of weir wall 30 set off by the dividers 32 and 34. Such water is then conducted back toward the rear end of the tray through side channels 54 and 56 defined between the outer side walls 58 of the tray and the outer sides of the respectively adjacent barrier walls 24 and 26. At the rear end of the tray the channels 58 turn approximately at right angles inwardly toward each other and terminate in transversely directed spill openings 60 located between the water reception chamber end walls 19 and 20 and the respectively adjacent sides of the tray.

The relative dimensions of the interior of the tray (i.e., the holder compartment 22) and the exterior of the holder cartridge 12 are such that the sides of the latter seat on the supporting elevated ledges 46, with the ends of the holder cartridge lodged between the weir 30 and the short transversely extending sections of end wall 94 and 96 which interconnect the respectively opposite barrier walls 24 and 26 and the reception pocket end walls 19 and 20. Between the wall portions 19 and 94 there is disposed an angled wall section 94', there being a similar wall section 96' at the opposite side of the tray.

The holder cartridge 12 comprises a box-like rectangular structure having a set of inner walls comprising the end walls 64 and the connecting side walls 66, and further having a set of outer walls comprising end walls 72 and opposite side walls 74. The inner and outer walls are interconnected in spaced-apart relationship by a bottom web 76 extending continuously therearound to form an upwardly open channel 78 in the base portion of which preferably is lodged a light-weight cellular packing 80, such as unicellular foamed plastic material, cork, or other buoyancy means to form a flotation cell, and the upper portion of which serves as a reception slot to accommodate the frame 82 of the cover 14. Stretched across the frame 82 is a cover screen 84 which is frictionally held in a slot formed in the top of the frame by means of wedging ring strip 86 extending continuously around the screen. The holder catridge bottom is preferably also in the form of a screen 88 likewise frictionally held in a slot in the bottom of the web 76 by means of a wedging ring strip 89. Thus the holder cartridge has both perforate top and bottom permitting free ingress and egress of water over all areas of the cartridge so that eggs and fry held within the cartridge may be subjected to uniform passage of fresh water at all times.

Across the end of the holder cartridge 12 which is stationed adjacent the receiving pocket 15, the outer end wall 72 is made higher, as indicated at 72', than the opposite end walls and the side walls. Preferably the end wall 72' is made substantially as high as the barrier side walls 24 and 26 so as to insure retention of water within the holder compartment 22, hence, in the space occupied by the holder cartridge, except for the discharge which is permitted to occur across the end weir 30. In consequence, water entering the space between the tray bottom 28 and the perforate bottom of the holder cartridge 12 wells up in a more or less uniform pattern of flow throughout the entire area of the cartridge and thereby circulates past all of the contents therein.

Around the entire periphery of the tray at the top thereof is a reinforcing flange 98 which also serves as a convenient supporting ledge and a readily graspable lip for convenience in handling and carrying the trays. The flange at opposite sides of the tray serves as a ledge by which a column of trays may be supported out of contact with each other, resting slidably on external supports (not shown).

In accordance with features of the present invention, a novel latching arrangement is provided by which the holder cartridge cover 14 is secured removably to the holder cartridge 12 and likewise the holder cartridge as a whole is secured removably to the tray proper.

One or more abutments preferably in the form of inwardly projecting knobs 100 on the cartridge end wall 72' are engageable with complemental abutment means on the end of the tray cover 14, in this instance the top side of the frame, in order to hold down that end of the cover against direct lifting from the cartridge slot 12'. However, such interengagement permits endwise withdrawal of the cover 14, when its opposite end is first lifted by handle 102 from out of the cartridge slot 12', as in Figure 6. A spring latch 104 mounted at 104' on the latter end of the cartridge and has an abutment portion 104*a* projecting inwardly over the top of the cartridge to hold down the adjacent end of the cover 14 with the latter seated in slot 12'. The latch has a finger tab 104*b* which projects upwardly and outwardly from the projecting inner end of abutment portion 104*a* and serves two functions. Its slope causes it to be deflected outwardly (i.e., endwise of the cartridge) by wedging action of the cover as the latter descends into slot 12'. It then snaps into latched position holding the cover in place when the cover reaches its seated position. Such finger tab 104*b* also serves as a convenient handle for springing the latch back or open manually in order to release the cover for removal. Latch 104 is mounted at a transverse location on the end of cartridge 12 which positions such latch in one end of clean-out well 38 wherein it will be out of the way yet conveniently accessible.

Substantially similar abutment knobs 106 are preferably mounted on the tray's end wall portions 94 and 96, projecting endwise of the tray and into holder compartment 22. Complementally formed and located holes 108 in the cartridge's end wall fit the abutments 106 in order to hold that end of the cartridge against being lifted directly from its seated position in the chamber 22, yet permitting its endwise withdrawal therefrom once its opposite end has been raised, as in Figure 5. Such opposite end is normally latched and held in its seated position, however, by the manually operable spring latch 110 which is generally similar in purpose and function to latch 104. Latch 110 is mounted at 110' on the end wall of clean-out well 38 opposite the location of latch 104. Latch 110 also has an abutment portion 110*a* and tab portion 110*b*. The abutment 110*a* normally engages the

cartridge top and holds it down in holder chamber 22 (Figure 4). The tab is automatically deflected back by wedging action in order to permit seating of the cartridge in the holder. It may be deflected back by finger pressure in order to permit lifting the cartridge from the tray (Figure 5). This action in no way disturbs the latched position of the cover.

It will be evident that both latches 104 and 110 and their associated oppositely located sets of abutments are situated where they will not interfere with nor be accidentally actuated by normal handling of the incubator as a complete assembly, or of the covered cartridge removed from the tray. With the cover 14 secured to the holder cartridge 12 and with the latter removed from the tray, the buoyancy of the holder cartridge permits it to be floated in a rearing pond or other body of water. The relative buoyancy imparted to the tray by reason of the flotation means therein incorporated is preferably such that the tray floats with its major portion submerged, so that the entire contents of the holder cartridge will be immersed.

These and other aspects of the invention will be evident to those skilled in the art based on the foregoing disclosure of the preferred embodiment of the invention.

I claim as my invention:

1. In a fish egg incubator comprising a tray structure having a bottom and inwardly spaced opposite side walls and end walls defining a holding chamber, means for introducing water into said holding chamber and for collecting and conducting water discharged therefrom, and an egg holder cartridge removably mounted in said holding chamber, confined laterally between said opposite side and end walls, for circulation of water through said cartridge, said cartridge comprising a surrounding wall structure, a perforate bottom portion, and a separate cover; means for latching said cartridge in the tray comprising abutment means on one end wall of the holding chamber positioned to overlie a portion of the adjacent end of the cartridge and thereby hold such cartridge end against direct lifting from the holding chamber, while permitting endwise withdrawal of the cartridge therefrom with the cartridge tilted upwardly, and a resiliently deflectable latch member mounted on the tray structure at the opposite end of the holding chamber and having an abutment portion normally overlapping a portion of the adjacent end of the cartridge to hold such latter end against direct lifting from the holding chamber, said latch member being manually deflectable from the cartridge to release the same for lifting into said tilted position in order to permit withdrawal thereof from said holding chamber.

2. The combination defined in claim 1, wherein the latch member comprises an outwardly inclined finger tab portion joined to the abutment portion, adapted to be engaged wedgingly by downward movement of the adjacent end of the cartridge in order to spring the latch member aside and permit seating of the cartridge in the holding chamber, whereupon the latch member returns resiliently into its normal position, said finger tab being adapted for manual engagement in order to deflect the latch member away from the cartridge for releasing the cartridge.

3. In a fish egg incubator comprising a tray structure having a bottom and inwardly spaced opposite side walls and end walls defining a holding chamber, means for introducing water into said holding chamber and for collecting and conducting water discharged therefrom, and an egg holder cartridge removably mounted in said holding chamber, confined laterally between said opposite side and end walls, for circulation of water through said cartridge, said cartridge comprising a surrounding wall structure having a cover-receiving recess therein extending around its periphery at the top thereof, a perforate bottom portion, and a separate cover detachably received in said recess; means for latching said cartridge in the tray comprising abutment means on one end wall of the holding chamber positioned to overlie a portion of the adjacent end of the cartridge and thereby hold such cartridge end against direct lifting from the holding chamber, while permitting endwise withdrawal of the cartridge therefrom with the cartridge tilted upwardly, and a resiliently deflectable latch member mounted on the tray structure at the opposite end of the holding chamber and having an abutment portion normally overlapping a portion of the adjacent end of the cartridge to hold such latter end against direct lifting from the holding chamber, said latch member being manually deflectable from the cartridge to release the same for lifting into said tilted position in order to permit withdrawal thereof from said holding chamber; and means for latching said cover on said cartridge comprising abutment means on one end of the cartridge wall structure, positioned to overlie a portion of the adjacent end of the cover and thereby hold such cover end against direct lifting thereof from said recess while permitting endwise withdrawal therefrom with the cover tilted upwardly, and a resiliently deflectable latch member mounted on the cartridge wall structure at the opposite end thereof and having an abutment element normally overlapping a portion of the adjacent end of the cover in order to hold such latter end against direct lifting from the recess, said latter latch member being manually deflectable from the cover to release the latter for lifting into said tilted position in order to permit removal thereof from the cartridge.

4. The combination defined in claim 3, wherein the latter latch member has a finger tab portion inclined outwardly and adapted to be wedgingly engaged and deflected away from the cover in order to permit seating of the latter by downward movement into the cartridge recess, whereupon the latch member returns resiliently to its normal position, holding the cover in the cartridge recess, said finger tab portion being manually engageable to deflect the latch member away from the cover in order to permit removal thereof from the cartridge.

5. The combination defined in claim 4, wherein the first-mentioned latch member comprises an outwardly inclined finger tab portion adapted to be engaged wedgingly by downward movement of the adjacent end of the cartridge in order to spring the latch member aside and permit seating of the cartridge in the holding chamber, whereupon the latch member returns resiliently into its normal position, said finger tab being adapted for manual engagement in order to deflect the latch member away from the cartridge for releasing the cartridge.

6. The combination defined in claim 5, wherein the holding chamber wall at one end has an interruption therein intermediate the ends of such wall, and wherein the latch members are located within such interruption.

7. The combination defined in claim 5, wherein the end of the cartridge opposite the latch member thereon has an end wall which projects upwardly above the top of the cover, said raised end wall carrying abutments projecting endwise of the cartridge and over the cover.

8. The combination defined in claim 7, wherein said cartridge end wall has apertures therein adapted to receive abutments on the adjacent end wall of the holding chamber, and abutments on such latter end wall adapted to engage said apertures by endwise relative approach movement of the adjacent end of the cartridge in the holding chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

173,262	Brackett	Feb. 8, 1876
680,838	Bourgeous	Aug. 20, 1901
833,418	Ruckl	Oct. 16, 1906
1,007,383	Parry	Oct. 31, 1911
2,611,337	Vibert	Sept. 23, 1952
2,804,045	Scott	Aug. 27, 1957