Sept. 25, 1934. H. J. BOUDREAUX 1,974,766

OYSTER OPENING APPARATUS

Filed Nov. 16, 1932 2 Sheets-Sheet 1

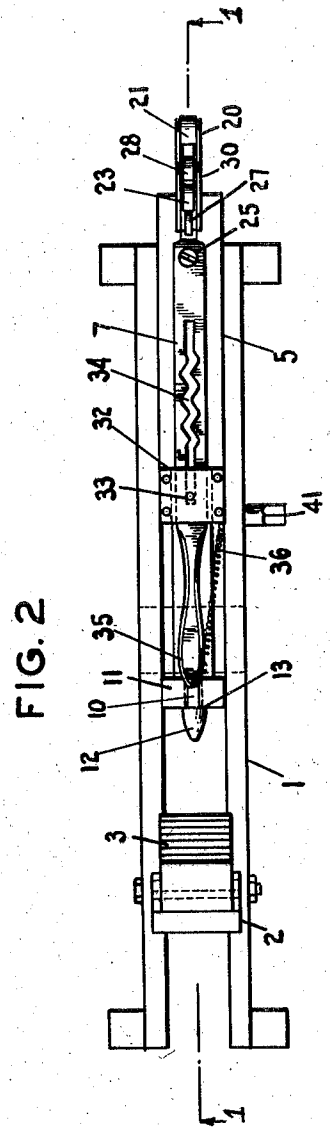


FIG. 2

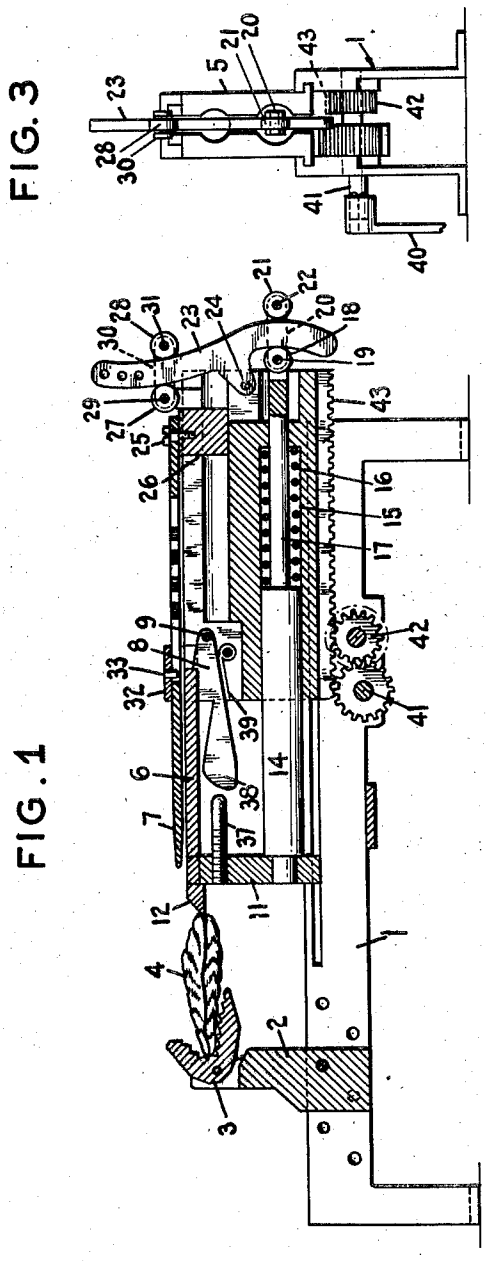


FIG. 1

FIG. 3

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FIG. 4.

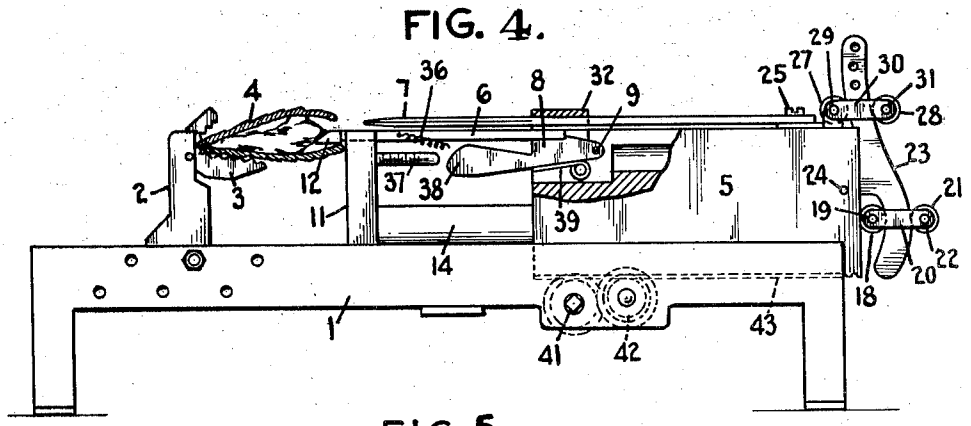


FIG. 5.

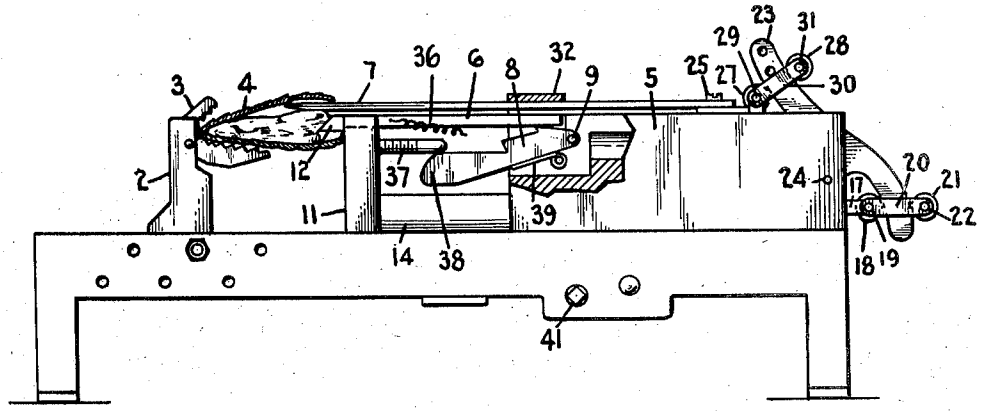
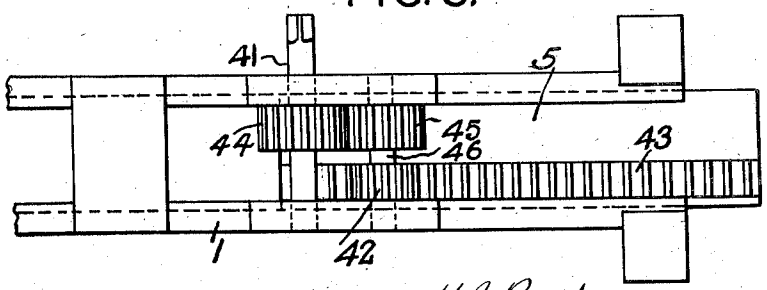


FIG. 6.



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UNITED STATES PATENT OFFICE

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OYSTER OPENING APPARATUS

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14 Claims. (Cl. 17—9)

This invention relates to machines for opening bivalvular shell-fish, such as oysters, clams, etc.

The main object of the invention is to provide an improved apparatus of the character indicated which shall have an improved efficiency and convenience in operation and which shall accurately and perfectly perform its work.

The mechanism comprises a frame or support upon which an abutment for receiving one end of the shell-fish and a carrier for the knives operating upon the other end of the shell-fish, are mounted, the abutment and knife carrier being relatively movable toward and away from each other longitudinally of the mechanism. The knives carried by the knife carrier include an "opening" knife which operates to separate or open the shells of the bivalve, and a "cutting" knife which, after the shells have been separated or opened, enters within the shells and severs the ligament by which the oyster or the like is secured to the shell.

As ancillary to the main object of the invention as stated above, further objects of the invention may be noted as follows:

It is an object of the invention to provide a mechanism of the character described wherein the knife carrier is not fixed but movable toward and away from the abutment rather than the knife carrier being fixed and the opposing abutment for the shell fish movable toward and away from the carrier. This greatly facilitates the operation of the machine because when the operator is facing the mechanism his left hand is opposite the shell-fish being operated upon and the means for moving the carrier and knives toward the opposing abutment is opposite the right hand of the operator. This enables the operator to use his left hand in adjusting and holding the shell-fish being operated upon, while his right hand operates the knife carrier to move it toward the opposing abutment to operate upon the shell-fish. This is the most efficient position for operating the mechanism for probably ninety per cent. or more of users, and enabling the mechanism to be operated in this manner greatly facilitates its efficiency and speed of operation.

It is a further object of the invention to mount not only the "cutting" knife to be movable upon the carrier but also to mount the "opening" knife so that it is movable upon the carrier. Making the "opening" knife movable with relation to the carrier enables it to be retracted after it has performed its "opening" operation so that it does not interfere with the operation of the "cutting" knife. Where the "opening" knife is fixed, it moves forward into the shell during the movement subsequent to the shell opening and during which the "cutting" knife comes into operation. This superfluous movement of the "opening" knife, after the opening of the shells, is liable to disarrange the shell and oyster with relation to the "cutting" knife so that the operation of the "cutting" knife is interfered with, if not prevented from performing its desired operation.

It is a further object of the invention to provide means for holding the "opening" knife in extended position with relation to the knife carrier by releasable means and then releasing and retracting the "opening" knife after it has performed its work of opening the shells.

It is a further object of the invention to provide means for laterally reciprocating the "cutting" knife whereby the efficiency and perfection of the severing of the ligament holding the oyster or the like to the shell, is greatly enhanced.

A further object of the invention is to provide a shell-fish abutment, towards and away from which the knife carrier is moved, which shall be readily adjustable to properly present the shell-fish to the operating knives.

Other and ancillary objects of the invention will appear hereinafter.

In the accompanying drawings which illustrate the invention:

Fig. 1 is a central longitudinal section on the line 1—1 of Fig. 2 of an aparatus embodying the invention, the apparatus being shown in the stage of operation where the opening of the shells of a bivalve is just beginning;

Fig. 2 is a top plan view of the apparatus of Fig. 1 (the shell-fish being omitted);

Fig. 3 is an end elevation, viewed from the right hand end of Figs. 1 and 2, of the apparatus of Figs. 1 and 2;

Fig. 4 is a side elevation, partly broken away and partly in section, of the apparatus of Figs. 1 to 3 but showing the machine at a different stage of operation, namely where the opening of the bivalve has been substantially accomplished by the "opening" knife, the "cutting" knife having not yet come into operation;

Fig. 5 is a side elevation of the same machine but with the parts in the stage of operation where the opening of the shells has been accomplished, the retraction of the "opening" knife effected and the "cutting" knife moved forward to sever the ligament connecting the oyster or the like to its shell; and

Fig. 6 is an enlarged bottom plan view of the apparatus of Fig. 1, broken away, showing the gearing for driving the carrier.

Referring to the drawings, the apparatus comprises a frame 1. Fixed upon the frame 1 is the abutment block 2 upon which is pivoted the abutment 3 for receiving one end, preferably the tip end (opposite the ends which are secured or hinged together) or the oyster 4 being operated on.

Sliding upon the frame 1 is a knife carrier 5. Mounted upon the knife carrier is the "opening"

knife 6 which operates first upon the oyster to open the shell, and the "cutting" knife 7 is thrust quickly forward after the shell has been opened, to cut the oyster from the shell. The "opening" knife 6 is slidably mounted in the carrier 5 and is normally held in extended position by a cam latch 8 pivoted at 9 on the carrier and adapted to engage the rear end of the knife 6. The knife 6 has a neck 10 adapted to slide in a slot in the upper end of the supporting block 11 which slides on the frame 1. The end of the knife 6 is an enlarged head 12 which will not pass through the slot in the block 11, having its extremity wedge-shaped for entering in between the shells of an oyster and also the shoulders 13 which abut against the block 11 to prevent the head from passing through the slot in the block 11.

Fixed to the block 11 is a plunger 14 fitting and sliding within a bore 15 in the carrier 5. Within the bore and interposed between the plunger 14 and the carrier 5 is a coil spring 16 tending to force the plunger outwardly. Integral with the plunger 14, but of less diameter, is the extension 17 which is surrounded by the spring 16 and extends to the outside of the carrier 5 at the rear. Outside of the carrier a roller 18 is rotatably mounted in the extension 17 by means of the pin 19, and pivotally mounted on the ends of the pin 19 are links 20 between the outer ends of which is rotatably mounted the roller 21 by means of the pin 22. Embraced between the rollers 18 and 21 is the lower arm of the operating lever 23 for the "cutting" knife, this lever being pivoted to the carrier 5 at 24. It will be seen that by this construction the lever is compelled to take up its position in accordance with the position of the plunger 14 in both directions of movement.

The cutting knife 7 is pivoted at 25 upon the block 26 which is longitudinally slidable in the carrier 5. The block 26 is moved forward and back by means of the upper end of the lever 23, which lever is embraced between the rollers 27 and 28. The roller 27 is rotatably mounted in the block 26 by means of a pin 29, and upon the pin are pivotally mounted the links 30 which, at their outer ends, carry the pin 31 upon which the roller 28 is rotatably mounted. The block 26, and consequently the knife 7, are positively moved backward and forward in accordance with the movement of the arm of the lever 23 in either direction.

It will be observed that the conformation of the lever 23 is such that the knife 7 will be moved forward at a comparatively low speed at the beginning of its forward stroke and will thereafter greatly increase in speed at the latter portion of that stroke. Overlying the knife 7 and secured to the carrier 5 is a plate 32. A pin 33 fixed in the plate 32 extends into a zig-zag slot 34 in the knife. As the knife is driven forward therefore, the cutting edge 35 at the forward end of the knife, will be caused to reciprocate laterally. This lateral reciprocating movement of the knife is of great importance to the proper severing of the oyster from the shell.

A spring 36, weak with relation to the spring 16, tends to force the knife 6 towards the carrier when it is not held in extended position by the block 11 or the latch 8.

Screwed into the block 11 is an adjustable pin 37 adapted when the block 11 is moved sufficiently near the carrier 5, to ride upon the cam portion 38 of the latch 8 and press the same downwardly against the spring 39 which tends to hold the latch raised into engaging, so that the knife 6 is disengaged from the latch and can move inwardly of the carrier 5 under the action of the spring 36.

The carrier 5 may be slid along the frame 1 in either direction by turning a handle 40 having a square socket fitting upon the squared end of a shaft 41 rotatably mounted in the frame 1 and connected by suitable gearing with the gear 42 which is rotatably mounted in the frame 1 and meshes with the rack 43 secured to the bottom of the carrier 5. This gearing connection comprises a gear 44 fixed on the shaft 41 which meshes with the gear 45 fixed on the shaft 46 rotatably mounted in the frame 1, the gear 42 which meshes with the rack 43 being also fixed upon the shaft 46.

The operation of the apparatus may be traced as follows:

The tip end of the shell-fish is placed within the pivoted abutment 3 and the carrier 5 with its knives 6 and 7, is moved toward the shell-fish by suitably turning the handle 40, into the position as shown in Fig. 1 wherein the head 12 of the opening knife is in position to enter between the shells and force them apart or "open" them. The shell-fish is firmly lodged against the abutment 3 and the pivoting of the abutment permits the oyster or other shell-fish to be raised or lowered to bring the division between its shells in proper relation to the entering edge of the opening knife 6, and this without disturbing the lodgement of the shell-fish in the abutment. Also when the knives are moved toward the shell-fish and abutment in the further operation as will be shortly described, the pivoting of the abutment 3 permits the ready automatic adjustment of the shell-fish to the operation without dislodging the engagement of the shell-fish with the abutment, so that the shell-fish is firmly held without slipping.

The machine having been brought to the stage as shown in Fig. 1, a further turning of the handle 40 and corresponding movement of the knife carrier will bring the parts into the position as shown in Fig. 4. In this position the head 12 of the opening knife has entered between and separated the shells, and the lower half of the shell has come in contact with and pressed back the block 11 and plunger 14 against the spring 16.

A further turning of the handle 40 brings the parts into the position as shown in Fig. 5. In passing to this position the carrier 5 is moved toward the shell-fish, during which period of movement the lower half of the shell presses the block 11 and plunger 14 further backwardly against the spring 16. The parts have, in the position of this figure, moved far enough so that the pin 37 has ridden upon the cam portion of the latch 38, forcing the latter downwardly against the spring 39 and removing the latch from engagement with the end of the opening knife 6. The knife having been thus released is retracted toward the carrier 5 by means of the spring 36 until the head 12 of the cutting knife comes against the block 11. Also during the movement into this position as shown in Fig. 5, and the consequent pushing of the plunger 14 to the right, the lower end of the lever arm 23 has been pushed to the right, thereby throwing the upper portion 23 of that arm to the left and thereby throwing the cutting knife 7 quickly forward into the position as shown in Fig. 5 where the ligament securing the oyster to the upper half of the shell has been severed. In this forward movement of the cutting knife it is given a lateral reciprocation by reason of the engagement of the stationary pin 33 in the zigzag slot 34 in the knife. This gives the increased cutting efficiency to the knife which

is characteristic of the reciprocation of a hand-operated knife rather than a straight push in a cutting operation. Also as the cutting knife moves forward, the retraction of the opening knife 12 will prevent it from occupying a position within the shell which might disarrange the oyster or the shell so as to interfere with the operation of the cutting of the ligament or cause it to be done imperfectly or cause the oyster to be mutilated.

The parts having been moved into the position as shown in Fig. 5 and the shell having been opened and the ligament between the oyster and the upper half of the shell having been cut, the handle 40 is turned in a direction to move the knife carrier away from the abutment 3. This will relieve the pressure of the shell upon the block 11 whereby the block 11 and its plunger 14 will be moved by the spring 15 to the left. The block 11 engaging the head 12 of the cutting knife will draw that knife away from the carrier 5 against the tension of the spring 36 (the force of the spring 13 being stronger). At a certain point in the travel the latch 38 will be released from the pin 37 and will be forced upwardly so as to latch behind the rear end of the opening knife 6 as shown in Fig. 4. Also this movement of the plunger 14 will cause the upper end of the lever arm 23 to be moved into the position as shown in Fig. 4 when it will have moved the cutting knife 7 into the retracted position as shown in Fig. 4. Further retractive movement of the handle 40 will move the carrier and knives into the position as shown in Fig. 1, when the shell-fish may be removed (if this has not been already accomplished) and the apparatus is in position for the insertion of a new shell-fish when the operation, as described, may be repeated. This may be carried on indefinitely.

While the invention has been illustrated in what is considered its best application it may have other embodiments without departing from its spirit and is not therefore limited to the structures shown in the drawings.

What I claim is:

1. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, an opening knife mounted on said carrier and movable longitudinally with relation thereto, a cutting knife movably mounted on said carrier and longitudinally movable with relation thereto, means for relatively moving said abutment and carrier to cause them to approach each other, means for moving said cutting knife toward said abutment with relation to said carrier, means for extending said opening knife toward said abutment with relation to said carrier and releasable means for holding such opening knife in extended position with relation to said carrier.

2. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, an opening knife mounted on said carrier and movable longitudinally with relation thereto, a cutting knife movably mounted on said carrier and longitudinally movable with relation thereto, means for relatively moving said abutment and carrier to cause them to approach each other, means for moving said cutting knife toward said abutment with relation to said carrier, means for extending said opening knife toward said abutment with relation to said carrier, releasable means for holding said opening knife in extended position with relation to said carrier and means for retracting said opening knife toward said carrier when said releasable means is released.

3. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other.

4. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other and means for laterally reciprocating said knife.

5. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally and longitudinally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other.

6. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally and longitudinally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other, means for moving said knife longitudinally and means for moving said knife laterally.

7. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally of the movement of said abutment and carrier toward each other, means for relatively moving said abutment and carrier toward each other and means for laterally reciprocating said knife, said means comprising a pin and slot connection between said knife and said carrier including a zig-zag slot.

8. In a bivalvular shell-fish opener, the combination with a support, of a pivoted abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, an opening knife mounted on said carrier and movable longitudinally with relation thereto, a cutting knife movably mounted on said carrier and longitudinally movable with relation thereto, means for relatively moving said abutment and carrier to cause them to approach each other, means for moving said cutting knife toward said abutment with relation to said car-

rier, means for extending said opening knife toward said abutment with relation to said carrier and releasable means for holding said opening knife in extended position with relation to said carrier.

9. In a bivalvular shell-fish opener, the combination with a support, of a pivoted abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other.

10. In a bivalvular shell-fish opener, the combination with a support, of a pivoted abutment for the shell-fish on said support, a knife carrier on said support, said knife carrier and abutment being relatively movable toward and away from each other, a knife mounted on said carrier to move laterally and longitudinally of the movement of said abutment and carrier toward each other and means for relatively moving said abutment and carrier toward each other, means for moving said knife longitudinally and means for moving said knife laterally.

11. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said frame, an opening knife mounted on said carrier and movable longitudinally with relation thereto, a latch tending to hold said knife in extended position with relation to said carrier, a spring tending to retract said knife toward said carrier and means adapted to be acted upon by the shell of the shell-fish when in operating position and the carrier and abutment are relatively moved toward each other, for releasing said latch and permitting said knife to be retracted by said spring.

12. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said abutment and carrier being relatively movable on said support, a member movable with relation to said carrier, spring means tending to force said member away from said carrier and an opening knife slidably mounted in said carrier and adapted to be engaged by said member to move the said knife into extended position with relation to said carrier, said member being adapted to be engaged by the shell of a bivalve in operating position to be forced toward said carrier as said carrier and abutment are relatively moved toward each other.

13. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said abutment and carrier being relatively movable on said support, a member movable with relation to said carrier, spring means tending to force said member away from said carrier, an opening knife slidably mounted in said carrier and adapted to be engaged by said member to move the said knife into extended position with relation to said carrier, said member being adapted to be engaged by the shell of a bivalve in operating position to be forced toward said carrier as said carrier and abutment are relatively moved toward each other, means normally tending to engage said knife to hold it in extended position, means actuated by said member for releasing said holding means from said knife and means for retracting said knife toward said carrier.

14. In a bivalvular shell-fish opener, the combination with a support, of an abutment for the shell-fish on said support, a knife carrier on said support, said abutment and carrier being relatively movable on said support, a member slidable with relation to said carrier, spring means tending to force said member away from said carrier, an opening knife slidably mounted in said carrier and adapted to be engaged by said member to move the said knife into extended position with relation to said carrier, said member being adapted to be engaged by the shell of a bivalve in operating position to be forced toward said carrier as said carrier and abutment are relatively moved toward each other, means normally tending to engage said knife to hold it in extended position, means actuated by said member for releasing said holding means from said knife, means for retracting said knife toward said carrier, a cutting knife movably mounted on said carrier and longitudinally movable with relation thereto, means for relatively moving said abutment and carrier to cause them to approach each other, and means, including said member, for moving said cutting knife toward said abutment with relation to said carrier.

HAMILTON J. BOUDREAUX.