

No. 848,784.

PATENTED APR. 2, 1907.

E. L. TORSCH & J. H. PARKER.
MACHINE FOR SHUCKING OYSTERS.

APPLICATION FILED JAN. 23, 1906.

4 SHEETS—SHEET 1.

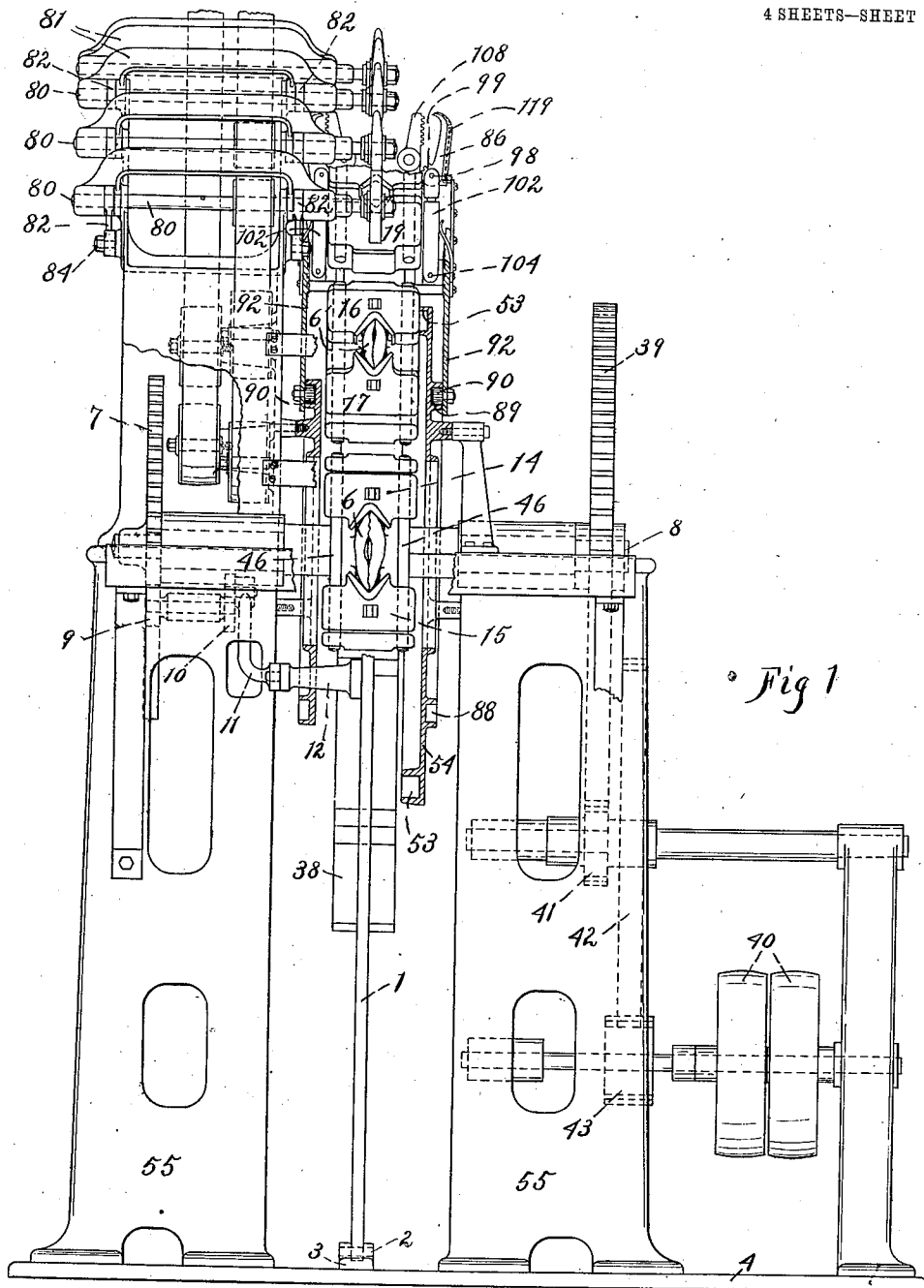


Fig 1

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John H. Parker

Inventors,
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By
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Att'y

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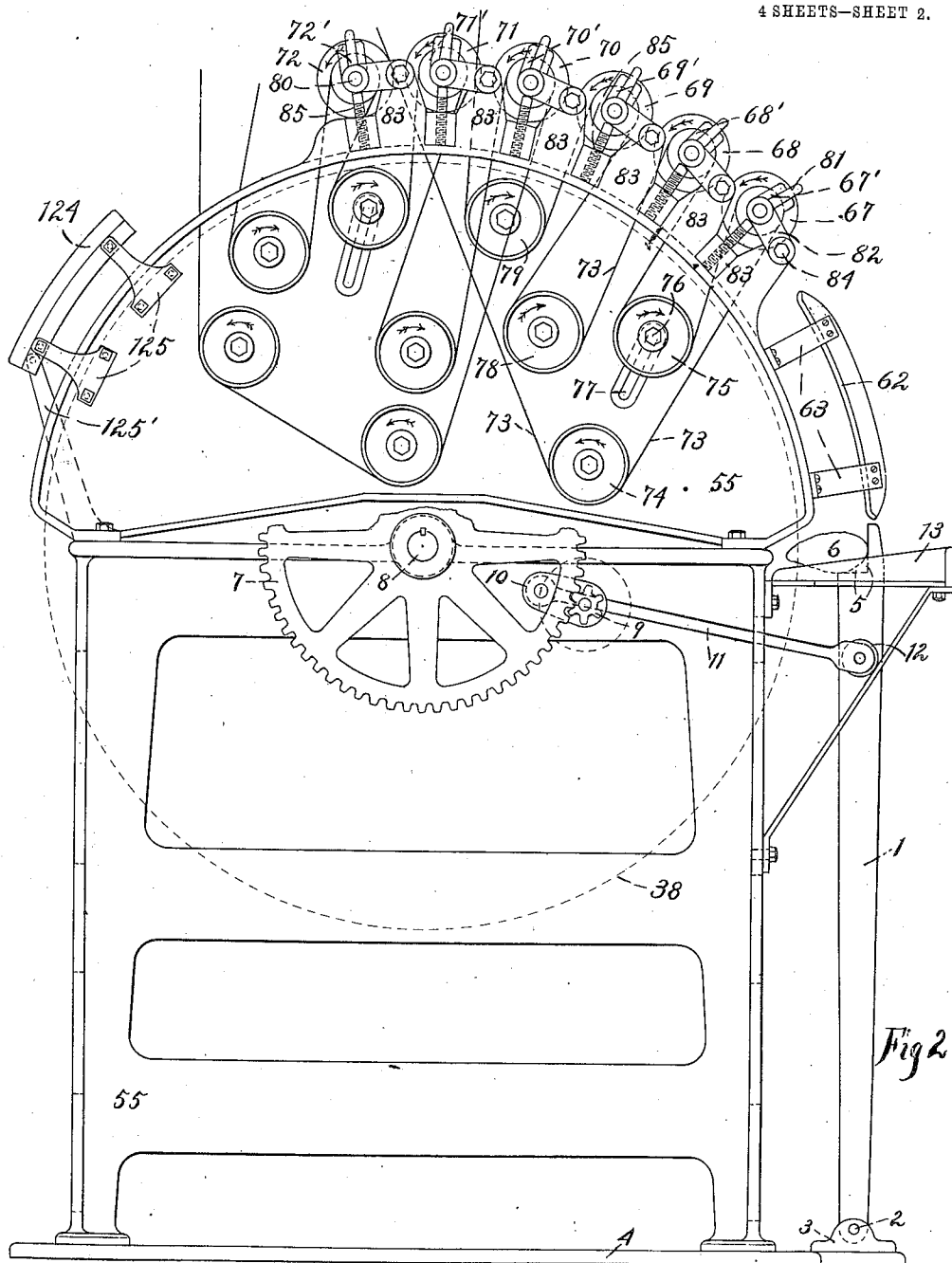


Fig 2

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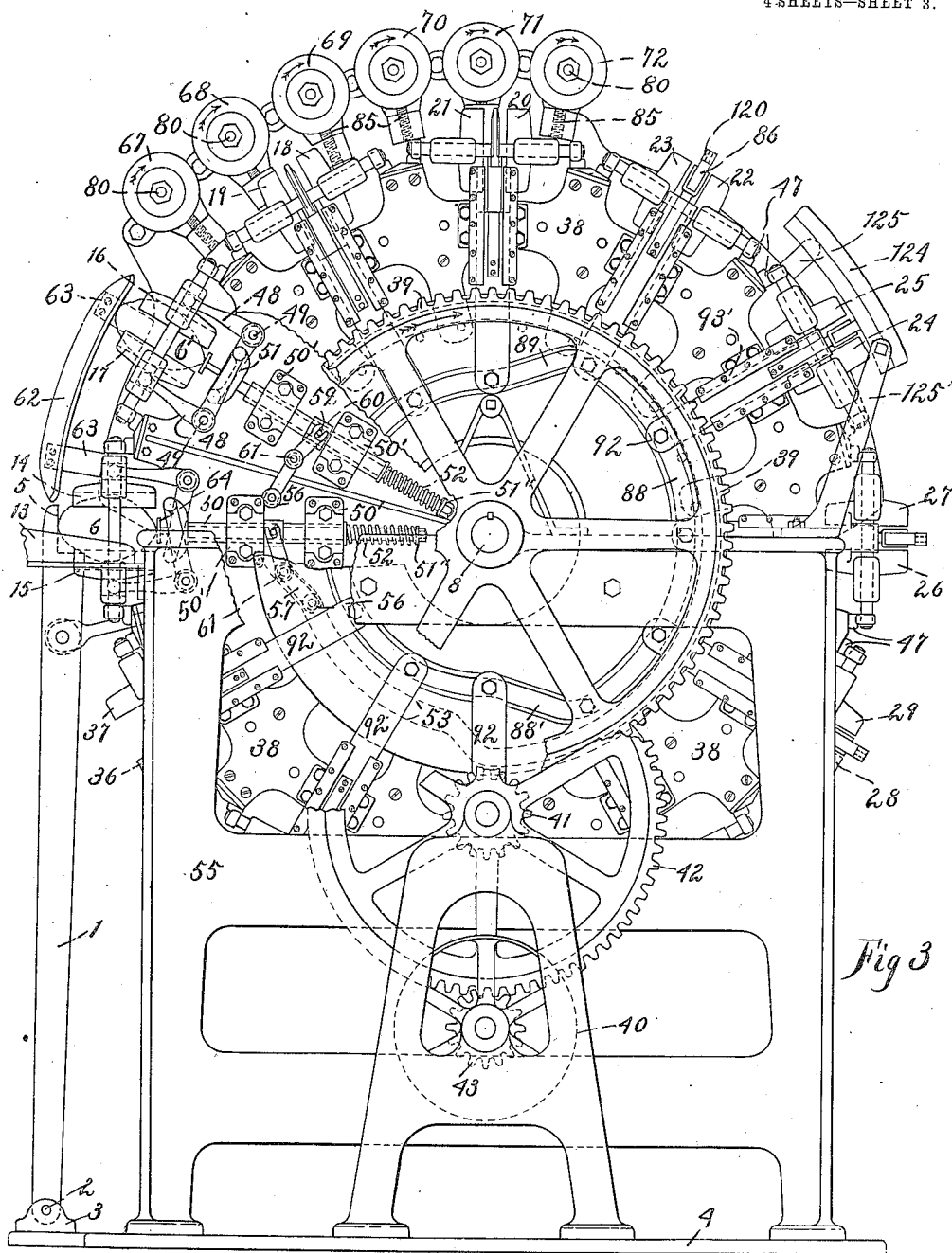


Fig 3

Witnesses.

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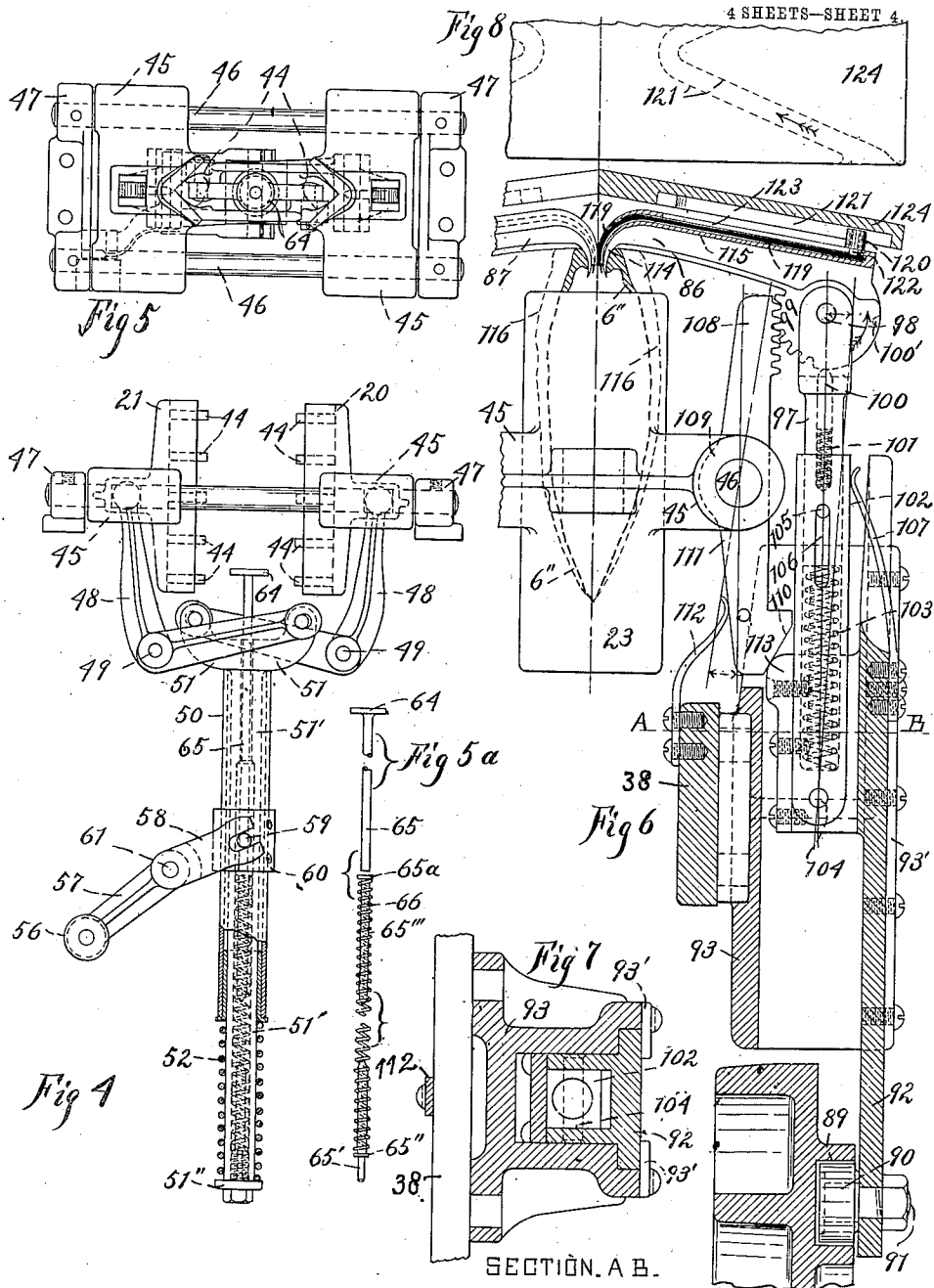
By Edward A. Thompson

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UNITED STATES PATENT OFFICE.

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

MACHINE FOR SHUCKING OYSTERS.

No. 848,784.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed January 23, 1905. Serial No. 242,335.

To all whom it may concern:

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

Our invention relates to a machine for opening oysters, and more particularly for automatically shucking oysters by operating on the hinged ends of the same.

The object of the invention is to provide rapidity in the separating of the meats from the shells and to provide maximum simplicity of movements for performing the various steps from the beginning to the end of the operation.

The machine for carrying out the invention consists, in a general way, without regard to the various scopes of novelty which are attended to in the claims, of a rotating wheel, oyster-grippers arranged around the periphery thereof, a feeding device opposite the periphery and so timed as to meet one of the grippers when opposite the same, a tongue for pressing against an oyster tending to drive it out of the grippers, a stop beyond the feeding device for limiting the action of the tongue upon the oyster in such a manner that the hinges of the oysters will all move in the same circular line, an arrangement for opening the grippers when opposite the feeding device and for closing them before they leave said stop, grinding-disks located beyond the stop and more and more intersecting the path traveled by said hinges for cutting holes into the oysters and destroying the hinges, fingers adapted to enter said holes, means for separating said fingers to pull the shells apart, extensible blades for entering the holes to cut the oysters from the shells, and a driver connected up with all of the above-named elements to constitute an automatic machine.

In order to have a more detailed preliminary statement of the organization, we will give the following specific definition: The machine involves a rotating wheel, open oyster-grippers on the periphery thereof equally spaced, a feeding device opposite one of the grippers at a time for pushing oysters into said grippers and consisting of a reciprocating lever timed to meet the grippers successively, a cam-and-roller device for maintain-

ing said grippers open during feeding and for awhile afterward, tongues within the grippers for pressing the oysters outward, a stationary stop to resist the outward motion of said oysters, so that the latter will protrude equally from the grippers, the cam-and-roller device being adapted to close the grippers before they leave said stop, said cam-and-roller device consisting of a stationary double cam forming a groove, as many pivots as there are grippers projecting from said wheel, levers pivoted to the respective pivots, a roller on each lever running in said groove, cranks for the jaws of the grippers, holders for said cranks, pin-and-slot joints between said levers and said holders, said stationary cam being formed endless around the center of said element, arc-shaped around said center for a certain distance therefrom for acting upon said rollers to hold said grippers closed for awhile, then curved inwardly toward the center, then arc-shaped again at a less distance from said center than before to act upon said cams for maintaining said grippers open, and finally curved outwardly from said center for acting upon said rollers to close said grippers.

The machine consists, further, of cutters for making holes in the shells at the hinges thereof, a pair of pivoted fingers for each gripper, with its pivots so disposed that the ends of the fingers can be brought toward each other and into the holes in the oyster-shells, means for separating the fingers for separating the shells, the means for each finger consisting of a toothed segment rigid with one of said fingers, a toothed rack normally out of engagement with said segment, said means being adapted to bring a finger into an oyster only after it has passed said cutters, a second cam with a similar contour, second rollers in said second cam, each pair of fingers being controlled by the respective rollers, pairs of blades, propellers for driving said blades into said holes for severing the meats of the oysters, means for operating said blades and consisting of a third cam, rollers therefor for operating one set of members of the pairs of blades, and other rollers for operating the other blades and dropping the meats and for further opening said grippers after the delivery of the meats for discharging the shells at a point of rotation of the wheel beyond that at which the meats were dropped.

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. 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 cooperating elements for closing and opening the jaws and a few dependent 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.

We will first describe the means for feeding oysters to the machine. It 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 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.

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 farther 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 shaft 8 than the preceding one for the purpose of successive deeper grindings of the shell at the hinge of the oyster, whereby a considerable hole 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 comprises 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 oyster 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 rear 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 fixed carrier 93, 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. 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. The arms 108 and 111, together with their hub 109, the inclined surface 110 on the arm 111, as shown in Fig. 6, are journaled upon the guide-rod 46. This is also apparent from the view in Fig. 1, but omitted from Fig. 2, hidden in Fig. 3, and omitted from Figs. 4 and 5. Figs. 4 and 5 are 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. 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 in 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.

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.

The remaining details of the machine are as follows and are preferably given here, as too much detail in the above description by reference to the drawings would only lead to confusion. We will first describe the detail 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 movement 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.

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 this fixed position until they travel around a circle and come to a point 88' on 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.

We claim as our invention—

1. In a machine for shucking oysters, the combination of a constantly-rotating wheel, oyster-carriers mounted upon said wheel, means governed by the motion of said wheel for holding said oysters in such positions that all their hinges coincide substantially with one and the same circle drawn about the center of said wheel, spinning grinding-disks located in the path of said hinges, the successive disks being nearer and nearer the center of said wheel, means for separating the shells of the oysters from each other successively, knives governed by the motion of said wheel for cutting the meats from the shells, and jaws forming a part of said carriers and gripping said oysters, and means for opening and releasing said jaws to deliver the shells after the discharge of said meats.

2. In a machine for shucking oysters, the combination of a rotating wheel for carrying oysters, means for producing holes in said oysters, knives carried by said wheel, rollers carried by said knives, and stationary cams in the paths of said rollers for propelling said knives through said holes for severing the meats from the shells of said oysters.

3. In a machine for shucking oysters, the combination of a moving element for carrying oysters, means for producing holes in said oysters, longitudinally-movable knives carried by said element, rollers attached to said knives, cam-and-roller mechanism governed by said element for tilting said knives so that the latter terminate at the holes produced in the oysters, stationary cams for the rollers which are on said knives for feeding the knives longitudinally into the holes in the oysters, sheathing-fingers for the knives, and means governed by said element for moving the fingers from each other for separating the shells before the said knives are fed longitudinally, and a driver for said element.

4. In a machine for shucking oysters, the combination of a moving element for carrying oysters, means for producing holes in the shells of said oysters, hollow fingers for pulling said shells apart to form larger holes in the shells, flexible knives in said fingers, rollers, cams on said element for actuating said rollers, mechanism between said fingers and said rollers for separating said shells, other rollers carried by said knives, and cams in the paths of the last-named rollers for guid-

ing said knives into the holes in the oysters, the fingers acting as guides for the flexible knives, and the portions of the fingers near their ends being curved.

5 5. In a machine for shucking oysters, the combination of a constantly-rotating wheel, jaws thereon, and a pusher-lever for forcing oysters into said jaws, said jaws being arranged in pairs, which are equally spaced
10 around the whole periphery of said wheel, said lever being reciprocated and timed in a predetermined manner with relation to said pairs of jaws to feed an oyster into the jaws every time a pair arrives at a certain point.

15 6. In a machine for shucking oysters, the combination of a constantly-rotating wheel, jaws thereon, a pusher-lever for forcing oysters into said jaws and having a notch in one end whose sides are for pressing against said
20 oysters, guides on each side of said notched portion and extending on the sides of said jaws and a spring-pressed element in the jaws opposite said notch by which element an oyster is pressed outward against a side of said
25 notch, for adjusting the oyster for the beginning of its travel with the wheel.

7. In a machine for shucking oysters, the combination of a constantly-rotating wheel, jaws thereon, a pusher-lever for forcing oys-
30 ters from a position out of said jaws to a position in said jaws, which are arranged in pairs, a spring-pressed element at each pair of jaws, and opposite said lever for pressing upon the oysters radially outward from the
35 center of said wheel and a curved stop-plate 62, against which it is the purpose of the springs to push each oyster to position it accurately.

8. In a machine for shucking oysters, the
40 combination of a constantly-rotating wheel, jaws thereon arranged in pairs, a pusher-lever for forcing oysters into said pairs successively, guides extending from the jaws to said lever for directing said oysters in a
45 straight line, a spring-pressed disk at each pair of jaws acting radially outward from the center of said wheel toward said lever and a curved stop-plate 62, against which it is the purpose of the spring to push each oyster to
50 position it accurately.

9. In a machine for shucking oysters, the combination of a rotary wheel, pairs of jaws on the periphery thereof, a pusher-lever opposite one of the pairs of jaws, which are
55 equally spaced around the whole periphery of said wheel, the relative motions of the traveling jaws and said lever which is reciprocating being timed in a predetermined manner, a driver for rotating said wheel and
60 reciprocating said lever, a disk at each pair of jaws and opposite said lever, a spring compressible from said disk radially inward and a curved stop-plate 62, against which it is the purpose of the springs to push each oyster to
65 position it accurately.

10. In a machine for shucking oysters, the combination of a rotating wheel, pairs of jaws thereon, a pusher-lever opposite one pair of jaws at a time, a driver for operating said wheel and said lever, a resisting-disk oppo-
70 site said lever and at the rear of said jaws, a spring behind said disk for resisting the inward motion of said disk toward the center of said wheel and a curved stop-plate 62, against which it is the purpose of the spring
75 to push the oyster to position it accurately.

11. In a machine for shucking oysters, the combination of a pair of jaws, a rotary wheel holding the same at the periphery of said wheel, a device governed by the rotary
80 wheel, for automatically feeding an oyster into said jaws and a spring and plate for adjusting oysters of various lengths, so that the end of each oyster will project the same distance from said jaws, the spring being car-
85 ried by said wheel, and the said plate being stationary.

12. In a machine for shucking oysters, the combination of a pair of jaws, a rotating element carrying said jaws, a yielding disk at
90 the rear of said jaws, a lever opposite one of the jaws, for pushing oysters into the jaws, and having a surface against which it is the purpose of the disk to push the oysters, and a curved stop-plate having a surface beyond
95 said first-named surface, and also for stopping an oyster when pressed outward by said disk.

13. In a machine for shucking oysters, the combination of a pair of jaws, a rotating element carrying said jaws, a yielding disk at
100 the rear of said jaws, a rod attached to said disk, a tube containing said rod, a second rod bearing against the first rod, a collar on the second rod, and a spring bearing against said
105 collar.

14. In a machine for shucking oysters, the combination of a pusher-lever 1, pivoted at its lower end by a pivot 2, a frame for the machine supporting the pivot 2, and the lever
110 having a notch 5 at its upper end for receiving an oyster, gripping-jaws opposite said lever, means for operating the lever 1 consisting of a constantly-rotating gear-wheel 7, a main shaft for the machine to
115 which said gear-wheel is fixed, a pinion 9 engaged with said gear-wheel 7, a crank 10 carried by said pinion, and a connecting-rod 11 for communicating reciprocating motion from said crank to said lever, being pivoted
120 to each, a guiding-bracket 13 reaching beyond the sides of said lever and overlapping one of the jaws 15, which is one of the above-named jaws, said jaws being normally open, an element in the rear of the jaws for pushing
125 the oyster therein against one of the surfaces of said notch, a curved stop-plate practically continuous with said one surface, and opposite the path of said jaws, gearing for moving said jaws in said path, and devices
130

for closing said jaws upon an oyster only after it has left said lever.

15. In a machine for shucking oysters, the combination of a pusher-lever 1, pivoted at its lower end by a pivot 2, a frame for the machine supporting the pivot 2, the lever having a notch at its upper end with two surfaces, one surface being for supporting the weight of an oyster and the other surface being for pushing the oyster, a pair of gripping-jaws opposite said lever, means for operating the lever, consisting of a constantly-rotating gear-wheel 7, a main shaft for the machine fixed to said wheel, a pinion 9 engaging with said gear-wheel 7, a crank 10 governed by said pinion, a connecting-rod joining said crank to said lever, a guiding-bracket 13 at the sides of said lever, a stop 62 having a surface parallel to the path of said jaws, and forming a practically continuous surface with the pushing-surface of said lever, when said lever is near said jaws, a disk in said jaws, and opposite said stop, and a spring for forcing said disk against an oyster in the jaws when open, so as to press said oyster against said stop, during the traveling motion of the jaws.

16. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a pusher for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device measured therefrom in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding tip ends lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, said oyster-grippers having interior spring-pressed teeth extending therefrom for pressing upon different parts of an oyster.

17. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, and a feeding device for supplying oysters to said grippers, said grippers consisting of pairs of jaws, spring-teeth therein, and a pusher in said jaws resiliently movable to and fro along the center line between the jaws.

18. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a stop-plate 62, spring-pressed disks 64, and means for performing the positive function of closing the jaws upon the oysters after being

properly located by the above-named elements.

19. In a machine for shucking oysters, the combination of a rotating wheel, a pair of jaws thereon, a driver for operating said wheel, a resilient pusher between and at the rear of said jaws, a spring behind said pusher for making it resilient in a radial direction with regard to said wheel, the two jaws being opposite each other, means for moving the jaws to and from each other while maintained parallel to each other, and spring-pressed teeth in two rows in each jaw pointing toward each other, each jaw being V-shaped, and the two rows of springs on each jaw being fastened to the inside of the arms of the V.

20. In a machine for shucking oysters, the combination of a rotating wheel, a pair of jaws thereon, a driver for operating said wheel, a resilient stop between and at the rear of said jaws, a spring behind said stop for making it resilient in a radial direction with regard to said wheel, the two jaws being opposite each other, means for moving the jaws to and from each other while maintained parallel to each other, and spring-pressed teeth in two rows in each jaw pointing toward each other, each jaw being V-shaped, and the two rows of springs on each jaw being fastened to the inside of the arms of the V, slides carrying said jaws, and parallel rods forming guides for said slides.

21. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a pusher for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding tip ends lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, each of said grippers consisting of a pair of jaws movable to and from each other, on a common center line, arms of two cranks pivoted to the respective jaws, a tube pivotally connected up with the other arms of said cranks, a rod supporting said pusher and sliding in said tube, and a pusher-spring in said tube for producing said spring action upon said pusher.

22. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a sta-

tionary stop opposite the grippers while they are open, and apparatus governed by said element for closing said grippers.

23. In a machine for shucking oysters, the combination of a rotating element, oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connected between said element and said feeding device for operating the same, a spring-pressed disk 64 to push the oyster outwardly, a stop beyond said feeding device for preventing said oyster from being pushed too far by said means, and means for closing said grippers upon an oyster before passing said stop, said grippers being arranged in pairs which are equally spaced in a row upon said element and projecting therefrom and timed to be opposite the feeding device during the feeding motion of said feeding device.

24. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a tongue for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device measured therefrom in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, and apparatus for cutting holes in the shells at said hinges and located beyond said means.

25. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a tongue for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, and apparatus for cutting holes in the shells at said hinges and located beyond said means, said feeding device consisting of a reciprocating lever alternately approaching and receding from said grippers, always approaching said grippers to the same distance for permitting oysters of different sizes to protrude equally from the different grippers, said mechanism consisting of a rotating crank and connecting-rod, said means consisting of a stationary stop for limiting the

outward throw of the oysters when actuated by said tongue, and said arrangement consisting of a stationary cam, a roller moving in said cam, and cranks connected up between said grippers and said rollers for closing said grippers.

26. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a tongue for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, apparatus for cutting holes in the shells at said hinges and located beyond said means, said grippers consisting each of a pair of jaws, and said arrangement consisting of a stationary cam, a roller for moving in the cam, a lever pivoted to said element, and carrying said roller on one arm thereof, a tube movable upon said element, and having a pin engaging with the other arm of said lever, and cranks pivotally connected up between said jaws and said tube, and a rod for said tongue sliding in said tube, resisting-springs being provided both for said tube and said rod.

27. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a tongue for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, apparatus for cutting holes in the shells at said hinges and located beyond said means, said element consisting of a wheel, said grippers consisting of pairs of jaws arranged circularly around the center of said wheel, a stationary support carrying a cam with two guiding-surfaces, a roller per each gripper between said surfaces which form an endless groove, levers pivoted to said wheel to form fulcrums for the levers, and pivoted also to said rollers, and mechanisms connected up between said levers and the respective pairs of jaws for closing the jaws, said cam having

such a curvature at the point for closing, as to tilt said levers one at a time as the rollers travel along said cam.

28. In a machine for shucking oysters, the combination of a rotating wheel, open pairs of jaws equally spaced around the periphery thereof, a reciprocating lever for furnishing oysters to said pairs of jaws, a crank-and-pinion combination connecting said wheel to said lever for reciprocating the latter, a tongue for pressing against each oyster in said pairs of jaws, a spring for said tongue, a stationary stop beyond said lever along the periphery of said wheel, and located opposite the path of said jaws for causing oysters in successive pairs of jaws to have their hinges protruding equally from said jaws, and cams and rollers governed by said wheel and driven thereby for closing a pair of jaws while it is opposite said stationary stop.

29. In a machine for shucking oysters, the combination of a rotating wheel, pairs of jaws arranged around the periphery thereof, and means for alternately closing and opening said jaws consisting of a stationary cam formed endless around the center of said wheel, arc-shaped around said center at that position where the jaws are to remain closed, curved inwardly toward the center from said arc at that position where the jaws are to be opened and to remain open, rollers traveling around said cam, levers fulcrumed upon said wheel and connecting with the respective rollers, and mechanically connected up with the respective pairs of jaws, and retractile springs coöperating with said cams, rollers and levers tending to open said jaws.

30. In a machine for shucking oysters, the combination of a rotating wheel, pairs of jaws arranged around the periphery thereof, and means for alternately closing and opening said jaws consisting of a stationary cam formed endless around the center of said wheel, arc-shaped around said center at that position where the jaws are to remain closed, curved inwardly toward the center from said arc at that position where the jaws are to be opened and to remain open, rollers traveling around said cam, levers fulcrumed upon said wheel and connecting with the respective pairs of jaws, retractile springs coöperating with said cams, rollers and levers tending to open said jaws, slides for each pair of jaws, guide-rods for said slides, arms of two cranks pivoted to the respective jaws of a pair, a tube pivotally connected up with the other arms of said cranks, bearings for said tube attached to said wheel, and a spring acting outward radially from the center of said wheel upon said tube, said spring being in a compressed condition when said jaws are open.

31. In a machine for shucking oysters, the combination of a rotating wheel, open pairs of jaws equally spaced around the periphery

thereof, a reciprocating lever for furnishing oysters to said pairs of jaws, a crank-and-pinion combination connecting said wheel to said lever for reciprocating the latter, a pusher for pressing against each oyster in said pairs of jaws, a spring for said pusher, a stationary stop beyond said lever as measured from said lever along the periphery of said wheel, and located opposite the path of said jaws for causing oysters in successive pairs of jaws to have their hinges protruding equally from said jaws, cams and rollers governed by said wheel and driven thereby for closing a pair of jaws while it is opposite said stationary stop, a spinning grinding-disk nearer the center of said wheel than said stop, and additional grinding-disks successively nearer the center of said wheel than any preceding disk.

32. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a tongue for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond said means, and apparatus for cutting holes in the shells at said hinges and located beyond said means, said apparatus consisting of individually manually adjustable grinding-disks.

33. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a stationary stop opposite the grippers while they are open, and apparatus governed by said element for closing said grippers, said apparatus consisting of a stationary double cam forming a groove, as many pivots as there are grippers projecting from said element, levers pivoted to the respective pivots, a roller on each lever running in said groove, and mechanism connected up between said levers and said grippers.

34. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a stationary stop opposite the grippers while

they are open, and apparatus governed by said element for closing said grippers, said apparatus consisting of a stationary double cam forming a groove, as many pivots as
 5 there are grippers projecting from said element, levers pivoted to the respective pivots, a roller on each lever running in said groove, and mechanism connected up between said levers and said grippers, said mechanism consisting of cranks connecting with said grippers, holders for said cranks, and pin-and-slot joints between said levers and said holders.

35. In a machine for shucking oysters, the
 15 combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a stationary stop opposite the grippers while they are open, and apparatus governed by said element for closing said grippers, said apparatus consisting of a stationary double cam
 20 forming a groove, as many pivots as there are grippers projecting from said element, levers pivoted to the respective pivots, a roller on each lever running in said groove, and mechanism connected up between said
 30 levers and said grippers, said mechanism consisting of cranks connecting with said grippers, holders for said cranks, and pin-and-slot joints between said levers and said holders, said cam being formed endless around the center of said element, arc-shaped around
 35 said center at a certain distance therefrom for acting upon said rollers to maintain said grippers closed, curved inwardly toward the center, and then arc-shaped again at a less distance from said center to act upon said
 40 cams for maintaining said grippers open, and then curved outwardly from said center for acting upon said rollers to close said grippers.

36. In a machine for shucking oysters, the
 45 combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a pusher for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of
 50 said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding hinges lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond
 60 said means, and grinding-disks for cutting holes in the shells at said hinges and located beyond said means, and an organization governed by said element for driving the disks in units of several each.

37. In a machine for shucking oysters, the
 65 combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter, a driver for said element, a pusher for pressing against an oyster with a spring action when an oyster is being driven into said grippers, means beyond said feeding device in the direction of rotation of
 70 said element, and located opposite the path of said grippers for causing oysters in successive grippers to have their protruding pushers lie in one and the same circle, an arrangement governed by said element for closing said grippers before they move beyond
 80 said means, and disks for cutting holes in the shells at said hinges and located beyond said means, and an organization governed by said element for driving the disks in units of several each, said organization consisting of pulleys attached to said disks, other pulleys separate from said disks, and a belt passing alternately over the first and second named pulleys.

38. In a machine for shucking oysters, the
 90 combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, and means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, said means consisting of a cam-and-roller device, the cams thereof being stationary, and the rollers of said device being individually connected with said grippers and devices for adjusting the oyster in the jaws, while the latter are still maintained open by said means.

39. In a machine for shucking oysters, the
 105 combination of a rotating element, oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connected between said element and said feeding device for operating the same, means for resisting the action of said feeding device upon an oyster when being fed into any pair of
 110 grippers, a stop beyond said feeding device for preventing said oyster from being pushed too far by said means, and means for closing said grippers upon an oyster before passing said stop, grinding-disks beyond said stop for cutting holes in said oysters, pivoted arms supporting said disks, and screws for adjusting the positions of said arms.

40. In a machine for shucking oysters, the
 120 combination of a rotating element, oyster-grippers thereon, a feeding device for supplying oysters to said grippers, mechanism connected between said element and said feeding device for operating the same, means for resisting the action of said feeding device upon
 125 an oyster when being fed into any pair of grippers, a stop beyond said feeding device for preventing said oyster from being pushed

too far by said means, and means for closing said grippers upon an oyster before passing said stop, grinding-disks beyond said stop for cutting holes in said oysters, pivoted arms supporting said disks, and screws for adjusting the positions of said arms, pulleys attached to said disks, and a driving-belt passing over the same in series.

41. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, fingers for entering said holes for separating said shells, means being provided for separating said fingers from each other, projectile-blades carried by said fingers, and means for projecting said blades into said oysters for severing the meats from the shells.

42. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said grippers for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, and fingers for entering said holes for separating said shells.

43. In a machine for shucking oysters, the combination of cutters for removing the material at the hinges of oysters for destroying the hinges and forming holes through the shells, a driver for propelling said oysters along a path, a pair of pivoted fingers, with their pivots so disposed that the ends of the fingers can be brought to each other for entering said oysters in pairs, and means controlled by said driver for moving said fingers bodily away from each other while in said holes, for separating said shells.

44. In a machine for shucking oysters, the combination of cutters for removing the material at the hinges of oysters for destroying the hinges and forming holes through the shells, a driver for propelling said oysters along a path, a pair of pivoted fingers, with their pivots so disposed that the ends of the fingers can be brought to each other for entering said oysters in pairs, and means controlled by said driver for moving said fingers bodily away from each other while in said holes, for separating said shells, said means for each finger being in duplicate and either duplicate

consisting of a toothed segment rigid with one of said fingers, a toothed rack normally out of engagement with said segment, a single driver for all of the above-named elements, and devices connected with said drivers and said segment for bringing the latter into engagement with said rack.

45. In a machine for shucking oysters, the combination of cutters for removing the material at the hinges of oysters for destroying the hinges and forming holes through the shells, a driver for propelling said oysters along a path, a pair of pivoted fingers, with their pivots so disposed that the ends of the fingers can be brought to each other for entering said oysters in pairs, and means controlled by said driver for moving said fingers bodily away from each other while in said holes, for separating said shells, said means for each finger being in duplicate and either duplicate consisting of a toothed segment rigid with one of said fingers, a toother rack normally out of engagement with said segment, a single driver for all of the above-named elements, and devices connected up with said driver and said segment for bringing the latter into engagement with said rack, said devices consisting of a holder for said segment, a stationary cam, and a roller carried by said holder, and bearing on said cam.

46. In a machine for shucking oysters, the combination of cutters for removing the material at the hinges of oysters for destroying the hinges and forming holes through the shells, a driver for propelling said oysters along a path, a pair of pivoted fingers, with their pivots so disposed that the ends of the fingers can be brought to each other for entering said oysters in pairs, and means controlled by said driver for moving said fingers bodily away from each other while in said holes, for separating said shells, said means for each finger being in duplicate and either duplicate consisting of a toothed segment rigid with one of said fingers, a toothed rack normally out of engagement with said segment, and a cam-and-roller device connected up with said driver both for bringing said segment into engagement with said rack and for rotating said segment by the joint action of said rack and said cam-and-roller device.

47. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distance therefrom, apparatus for cutting holes in the shells of the oysters, and fingers for entering said holes for separating said shells,

and devices for successively rotating said fingers to enter said holes and for moving said fingers bodily for forcing the shells of the oysters apart.

48. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, partly rotary fingers for entering said holes close together in pairs, and a toothed segment and rack for rotating each pair of said fingers.

49. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, fingers for entering said holes for separating said shells, a pivoted toothed segment carried by each finger, a pivoted rack for engaging with said segment, the pivots for the last two elements being on lines parallel, to each other, a movable support for the pivot of the segment, and an arrangement provided between said support and said rack for tilting said support during a part of its movement.

50. In a machine for shucking oysters, the combination of a rotating element, oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said grippers for opening and closing the latter, an automatic regulator for causing the oysters in said grippers to project equal distances therefrom, cutters for making holes in the shells of the oysters, a pair of rotary fingers for entering any hole in the oysters, said fingers being normally out of the hole, the device for rotating each finger consisting of a pivot for the finger, movable along a straight line, teeth arranged around said pivot and rigid therewith, a rack whose teeth are in a straight row and parallel to said line, and a device governed by said element for causing the first-named teeth to roll over the second-named teeth, which latter are stationary.

51. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for op-

erating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, blades, and projectors for propelling said blades and guiding the same for severing the meats from the shells.

52. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, blades, projectors for propelling said blades and guiding the same for severing the meats from the shells, and propellers for operating said projectors, consisting of cam-and-roller devices.

53. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeding device for supplying oysters to said grippers, means governed by said element for maintaining said grippers open for a predetermined interval of time after being fed with oysters, a stationary stop opposite the grippers while they are open, and apparatus governed by said element for closing said grippers, said apparatus consisting of a stationary double cam forming a groove, as many pivots as there are grippers projecting from said element, levers pivoted to the respective pivots, a roller on each lever running in said groove, and mechanism connected up between said levers and said grippers, said mechanism consisting of cranks connecting with said grippers, holders for said cranks, pin-and-slot joints between said levers and said holders, said cam being formed endless around the center of said element, arc-shaped around said center at a certain distance therefrom for acting upon said rollers to maintain said grippers closed, curved inwardly toward the center, and then arc-shaped again at a less distance from said center to act upon said cams for maintaining said grippers open, and then curved outwardly from said center for acting upon said rollers to close said grippers, a second cam with a similar contour, second rollers in said second cam, means for cutting holes in said oysters, fingers controlled by said second rollers for entering said holes, there being a pair of fingers for each of said grippers, a device for forcing apart the shells of the oysters by separating each pair of fingers from each other, pairs of blades, propellers for driving said blades into said holes for severing the meats,

and consisting of a third stationary cam, and rollers carried by one set of the members of said pairs of blades for being operated by said third cam, there being a similar cam and roller movement for the other set of members of the said pairs of blades.

54. In a machine for shucking oysters, the combination of a rotating wheel, oyster-grippers carried thereby, cutters for making holes in the oysters held by said grippers, a blade projecting into one of the holes, and being movable, in a direction for severing the meats, a roller carried by said blade, and a cam for the roller, a bearing for the blade being provided and movable with said wheel, said cam being stationary.

55. In a machine for shucking oysters, the combination of oyster-grippers, cutters for making a hole in the oyster held in said grippers, a driver for moving said grippers, a blade, means for pointing said blade into said hole, and a propeller for projecting said blade through the hole into the oyster, said propeller consisting of a driver for propelling the blade laterally synchronously with said grippers, a stationary cam, and a roller for said cam mounted upon said blade, and a guide for the blade for causing it to move point first when said roller is propelled by said cam.

56. In a machine for shucking oysters, the combination of a rotating element, open oyster-grippers thereon, a feeder for supplying oysters to said grippers, mechanism connecting said element and said device for operating the latter to open and close the same at predetermined intervals, a regulator for adjusting the oysters in said grippers, for causing the oysters therein to project the same distances therefrom, apparatus for cutting holes in the shells of the oysters, fingers for entering said holes for separating the shells, blades for entering said holes, for severing the meats from the oysters, means for closing said grippers before the action of said cutting apparatus, and for opening said grippers after the discharge of the meats for delivering the shells of the oysters.

57. In a machine for shucking oysters, the combination of a set of fingers for entering a hole formed in the shell of the oyster, and means for separating the fingers from each other to pull the shells apart, and a driver for actuating said fingers, means for holding the oyster, and connections for coördinating the movements of the oyster.

58. In a machine for shucking oysters, the combination of flexible knives, means for cutting holes in the oysters for the entrance of said knives to separate the meats from the shells, means for separating the shells sufficiently to deliver the meats, a driver being provided for actuating the above-named elements, means for holding the oysters, and

connections for coördinating the movements of the oysters.

59. In a machine for shucking oysters, the combination of a rotating wheel, grippers thereon for holding oysters, a feeding device for supplying said grippers with oysters, abrasive cutters for freeing the shells of each oyster from each other, a pair of fingers for insertion between the shells of each oyster, flexible knives for separating the meats from the shells, a driver and mechanisms connected up therewith for operating the elements, in the required order.

60. In a machine for shucking oysters, the combination of a rotating wheel, jaws arranged in a row thereon in pairs, and means governed by the motion of said wheel, for alternately opening and gradually closing the pairs of jaws, said means consisting of a stationary cam-plate, having two endless cam-surfaces, a roller for each pair of jaws between said surfaces, a tube for each pair, bell-cranks connecting said tubes to the respective jaws, and a retractile spring for each tube.

61. In a machine for shucking oysters, the combination of a rotating wheel, jaws arranged in a row thereon in pairs, means governed by the motion of said wheel, for first opening the pairs of jaws in succession, then gradually closing the jaws in succession, and then gradually opening them again in succession, said means consisting of a single cam and a series of rollers therein connected up respectively with the pairs of jaws, a feeder successively opposite the pairs of jaws in their open condition, a stop beyond the feeder, opposite said jaws, and spanning about two pairs of jaws at a time, a series of grinding-disks beyond the stop, each one being nearer and nearer the center of the wheel, fingers carried by said wheel, a cam-and-roller device for operating the same at a point beyond said disks and for pulling apart the shells of the oysters, blades, rollers connected up therewith, a cam beyond said disks and in the path of said rollers for guiding them out of said path for propelling said blades into said oysters, and intermediate mechanisms connected with said wheel for actuating the various parts in the required manner and order.

62. In an oyster-shucking machine, the combination of a wheel; equidistant pairs of gripping-jaws on its periphery; a pusher-lever; and connections moving the lever toward the wheel when a gripping-jaw comes opposite to said lever; whereby one oyster is fed to each gripping-jaw.

63. In a machine for shucking oysters, the combination of a traveling element, a series of jaws mounted thereon for receiving oysters while in motion, a pusher-lever for feed-

ing oysters successively to said jaws, a yielding stop in each of said jaws for maintaining any oyster of whatever size against said lever, means for closing said jaws to grip the
5 oysters, and connections causing the lever to approach each jaw as it comes opposite said lever.

In testimony whereof we have hereunto

subscribed our names and affixed our seals this 17th day of January, 1905.

EDWARD L. TORSCH. [L. s.]
JOHN H. PARKER. [L. s.]

Witnesses:

EDW. R. SAPPINGTON,
EDWARD H. SAPPINGTON.