No. 848,608. PATENTED MAR. 26, 1907.

E. L. TORSCH & J. H. PARKER.

PROCESS OF SHUCKING OYSTERS.

APPLICATION FILED JUNE 3, 1905.

4 SHEETS—SHEET 1.

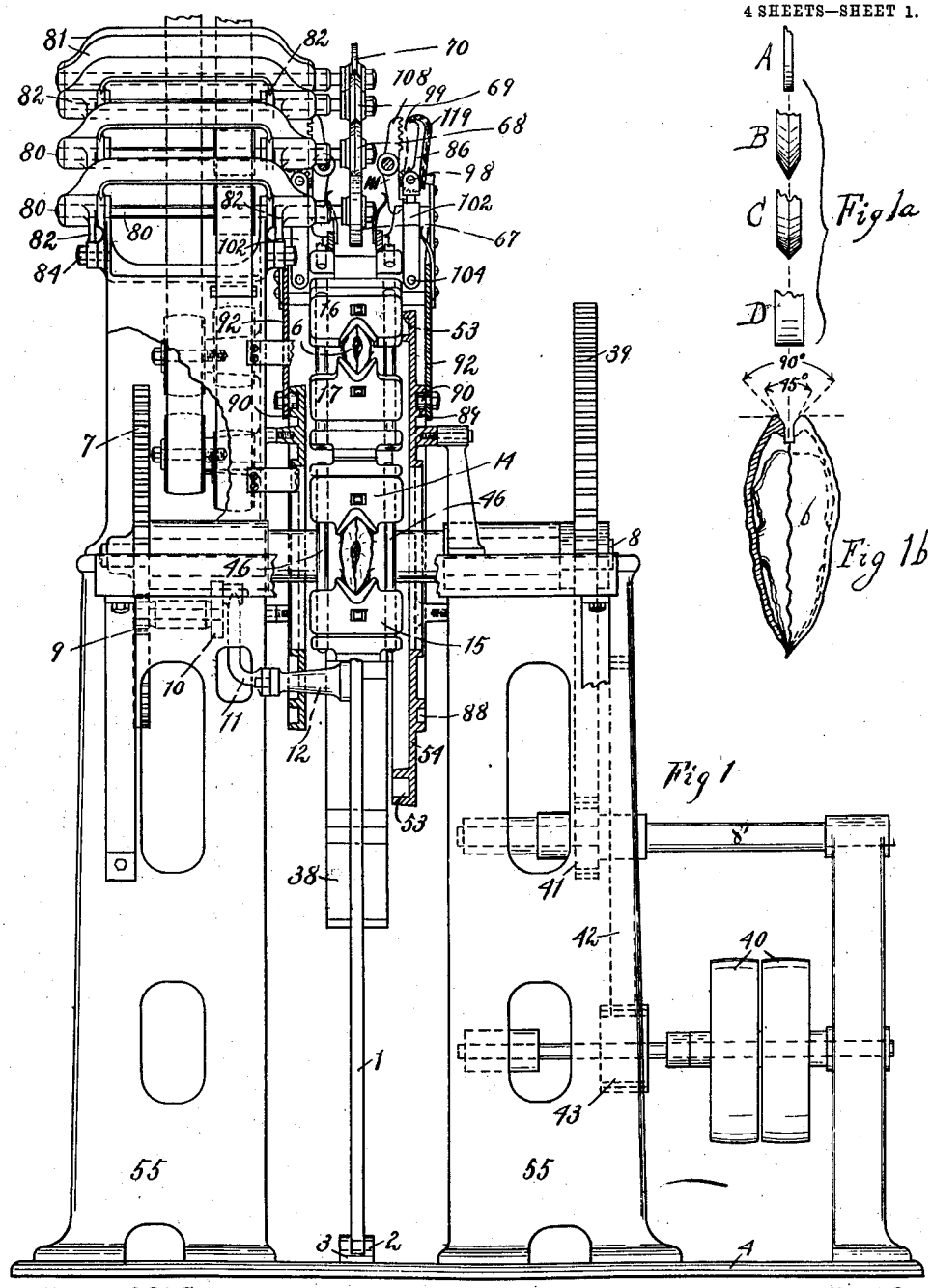

Fig 1

Fig 1a

Fig 1b

WITNESSES

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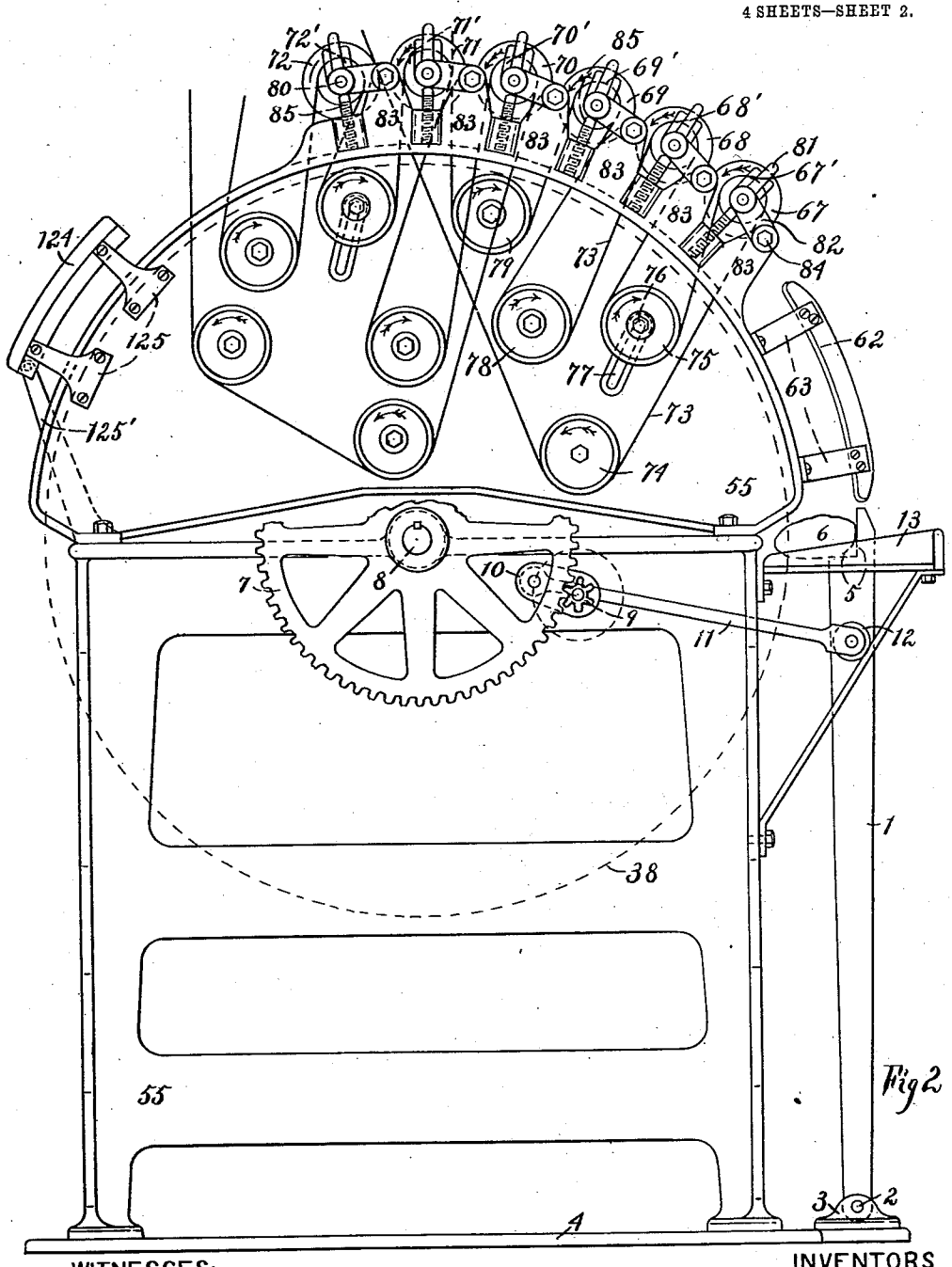

Fig 2.

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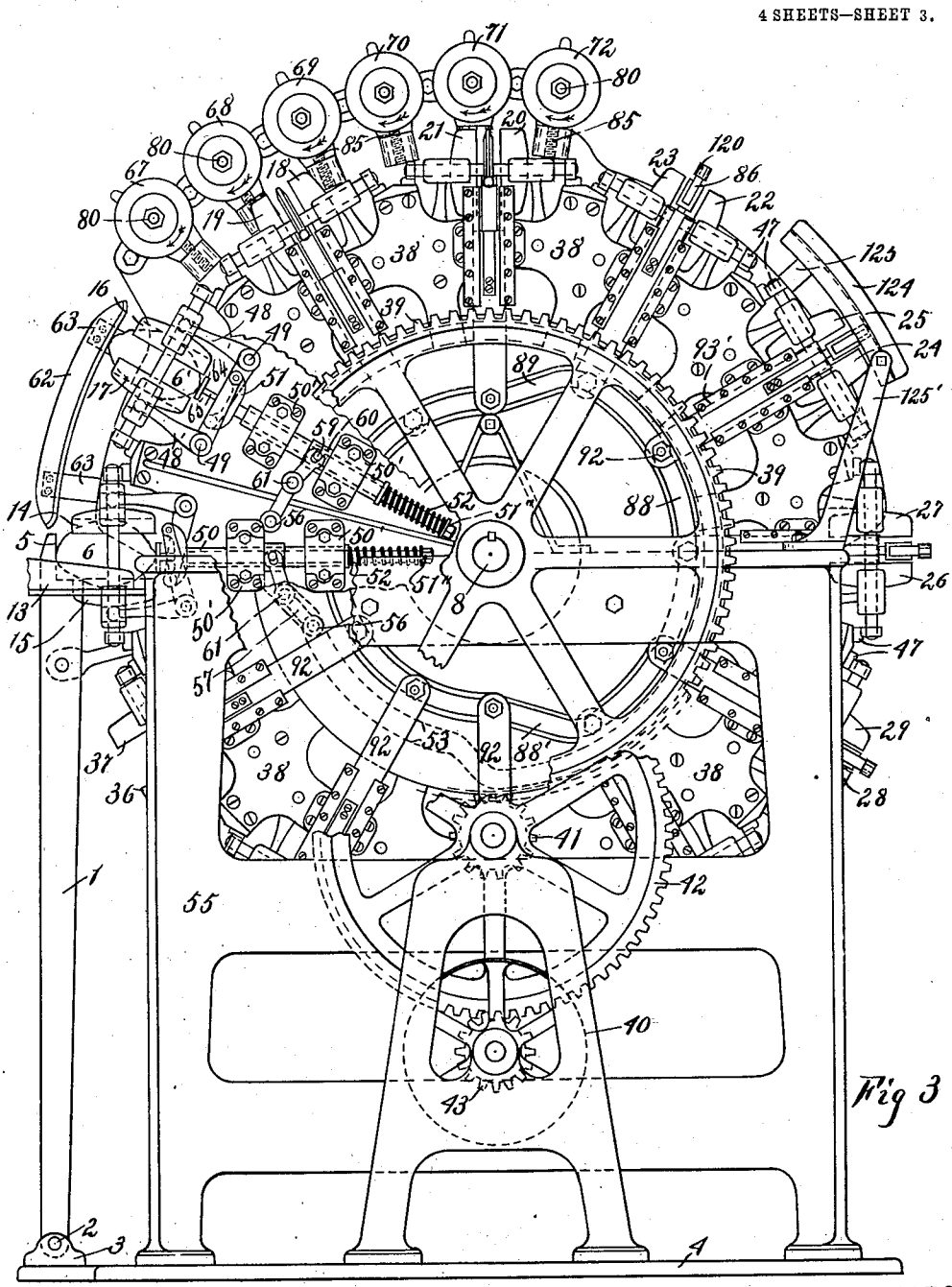

Fig 3

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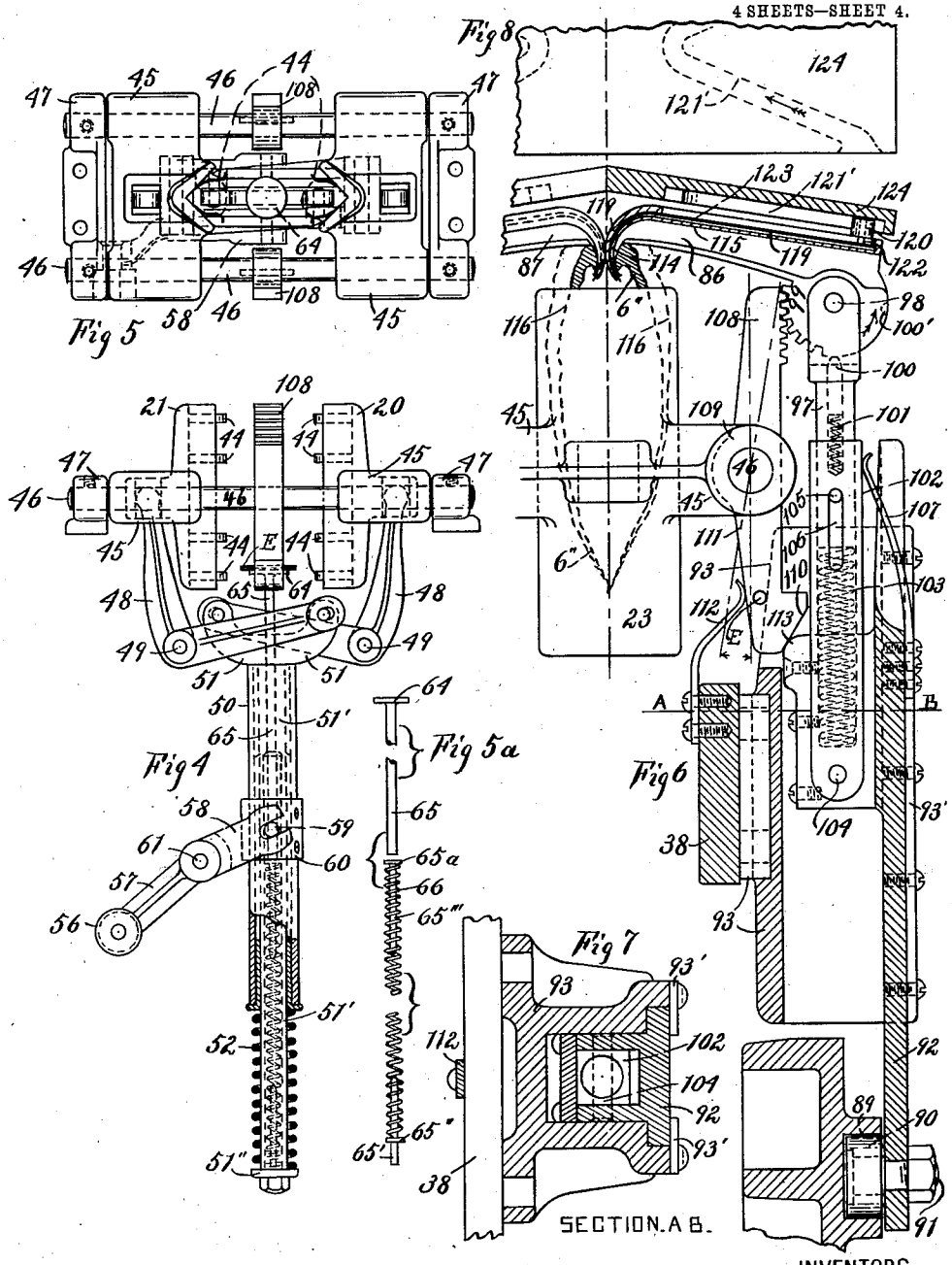

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UNITED STATES PATENT OFFICE.

EDWARD L. TORSCH AND JOHN HENRY PARKER, OF BALTIMORE, MARYLAND.

PROCESS OF SHUCKING OYSTERS.

No. 848,608. Specification of Letters Patent. Patented March 26, 1907.

Application filed June 3, 1905. Serial No. 263,610.

To all whom it may concern:

Be it known that we, EDWARD L. TORSCH and JOHN HENRY PARKER, citizens of the United States of America, and residents of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Processes of Shucking Oysters, of which the following is a specification.

The invention herein described relates to a process of shucking oysters automatically from the point of placing them into a certain position manually to the stage of freeing the meats from the shells, so that the meats are found in one receptacle and the shells in another.

By the present methods of shucking oysters many hundreds of hands have to be employed, and in some cases must be transported great distances from their homes to the shucking-houses at a great expense for travel and maintenance. Accordingly our object, primarily, is the saving of labor. The invention is useful also in the smaller shucking establishments, as the process is rapid and convenient.

Heretofore oysters have had holes sawed into them automatically and the ends of the shells knocked off automatically, but the remainder of the operation had to be accomplished by hand, thus saving no time, labor, or expense, for the operator would be obliged to handle each oyster again as it came from the machine, pry open the shells, cut out the meats, and throw the meats into one receptacle and the shells into another. Further, it would take longer for the machine to cut holes and knock off the ends, including the time for picking up the oysters, putting them in the machine, and picking them out again, than it would to knock off the ends as in the usual manual process as practiced in every oyster-house and restaurant.

Without defining now the varions scopes of the invention, which are attended to in the claims, our process consists in automatically causing the meats to be freed from the shells after the oysters have been placed manually in a certain position.

The general outline of the more detailed process consists in causing the oysters to travel along a path in succession with all their hinges moving in the same line, grinding off parts of the shells at the hinges at one point of travel, then grinding off more of the material of the shell at a further part of the travel, and so on until the hinges are destroyed and holes are formed at the places of the hinges existing originally, separating the shells from each other for enlarging the holes, severing the meats from the shells by an action from without, and through the holes thus made, removing the meats through said holes, and depositing them at one location and the shells at a different location.

The opening of the shells after the holes are cut is accomplished by fingers, and the object of cutting through the hinges is to have a strong and thick part of the shells for the fingers to act upon. Also a larger opening is possible than at the end opposite the hinge. Furthermore, the meats are not hacked into by the grinders, as they would be if the cutters acted on the other end of the shells. The gills are at this opposite end, and hence they would be cut considerably. The grinding also cuts away the ligament at the hinge, and thus the shells are easily pulled apart.

Figure 1 is a front elevation of the machine illustrating the same in operation, certain posterior elements being omitted for preventing confusion and certain anterior parts being broken away to exhibit parts otherwise hidden. In all the figures dotted lines represent hidden parts. Some elements are shown in section vertically in Fig. 1. Fig. 1^a is a diagram of the grinding-disks. Fig. 1^b shows the action produced upon the shells. Fig. 2 is a left-hand side elevation in that phase in which an oyster is being introduced. This figure is not intended to represent all the mechanism, but especially certain driving elements and guides from the left-hand side. Fig. 3 is a right-hand side elevation with parts broken away and in the operating phase, two oysters being shown as going through the process. For better illustrating the invention certain parts are omitted. Figs. 4 and 5 are respectively side and plan of the gripping-jaws while open, together with the coöperating elements for closing and opening the jaws and a few depending elements. Fig. 5^a is a view of one of the disks and associated parts which are shown in Figs. 4 and 5. Fig. 6 is a central sectional view, partly not sectioned, of the means for

separating the meat of the oyster from the shells of the oyster in that phase in which the separating-fingers are entering between the shells. Fig. 7 is a cross-section at the line A B. (See Fig. 6.) Fig. 8 is a fragmentary view of one of the cams involved in the machine.

The means for the step of feeding oysters to the machine consists of a pusher-lever 1, pivoted at its lower end by a pivot 2 in a forked bearing 3 on the base-plate 4 and having a notch 5 at its upper end, upon the lower surface of which one edge of an oyster 6 may rest, the hinge of the oyster-shells resting against the vertical surface of said notch, the opposite end of the oyster pointing toward the center of the machine. The oyster is to be placed in this position by hand; but this act constitutes the only manual operation needed, the function therefore of the pusher-lever 1 being to force the whole oyster into certain jaws, described later herein. The means for operating the pusher-rod 1 consists of a constantly-rotating gear-wheel 7 on the main shaft 8 and keyed thereto and gearing with a pinion 9, carrying a crank 10, which in turn is pivoted to a connecting-rod 11 for communicating reciprocating motion from the pinion 9 to the lever 1, which latter has a post 12 extending laterally therefrom for connecting with the rod 11. The continual rotation of the wheel 7 moves the lever 1 back and forth at suitable intervals, based in length upon the speed with which an operator may place oysters in position in the notch 5. A guiding-bracket 13 at the sides of the lower portion of the oyster facilitates the positioning of the oyster by the operator.

The next step consists in the reception of the oyster by the machine, the gripping of the oyster, and some subordinate steps, the construction for which and the operation thereof being next in order in this description. To assist in explaining the mechanisms, we will relate the general functions first. The machine automatically grips the oyster with the hinge thereof at a fixed radial distance from the main shaft, whatsoever is the size of the oyster or other bivalve. Oysters may be promiscuously fed into the machine; but the hinge of each is always at the same distance from the center of the machine. Any number of gripper-jaws are provided, according to the capacity of the machine desired. Twelve pairs are used in the machine shown, the first pair being 14 and 15, the next pair 16 and 17, the next 18 and 19, the next 20 and 21, the next 22 and 23, the next 24 and 25, the next 26 and 27, the next 28 and 29, the next visible ones being 36 and 37. All the jaws are mounted successively upon the periphery of a wheel 38, which is keyed to the main shaft 8, having a driven gear-wheel 39, connected up with the driving-pulleys 40 through intermediate gears and pinions 41, 42, and 43, which need not be more minutely described because not involved in the novelty of the invention, being common in most automatic machines. There is a relation between the number of pairs of jaws and the number of reciprocations of the pusher-lever 1—namely, the latter must act twelve times at equal intervals to one rotation of the wheel 38. Consequently an oyster will be fed exactly on time to each pair of jaws in succession; but no trouble will follow if one or more pairs pass the lever 1 without being fed with an oyster.

The machine so operates, as will hereinafter be described, that the jaws 14 and 15 opposite the feeding device are fully opened sufficiently wide to receive the largest possible bivalve to be operated upon. Each jaw throughout is V-shaped, and the V's in each pair face each other for more nearly accommodating the outline of an oyster. Gripping-springs 44 project like teeth from the inner surfaces of the jaws and pointing toward each other for receiving oysters. The jaws are fixed to slides 45, which in turn are loosely mounted upon parallel rods 46, whose supports are 47. The slides 45 are movable to and from each other on the rods 46. The means for producing this motion consists of a bell-crank 48 for each slide, the pivots for the cranks being at 49, forming the fulcrums about which said cranks may turn. There is a tube 50, movable to and from the jaws and provided indirectly with arms 51, which are respectively pivoted to those arms of the cranks 48 that are not pivoted to said slides 45. 52 represents a compensating spring for assisting in the movements of the jaws. The cam is represented at 53, having two guiding-surfaces, and belonging to a plate 54, which is stationary, by being mounted upon the general frame 55 of the machine as a whole. The roller for this cam is 56, carried by a lever whose one arm is 57 for the roller 56, and whose other arm is 58, which is slotted at the outer end for operating a pin 59 upon a collar 60, which is screwed fast to the tube 50. The pivot 61, forming the fulcrum for the cam-lever, travels around with all the jaws, and is therefore carried by the main wheel 38. We have described the construction of one pair of jaws and its adjuncts, but the explanation applies to all pairs, as they are duplicates the one of the other.

We will now describe in detail the construction and operation of a part of the gripping device not already fully described. The arms 51 are fixed to a tube 51′, sliding in the tube 50 and carrying a nut 51″ to form an abutment for the spring 52, whose one end presses against the nut 51″ and whose other end abuts against the tube 50. The bearings 50′, secured to the wheel 38, permit the tube 50 to slide back and forth. The cam 53 produces a positive and unyielding move-

ment of each lever-arm 58, and therefore of each tube 50; but as the oysters may be of different sizes it follows that for a rather larger oyster than usual a pair of jaws 20 and 21 will have to stop in their closing action sooner than for smaller oysters; but still the cam action may continue, because the arms 51, being stopped from an inward central motion, will remain, while the tube 50 will travel slightly away from the arms 51, which it may do by sliding in the bearings 50′ and slightly compressing the spring 52. The tube 50 therefore slides upon the inner tube 51′ as well as in the bearings 50′ as soon as a rather large oyster is gripped. For certainty of action upon the smallest probable oysters this action also takes place, although only slightly.

As to the details of the disk mechanism, we may say that the tube 51′ has at its lower end a pin 65′, fixed at the end nearest the center of the wheel 38 and having a collar 65″. There is a pin 65‴ directly in line with the pin 65′ and having a head 65^a and loose in the tube 51′. The spring 66 is helical and surrounds both the pin 65′ and the pin 65‴ and abuts at its opposite ends against the collar 65″ and the head 65^a. When the rod 65 of the disk 64 is pressed into the tube 51′ by the action of an oyster driven by the pusher-lever 1, it drives the head 65^a and compresses the spring 66, which has sufficient power to maintain an oyster against the stop 62.

The cam 53 is of such a contour that at the position of a pair of jaws for receiving an oyster the latter rests by its own weight upon the lower jaw 15 and is carried upward by this moving jaw before the oyster is gripped. There is a curved stop-plate 62, having an arc-shaped surface whose center is the center of the shaft 8, and which is held by brackets 63 upon the frame 55 for remaining stationary, and the curved surface of this plate is a continuation as nearly as possible of the vertical surface 5 on the pusher-rod 1. As the jaw 15 travels around the oyster 6 is forced by a disk 64 first against the surface 5 and then against the stop-plate 62, the function of which is to insure the outer end of the oyster to be at a predetermined fixed distance from the axis of the shaft 8 whatever the general dimensions of the oyster. The disk 64 is on the end of a rod 65, which is provided with a regulating-spring 66, the tube 50 containing the rod 65. The function of the disk 64 is therefore to adjust the oyster to a position for grinding the same before it is gripped by the jaws.

We will now describe the operation of gripping the oyster. This is accomplished by the cam 53 and the cam-roller 56, which latter is actuated by the former to operate the lever 57 58 to gradually pull the tube 50 inwardly toward the shaft 8, thereby turning the bell-cranks 48 and moving the slides 45 until they can move no further on account of the resistance offered by the oyster. Before the oyster has left the plate 62 it has been fully and tightly gripped, as shown, by an advance oyster 6′. The cam 53 after the position represented by the oyster 6′ is simply circular about the shaft 8, so that the jaws will not be opened till toward the end of the operation upon that particular oyster.

We will next describe the grinding means and the operation thereof. We provide successive grinding-disks 67 68 69 70 71 72, arranged peripherally just beyond the jaws which are just beyond the plate 62, and each such disk in succession is nearer the shart 8 than the preceding one for the purpose of successive deeper grindings of the shell at the hinge of the oyster, whereby a considerable aperture is produced and the hinge destroyed by the time the oyster has left the last grinding-disk. The disks are provided with driving-pulleys, respectively, 67′ 68′ 69′, &c. These pulleys are driven in series or units of three each to avoid a multiplicity of belts, the belt 73 passing down through an opening in the frame 55, passing over an idler 74, thence over the pulley 67′ back to an idler 75, which is adjustable for taking up slack by means of the bolt 76, movable in the slot 77, then over the pulley 68′, then an idler 78, then the pulley 69′, then an idler 79, and so out of the machine. The operation of this belt 73 causes the grinding-disks 67 68, &c., to spin in the direction of the arrows indicated thereon. A similar arrangement of belting, which need not be described, serves to spin the other grinding-disks also. The grinding-disks are upon spindles 80, journaled in yokes 81. 82 represents adjustable arms, one set of corresponding ends being pivoted to stationary brackets 83, the pivots being screws 84, which may be tightened more or less. The other corresponding ends are linked to the spindles 80 and rest upon adjustable screws 85, which being turned will serve as stops for regulating the distance of the grinding edges of the disks 67 68, &c., at suitable successive distances from the shaft 8, said screws pointing radially outward. This regulation will serve not only to compensate for the wearing away of the disks, but for regulating the depth of abrasive action upon the oysters and for adjusting the disks generally for different kinds of bivalves. The complete operation of this part of the invention is the running of the belt 73 and the belts for any more grinding-disks, the resultant spinning of the disks, and the cutting away of the hinge of the oysters in rapid succession.

We will now describe the construction adopted for the next step. The general nature of this part of the organization com-

prises fingers and blades which automatically enter the hole cut in each oyster and sever the muscles of the oyster from both shells, leaving the meat of the oysters free to fall out. The apparatus for accomplishing this action consists of fingers 86 and 87 and their adjuncts. As the construction and operation of both are similar, only one need be elucidated. As noticed, Fig. 1 shows the device in a normal position and Fig. 6 the device during action upon an oyster 6'' in the jaws—for example, 23—which is a near view of one jaw, which is closed, the oyster being held between this and the opposite jaw 22. The position at which the action takes place is just beyond the grinding-disks 71 and 72. The actuating force is derived from the double cam 88, which just beyond the disks, as shown at 89, curves away from the shaft 8 and gradually assumes a circular contour about said shaft. The roller for running in this grooved cam is 90, turning on the pin 91, which is carried by an extension 92 of a slide working in a carrier 93, fixed bolted to the main wheel 38 and supporting the finger 86, which is mounted upon a forked rod 97 by a pivot 98 passing through the tines of the fork. A part of the finger is formed with a toothed segment 99, the pivot 98 being at the center of the segment. The rod 97 has an interior stop-pin 100, pressed by the spring 101 against the segment, the spring-box 102 being finally pivoted to the slide 92 and the rod 97 extending into the box 102, against the spring 103, which acts as a cushion for the rod 97 and allows further travel. The slide 92, together with the elements attached thereto, can be moved to and fro by the combined action of the cam 88 and roller 90.

The spring 103 continually presses against the lower end of the rod 97, which carries a pin 105, extending through a slot 106, cut through the side of the tube 102. The arms 108 and 111, together with their hub 109, and the inclined surface 110 on the arm 111, as shown in Fig. 6, are journaled upon one of the guide-rods 46. This is also apparent from the view in Fig. 1, but omitted from Fig. 2, and hidden in Fig. 3. Figs. 4 and 5 are especially for the purpose of showing the grippers by themselves, with as few other adjuncts as possible. The spring 112 is carried by the wheel 38 and presses against the arm 111 in the direction of the cam-point 113, which is carried upon the slide 92, while the incline 110 bears upon said cam-point 113. A spring 107 is carried by the slide 92 and bears upon the pivoted tube 102 toward the guide-rod 46.

Regarding the fingers 86 and 87, the brake 100 on entering a notch 100' holds the finger-segment 99 out of engagement with the rack 108 as soon as the cam action causes the finger 86 to turn up to the position shown in Fig. 1. This return of the finger to its normal position does not occur until after the jaws have gone beyond the cam-plate 124, and the fingers remain in a stationary position until they travel around in a circle and come to a point 88' on the cam 88. The spring 101 is under permanent compression for operating the stop 100. The finger is mounted indirectly upon the support 92, which is a sliding piece whose guide is the box 93, into which the support 92 fits and is retained by holding-pieces 93', fastened to the part 93, which in turn is bolted to the wheel 38.

When the cam-roller 90 begins to move outwardly from the center of the shaft 8 at the point 89 on the cam 88 in Fig. 3, it carries the slide 92, the spring-box 102, and the finger 86 outwardly in a straight path until the toothed segment 99 meets a corresponding rack cut on 108, with which it engages, a pin 100 is forced back out of a depression 100', and the finger 86 begins to describe a curved path toward the opening in the oyster revolving upon its fulcrum-pin 98 in the direction shown by the arrow. A continued outward motion of the cam-roller 90 brings the finger into the opening in the oyster, and the parts described now occupy the relative positions shown in Fig. 6. A still further outward movement of the cam-roller 90 causes the cam-point 113 to travel along the incline 110, causing the arm 111 to swing away, moving on its fulcrum 46, and the arm 108 has correspondingly moved in an opposite direction, forcing the finger 86 backward from the oyster-opening, and as the finger 87 has described a similar movement in unison with 86 the mouth or opening in the oyster has been pulled apart by the action of the fingers on opposite sides. During this last part of the outward movement of the cam-roller 90 the finger 86 has not revolved any farther, as it rests on the end of the oyster and is prevented thereby from doing so, and the last part of the travel of the slide 92 has compressed the spring 103, the slide 97 has traveled down into the spring-box 102, and the pin 105 has traversed the slot 106. All of these parts now remain in a fixed position, while the knife or blade 119 enters the shell and separates the meat therefrom, and the oyster is emptied from the shell, after which the cam-roller 90 meets the point 88' in the cam 88, and all these movements are reversed from the order in which they were described, the fingers first coming together, swinging out of and away from the shell, assuming a position radially outward from the center of the shaft 8 and withdrawing inwardly toward said shaft and assuming the position which they normally occupied before arriving at the point 89 in the cam 88.

We will now set forth the construction for and the operation of the means for separating the muscles of the oyster from the shells. The flexible knife 119 is fed out of the hollow finger 86 into the interior of the oyster for

severing the meat from the shell. For this purpose a roller 120 is carried by the finger 86, and a cam 121 is provided for guiding said roller and for propelling it lengthwise of the finger. A pin 122 passes through a slot 123 on the upper portion of the finger 86 and connects said roller 120 to the knife 119 and serves at the same time as a pivot for the roller 120. This cam 121 is formed upon an arc-shaped plate, (shown at 124,) with its center at the axis of the shaft 8, and mounted upon brackets 125 and 125′, which may be shaped as shown at Fig. 2. Of course the jaws 22 and 23 arrive at the plate 124 at the proper time for the knives 119 to enter the oyster. The roller 89 moving in an arc about the shaft 8 maintains the pivot 98 at the right distance for the roller 120 to come into engagement with the cam 121 as soon as the jaws reach the said cam. The knife in cutting off a meat strikes the shell and follows its contour in its downward course, the smooth shell acting as a guide, the flexibility of the knife allowing it to act as described.

It now only remains to explain how the meats and the shells are dropped at different points during their circular travel. The falling out of the meat takes place simply by automatically removing the knives, (the fingers 86 and 87 remain stationary, holding the shells apart—nearly one-fourth of a revolution of shaft 8 takes place before the fingers release,) which will permit the loosened oyster meat to drop out by gravity as soon as the main wheel 38 has rotated far enough to invert the oyster, whereby the end operated upon points downward. The opening is made its full size and large enough before the knives enter. The fingers are next removed, because the roller 90 is moved by the cam 88 at the portion 88′ toward the center of the shaft, thereby operating the gearing 99 and 108 and rotating the finger 86 and by similar means rotating the finger 87 out of the end operated upon; but the jaws do not open until the shell is to be discharged, the gripping-springs 44 giving way enough for the shell to open while the jaws are still closed, while the opening of the jaws 22 and 23 at a subsequent time, probably a few seconds later, will release the shells. The empty jaws continue to travel circularly until they reach the pusher-lever 1, where they are fed with further oysters successively as before.

A modification of the grinders is shown in Fig. 1ª. A represents a narrow disk for cutting a narrow groove at the hinge and to the full depth intended. The next, B, grinder is broader, which does not make the cut in the oyster any deeper, but broader, while the grinder C is broader yet, both B and C being tapered on their peripheries for making the cut slanting, as shown in Fig. 1ᵇ. Finally, the grinder D is broadest of all and not tapered for cutting off protruding edges, and it is evident that this broadest one may be the first to grind. The object of this successive grinding and tapering, &c., is to give a shape of aperture in the oyster that is best adapted to receive the fingers 115. (See also Fig. 6.)

We claim as our invention—

1. The process of shucking an oyster, consisting in removing the hinge by successive grindings which sunder the nexus between the shells while producing a suitably-enlarged aperture; pulling the shells apart and severing the muscles attaching the meat to the shells by instruments introduced through the aperture; and separately depositing the meat and shells.

2. The process of shucking an oyster, consisting in removing portions of the shells by successive deeper and deeper grindings for producing an enlarged aperture; pulling the shells apart and severing the muscles attaching the meat to the shells by instruments introduced through the aperture; and separately depositing the meat and shells.

3. The process of shucking oysters, consisting in producing holes in the shells, severing the nexus and retaining muscles during a continual circular movement of the oysters, while in substantially vertical positions, so that the holes are not yet below the horizontal, causing the oysters to continue their circular movement, and then turning the oysters upside down for discharging the meats from the shells by gravity.

4. The process of shucking an oyster consisting in producing a hole in and thereby weakening the hinge connection between its shells, separating the shells and removing the meat.

5. The process of shucking oysters, consisting in grinding through the hinges thereof and cutting the meat from the shells through the openings thus made.

6. The process of shucking oysters, consisting in grinding through the hinges thereof, pulling the shells apart, cutting the meat from the shells through the opening thus made, and discharging the meat therethrough by the action of gravity.

7. The process of shucking oysters, consisting in grinding through the hinges thereof, cutting the meat from the shells, and dropping the meats and the shells at different places.

8. The process of shucking oysters, consisting in grinding holes in the shells by successive abrasive actions, pulling the shells apart by means applied at the sides of the apertures produced, sufficiently far to allow the introduction of knives for severing the meat from the shells, releasing the meat by the action of gravity, at one location, and dropping the shells at a different location.

9. The process of shucking oysters, consisting in causing them to travel along a path in succession with all their corresponding

parts moving in the same line, cutting larger and larger holes at successive locations of said path, partly separating the shells from each other and thus enlarging the openings, severing the meats from the shells by cutting the muscles which connect said meats to said shells, and finally dropping the shells at another location of the travel.

10. The process of shucking oysters, consisting in destroying the hinges and severing the retaining-muscles during the continued circular movement of said oysters while in substantially vertical positions with the hinges upward, causing the oysters to continue their circular travel, and then turning the oysters upside down for discharging the meats from the shells.

11. The process of shucking oysters, consisting in propelling them along a circular path in succession with all their hinges moving in but one circle, grinding off part of the shells at the hinges at one point of travel, then grinding off more of the material of the shell at a farther part of the travel, and so on until no hinges remain and holes are formed at the places of the hinges existing originally, severing the oysters' muscles while still moving in a circle by an action from without and through the openings thus made, and then removing the meats from between the shells.

12. The process of shucking oysters, consisting in destroying the hinges while pointing upright, separating the shells sufficiently to release the meats, and severing the muscles from the shells, then turning the oysters to a downward position for releasing the meats.

13. The process of shucking oysters, consisting in moving oysters toward a center of revolution against a resisting force of a yielding nature acting outward radially, positively blocking the outward movement of the oysters for preventing their outermost edges from passing a single circle, gripping the oysters circularly, causing them to continue their travel in a circle, cutting holes through said outermost edges, pulling the shells apart, cutting the meats from the shells through the openings thus made while the oysters are still traveling in a circle, and then removing the meats from the shells while the latter are still traveling in a circle.

In testimony whereof we have hereunto subscribed our names and affixed our seals this 31st day of May, 1905.

EDWARD L. TORSCH. [L. S.]
JOHN HENRY PARKER. [L. S.]

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