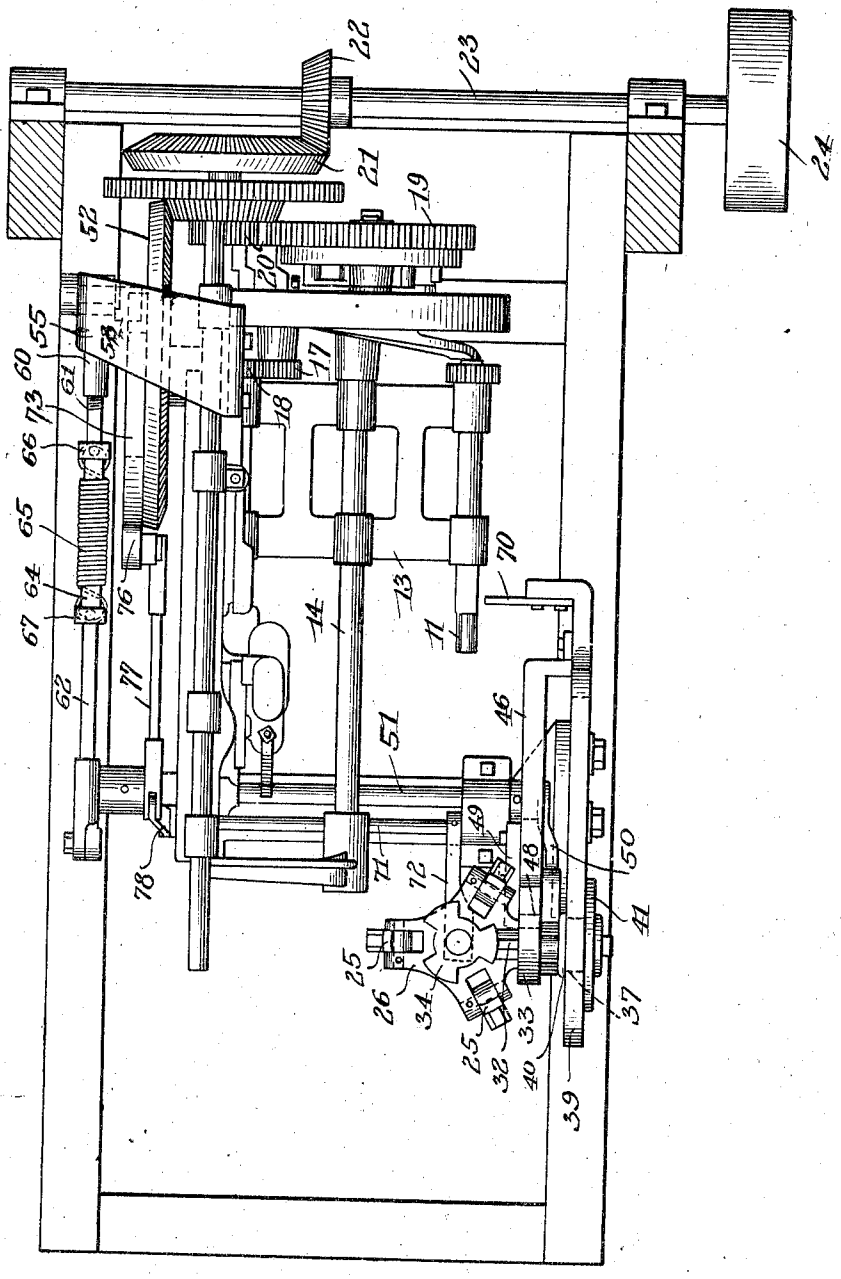
Jan. 28, 1930. C. S. FISH 1,745,158

APPLE PARING MACHINE

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Fig. 1



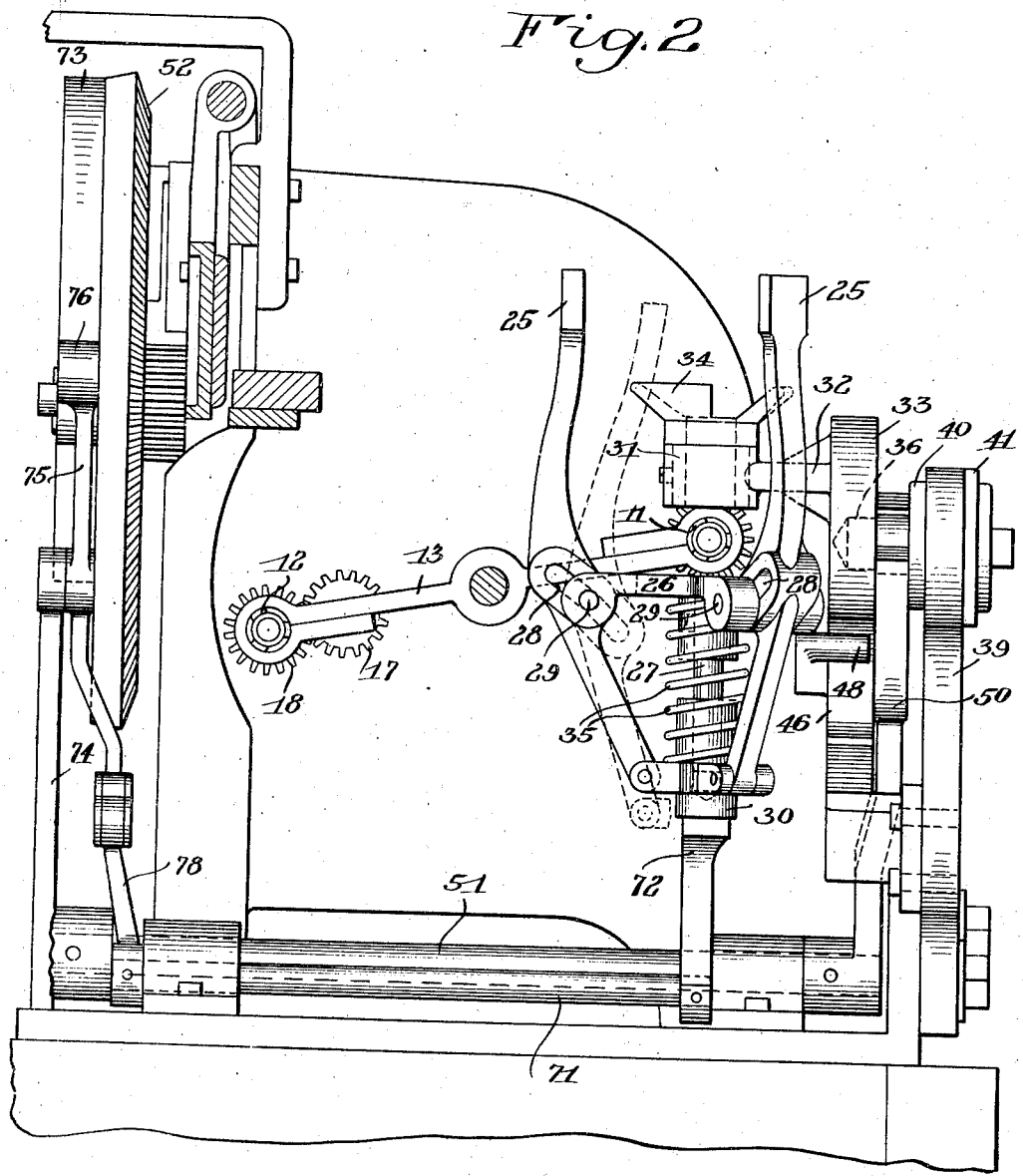
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APPLE PARING MACHINE

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Fig. 2



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APPLE PARING MACHINE

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Fig. 4

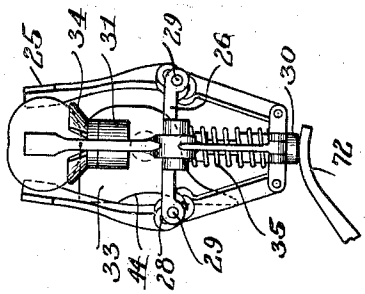
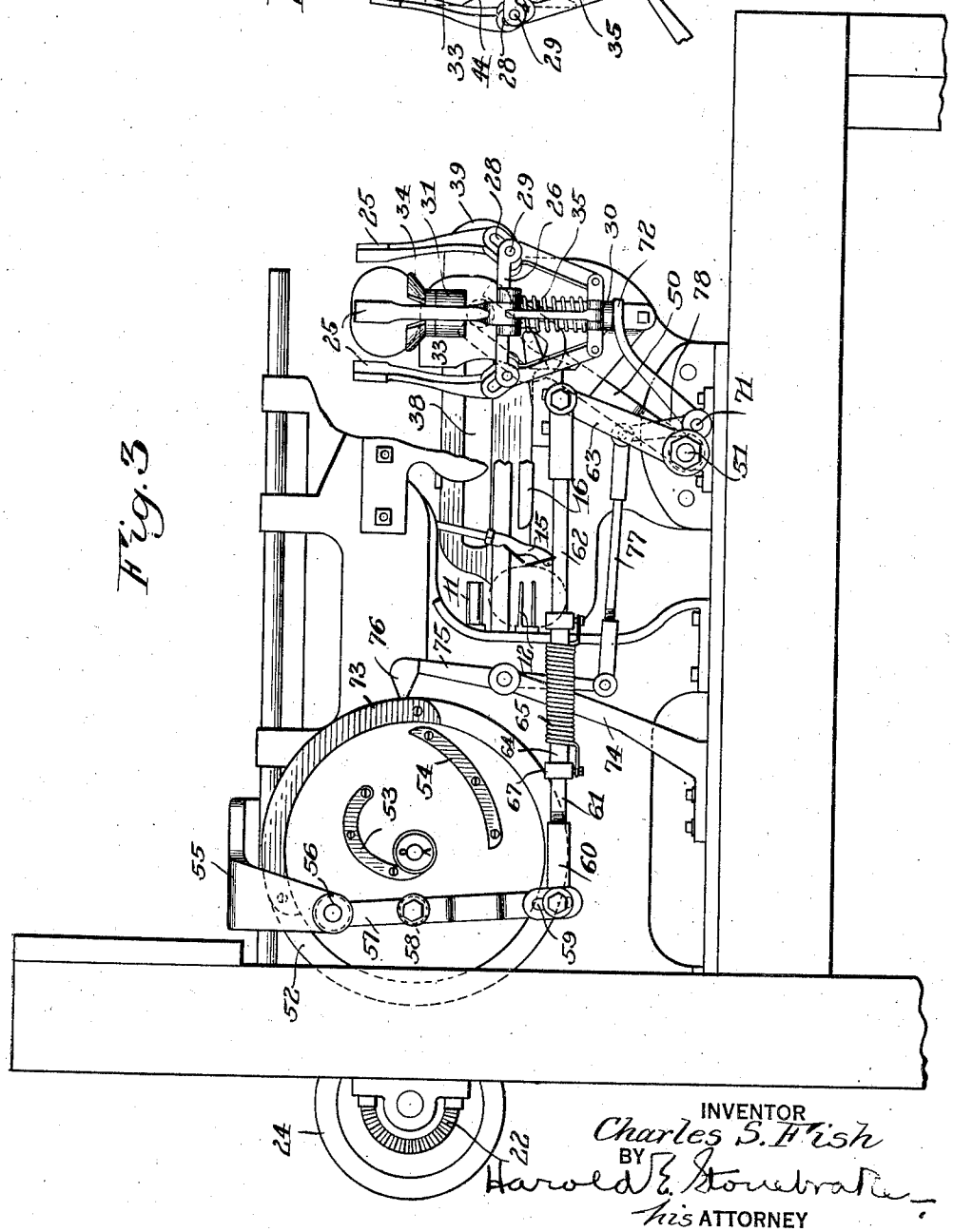


Fig. 3



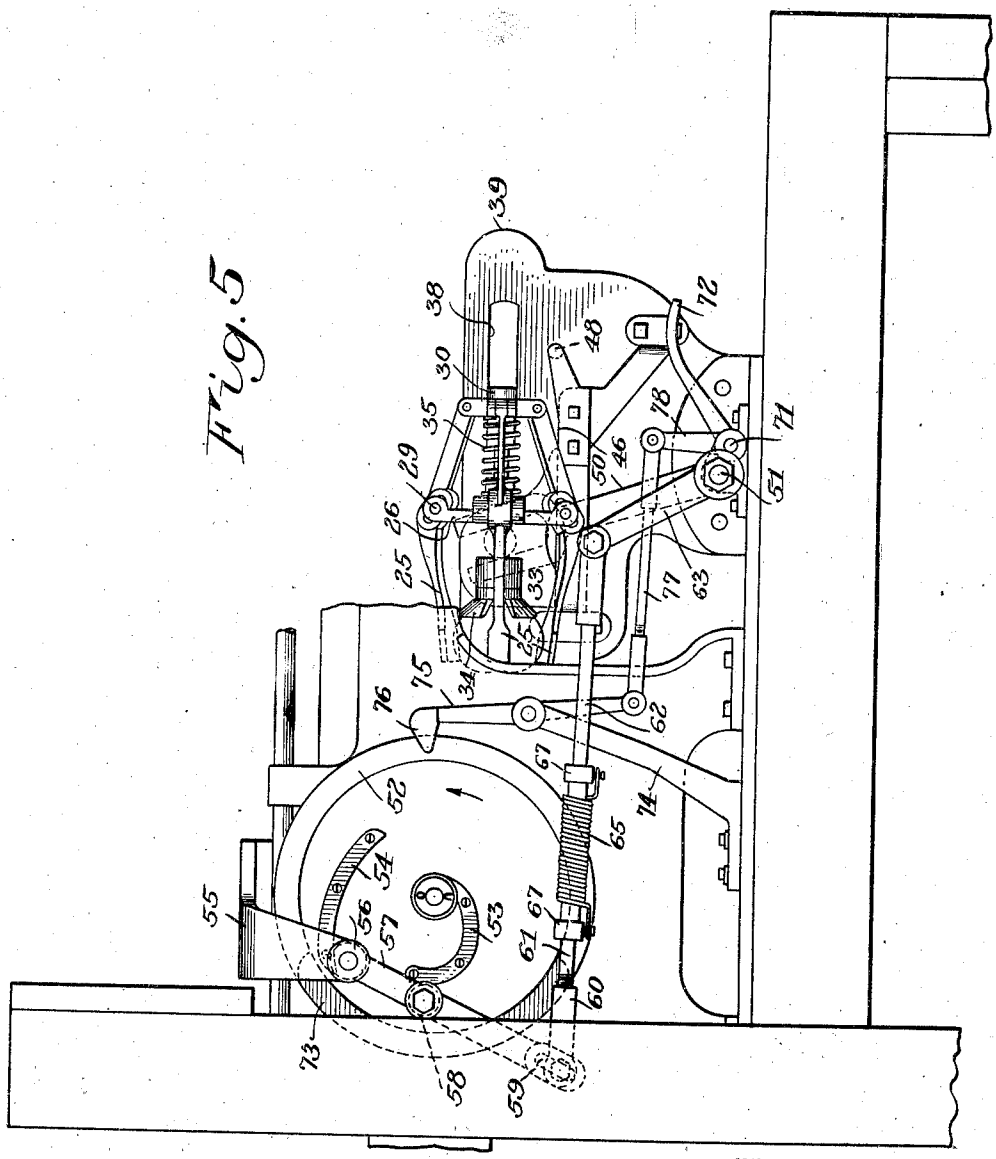
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APPLE PARING MACHINE

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Fig. 5



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APPLE PARING MACHINE

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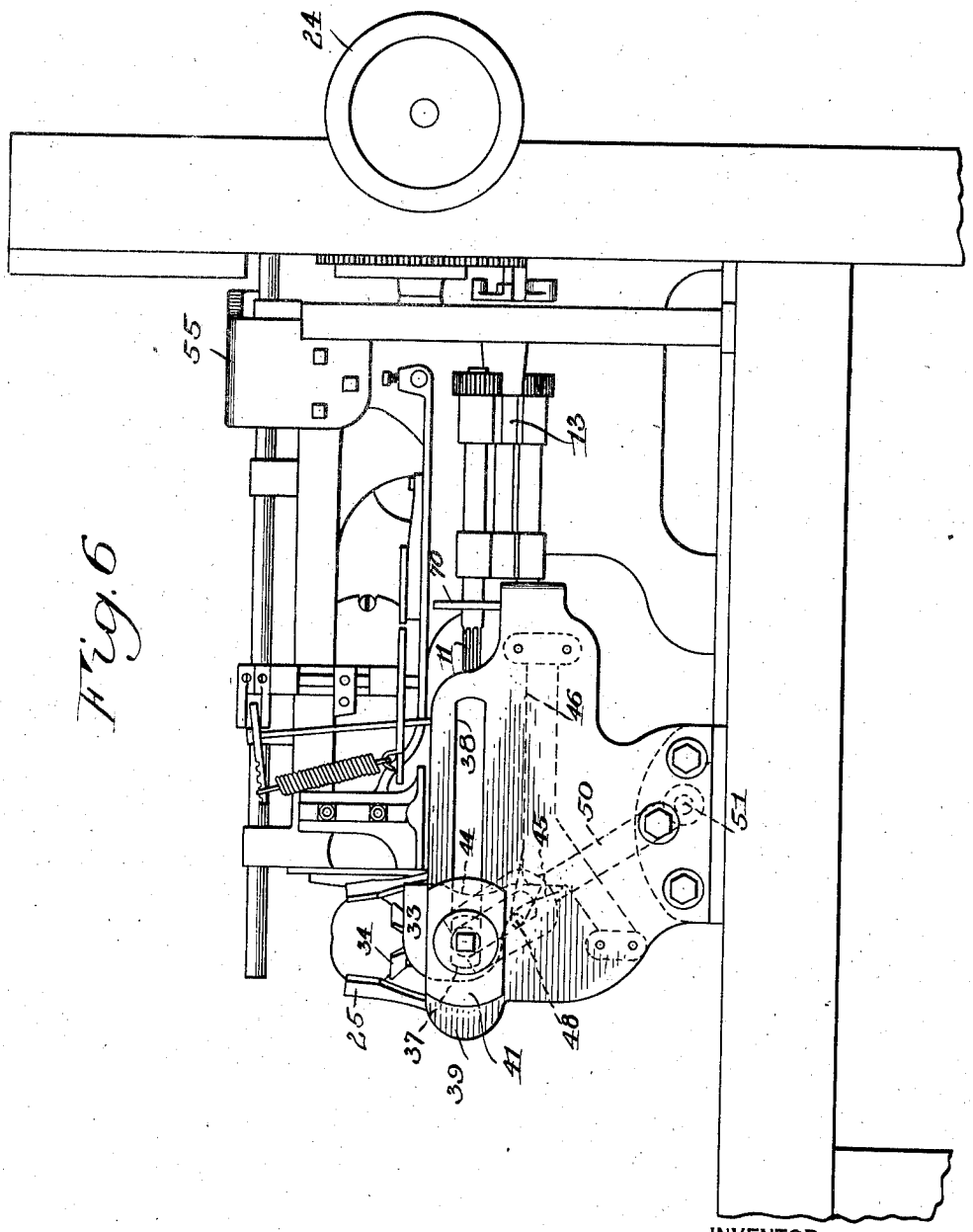


Fig. 6

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APPLE PARING MACHINE

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Fig. 7

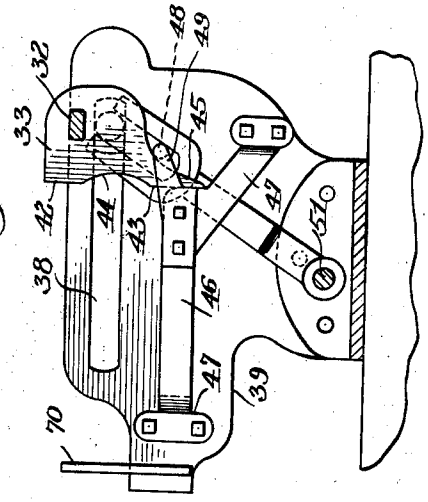


Fig. 8

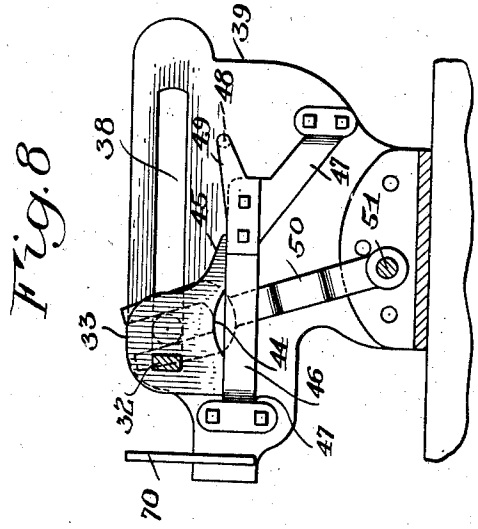
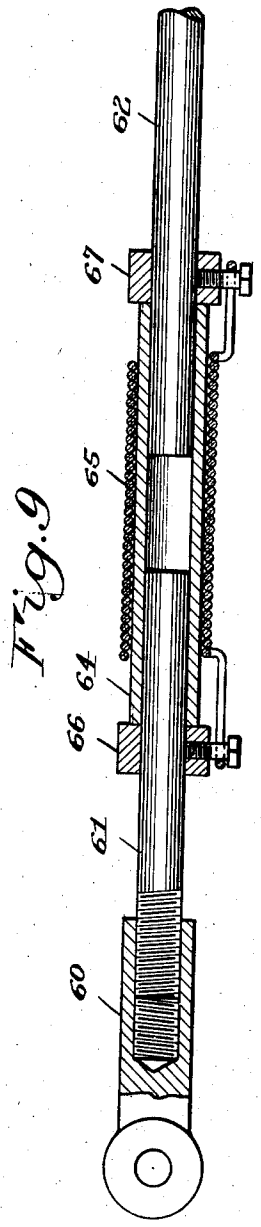


Fig. 9



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1,745,158

UNITED STATES PATENT OFFICE

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APPLE-PARING MACHINE

Application filed May 21, 1927. Serial No. 193,322.

This invention relates to an apple paring machine, and more particularly to an apple gripping device for positioning apples upon the forks of such machines.

The invention has for its principal object to provide a mechanism which will center apples accurately upon the forks, without requiring great care on the part of the operator.

Other objects are to provide an improved and simplified construction, easy and cheap to manufacture, and which will not readily become out of order.

A further object of the invention is to eliminate a large part of the noise and vibration incident to mechanisms heretofore used, and to afford mechanism offering minimum resistance and requiring minimum power for its operation.

Another object is to provide compensating mechanism to allow the use of apples of different sizes without damage to the machine.

A still further object of the invention is to provide a simplified mechanism for opening the jaws of the apple gripping device to permit a fresh apple to be placed therein.

Still another object of the invention is to provide mechanism for opening the jaws which acts in such a direction as will produce no tendency to move the gripping device along its guideway.

With these and other ends in view, the invention comprises the structure and combination of parts which will appear more clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Figure 1 is a plan of an apple paring machine showing one possible embodiment of my invention applied thereto;

Figure 2 is an end elevation of the machine shown in Figure 1;

Figure 3 is a side elevation thereof, showing the jaws of the apple gripping device in open position to receive an apple;

Figure 4 is a view of the apple gripping device showing the jaws thereof closed to retain an apple;

Figure 5 is a view similar to Figure 3 showing the apple gripping device positioning an apple upon the fork;

Figure 6 is a side elevation of part of the machine, showing especially the guideways for the apple gripping device;

Figure 7 is a fragmentary side elevation of part of the apple gripping device in its normal or apple receiving position;

Figure 8 is a view similar to Figure 7 showing the parts in the position for placing an apple upon the fork, and

Figure 9 is a section through part of the actuating mechanism, illustrating the compensating device.

I have illustrated my invention in connection with a conventional apple paring machine in which apples are positioned upon forks 11 and 12 rotatably mounted upon a reel 13 which may be revolved upon a shaft 14. As is well understood in the art, an apple is placed upon one of the forks when it is in the position of the fork 11, and the reel is then rotated until this fork is in the position of the fork 12, bringing the fork which was formerly at 12 into the position 11. The fork in the position 11 then has an apple positioned upon it, while the apple on the fork 12 is being pared and cored by suitable mechanism, such as the knife 15 and corer 16, the apple being meanwhile rotated by engagement of the driving gear 17 with the gear 18 on the fork spindle. The gear 17 is driven, and the reel 13 is rotated, through suitable trains of gearing, which may comprise the gears 19, 20, 21 and 22, shown in Figure 1. The gear 22, as shown in this figure, is mounted upon the main drive shaft 23 which may be provided with a pulley 24 driven from any suitable source of power.

It should be understood that the mechanism heretofore described forms no part of my present invention, but is simply a well known form of apple paring machine. My invention relates to a mechanism for placing apples upon the fork 11.

One possible embodiment of my invention comprises an apple gripping device including a plurality of gripping jaws 25 for gripping an apple when placed therein by the

operator, conveying it to, and positioning it upon the fork 11. These jaws may be movably mounted upon a member 26 fixed by a set screw on the shaft 27. As will be seen clearly from Figure 2, the jaws have diagonal slots 28 formed therein, through which slots are inserted pins 29 carried by the member 26. The lower ends of the jaws are pivoted to lugs fixed to the sleeve 30 slidable upon the shaft 27. As will be readily apparent from Figure 2, upward movement of the sleeve 30 will move the jaws upward, and at the same time the upper ends of the jaws will open or move outward, due to the inclination of the slots 28. Similarly, a downward movement of sleeve 30 will result in bringing the upper ends of the jaws together.

The upper end of the shaft 27 may be fixed, such as by a set screw, in the socket 31 which is integrally connected, through the web 32, to the control block 33 which will be described in greater detail below. Thus the members 26, 27 and 31 are all secured rigidly to each other and to the block 33, and are carried by the latter. On the top of the socket 31 may be fixed an apple support 34, slightly concave on its top surface, and having its periphery cut away in part, as shown in Figure 1, so that it will not interfere with the closing movement of the jaws 25.

It will now be understood that an apple is placed by the operator upon the support 34, when the jaws are in their open position, shown in Figures 2 and 3. When the sleeve 30 moves downward, the jaws will close, gripping the apple as shown in Figure 4. Due to the fact that the jaws are all connected to the same member at their bottom ends, each jaw will necessarily be open or closed exactly the same amount as the other jaws at any given instant. Thus the jaws in closing will act as a centering device, and will position the apple exactly in the center of the support 34, irrespective of the position in which the operator may have placed it. A coil spring 35 surrounding the shaft 27 between the members 26 and 30 presses constantly downward upon the latter and thus tends to keep the jaws 25 closed, or to close them after they have been opened. The mechanism for raising the sleeve 30 so as to open these jaws will be described below.

The control block 33 above referred to is pivotally mourted upon the end of a short shaft 36 which extends into a socket in the side of the block 33, the block being retained on the shaft in any suitable manner which will permit partial rotation or oscillation while preventing longitudinal movement of the shaft relative to the block. This shaft 36 extends outward a substantial distance from the side of the control block 33 and near its end is enlarged to form a block 37 shown in dotted outline in Figure 6. This block has smooth upper and lower surfaces, and forms a slide movable back and forth lengthwise in the slot or guideway 38 formed in the frame member 39. Side pieces 40 and 41 are fixed to the shaft 36, one on each side of the frame 39 and in engagement therewith. Thus the parts 37, 40 and 41 form a slide reciprocable in the guideway 38, this slide having a substantial bearing surface not only against the top and bottom of the slot but against the sides of the frame as well. Since the apple gripping device, including the jaws 25, the support 34, and associated parts, is mounted upon and entirely supported by the shaft 36, it follows that this gripping device may be moved back and forth by moving the shaft in its guideway.

The apple gripping device has been described so far with its axis in a vertical position, as shown in Figure 3. This is the position in which the device stands when a fresh apple is placed therein by the operator. In order to deliver this apple to the fork 11, and to place the same thereon, it is necessary not only to move the gripping device in the guideway 38 but also to turn it so that its axis will be horizontal, as shown in Figure 5, thus bringing the apple into alinement with the fork. This turning movement or oscillation is possible because of the mounting of the gripping device upon the shaft 36. As will be noted from Figures 2 and 3, the fork 11 and the shaft 36 lie in the same horizontal plane and at approximately right angles to each other, while the axis of the gripping device lies in the same vertical plane with the fork and is rotatable on the shaft 36.

Consequently, if the gripping device be oscillated from the Figure 3 position through approximately 90° until its axis is horizontal, as shown in Figure 5, the axis of the gripping device will be accurately alined with the axis of the fork 11, and an apple held by the gripping device will be centered squarely on the fork.

The mechanism for producing this partial rotation or oscillation of the gripping device on the shaft 36 may be of any suitable construction. Preferably, however, I produce this oscillation through mechanism controlled by the reciprocation of the slide 37. One possible embodiment of my invention utilizes the control block 33, heretofore mentioned, for this purpose. The main portion of this block, as shown in Figures 7 and 8, includes two alined surfaces 42 and 43 along one side thereof, with a slightly hollowed out portion 44 between them. A cam nose 45 is formed at one corner of the block, one side of this nose being the surface 43 and the other side extending at an angle thereto, as shown in Figures 7 and 8. A control guide 46 is fixed to brackets 47 extending from the side of the frame 39, and a stop member 48, which may be in the form of a pin, extends sideways from an extension 49 on the guide 46.

These parts are so arranged that when the slide 37 is at the end of its stroke away from the apple fork 11, the control block 33 will be held rigidly in the position shown in Figure 7, clockwise rotation thereof being prevented by engagement of the surface 43 with the end of the control guide 46, and counterclockwise movement being prevented by engagement of the cam nose 45 with the stop member 48. In this position, the apple gripping device is in the upright position shown in Figure 3. As soon as the slide 37 begins to move to the left, as viewed in Figures 7 and 8, or toward the apple fork, the control block 33 will commence to move in counterclockwise direction, due to the surface 43 being restrained by the end of the control guide 46. Before the slide has moved very far, the control block will have turned until the surface 42 is against the top of the guide 46, and throughout the rest of the stroke the parts will be in this relation, with both the surfaces 42 and 43 in contact with the top of the guide until the end of the stroke is reached, this final position being illustrated clearly in Figure 8. Thus the control block 33 will have turned through approximately 90°, and since the apple gripping device is carried by the web 32 extending from the side of the block, it also will have turned through the same angle, bringing it into the position shown in Figure 5.

On the return stroke, the control block will slide along on the guide 46 until almost the end of the stroke, when the cam nose 45 will catch under the stop 48. By this time, the surface 43 has passed the end of the guide 46 and is free to move downward, so that continued movement will throw the cam nose down into the original position shown in Figure 7. Thus the apple gripping device is returned to its upright position, shown in Figure 3.

A stop member 70 may be fixed to the frame 39 adjacent the apple fork 11. This member 70 limits the movement of an apple when being positioned on the fork, and thus prevents it from being placed too far on to the fork. Were it not for a stop member such as this, it is obvious that a large apple would be placed farther on the fork than a small one, but with this arrangement all sizes of apples are placed in approximately the same position on the fork, thus making the operation of paring more uniform and resulting in a better product. It is obvious that when a large apple is being placed on the fork by the gripping device, it will come in contact with the stop member 70 before a smaller apple would reach this stop, and it will prevent the apple gripping device from completing its normal full stroke. In order that the mechanism may not be broken under such conditions, it is desirable to provide resilient connections which will permit stoppage of the gripping device before the end of its stroke, if such stoppage is necessary, due to the size of an apple being used. I have provided resilient or compensating connections for this purpose, as described below.

Any suitable mechanism may be employed for reciprocating the slide 37. Preferably, I use a forked arm 50 fixed to a shaft 51 extending across the machine. This arm 50, as shown especially in Figures 2, 7 and 8, extends upward just inside the frame 39 and between this frame and the control guide 46, and it has a forked end, one branch of which extends on each side of the shaft 36. Thus oscillation of the arm 50 will reciprocate the shaft 36, the slide 37, and the apple gripping device mounted upon the shaft.

As one possible way of oscillating the arm 50 through the shaft 51, I have disclosed a cam gear 52 driven from the main gear train shown in Figure 1. This gear carries on its face two cams, an advancing cam 53 and a retracting cam 54, both shown in Figures 3 and 5. A bracket 55 fixed to the frame of the machine, extends over the top of the cam gear 52 and down part way over the face thereof. To this bracket is pivoted at 56 an arm 57 carrying a roller 58 for cooperation with the cams above mentioned. As the cam gear 52 rotates in the direction of the arrow, the advancing cam 53 will contact with the roller 58 and force the same radially outward, thus moving the lower end of the arm 57 to the left as seen in Figures 3 and 5. The cam 54 then comes in contact with the roller and pulls it inward again to its original position, bringing the lower end of the lever to the right. Figure 3 shows the parts slightly before the cam 53 begins to operate upon the roller, while Figure 5 shows the cam 53 completing its action upon the roller and the cam 54 nearly ready to begin the retraction thereof.

The lower end of the arm 57 is slotted at 59 and pivoted thereto is a sleeve 60 into which is threaded the end of a rod 61. Another rod 62 in alinement with the rod 61 is pivoted to the crank arm 63 fixed on the shaft 51. The ends of the rods 61 and 62 are slightly separated from each other and a sleeve 64 surrounds the ends of both rods, as shown in Figure 9. Around this sleeve is arranged a compensating spring 65, the ends of which are secured to screws on collars 66 and 67 fixed on the rods 61 and 62 respectively. Thus a resilient connection is provided so that the arm 57 and the rod 61 may move through their full range of motion without breaking the apparatus in case an unusually large apple prevents the arm 50 from completing its full range of movement, since when the rod 62 is stopped, the spring 65 may stretch and allow full movement of the rod 61. The screw connection between the sleeve 60 and the rod 61 allows fine ad-

justment of these parts so as to vary the normal throw of the apple gripping device.

In machines of this general character, the opening of the jaws which grip the apple has generally been attended with considerable noise and vibration. This has resulted in rapid wearing of the parts and in making working conditions less pleasant for the operators of the machines. In the preferred embodiment of my invention, I utilize mechanism for opening the gripping jaws which is comparatively quiet in operation, requires minimum power for its operation, does not produce jars or vibrations, and consequently lasts longer, requires less adjustment, and makes working conditions in general more satisfactory.

To this end I provide a shaft 71 extending across the machine parallel to the shaft 51 above described. Near the right hand end of this shaft, as seen in Figure 2, and in the plane of the gripping device, I provide an arm 72 fixed to the shaft by a pin or other suitable means. This arm extends upward from the shaft at approximately 45°, and is slightly curved at its upper end, as shown clearly in Figures 3 and 5. The parts are so constructed that when the apple gripping device is in its apple receiving position, shown in Figure 3, the end of the arm 72 will engage and lift the sleeve 30 of the gripping device. As previously described, an upward movement of the sleeve 30 will result in opening the gripping jaws 25, thus allowing the insertion of a fresh apple by the operator. It is apparent that slight rotation of the shaft 71 and arm 72, in counterclockwise direction, as seen in Figure 3, will result in raising this sleeve and opening the jaws. Similarly, if the arm be moved in clockwise direction, the sleeve will be released and the spring 35 will move it downwardly, closing the jaws and gripping the apple which has been placed between them.

It should be especially noted that the direction of force transmitted from the arm 72 to the apple gripping device, in opening the latter, is directly upward, or at right angles to the direction of the guideway 38. Such a construction is very desirable, since it produces no tendency to move the gripping device along the guideway. The thrust of the arm 72 is taken up entirely by the top surface of the guideway and is applied perpendicularly thereto, none of the strain being transmitted to the arm 50 or other parts of the reciprocating mechanism.

Any suitable means may be provided for rotating the shaft 71 and arm 72 in order to produce the desired opening of the gripping jaws. As one possible way of doing this, I have shown a cam 73 at the periphery of the cam gear 52. On a bracket 74 extending upward from the frame of the machine, is pivoted a lever 75 having a nose 76 to cooperate with the cam. To the other end of this lever is pivoted one end of a rod 77, the other end of which is pivoted to a crank arm 78 fixed on the shaft 71. If desired, sleeves provided with threads may be used at the ends of the rod 77, as shown in Figures 3 and 5, in order to provide for adjustment of the parts.

The cam 73 is so placed with respect to the cams 53 and 54 that the lever 75 will be acted upon during the time that the apple gripping device is at the end of its reciprocation and in the normal or upright position shown in Figure 3. The parts are so arranged that the arm 72 normally stands just below and almost in contact with the sleeve 30, and only a comparatively slight upward movement of the arm and sleeve is necessary in order to open the gripping jaws.

The cycle of operation of the machine is as follows: Beginning with the position shown in Figure 3, in which the jaws are open, the operator places an apple upon the support 34. An instant later, as the cam gear 52 rotates in the direction of the arrow, the nose 76 drops off the end of the cam 73, thus releasing the lever 72 and allowing it to drop downward. The spring 35 then forces the sleeve 30 downward, closing the jaws of the gripping device and tightly gripping the apple, as shown in Figure 4. The cam 53 then begins to act upon the roller 58 on the arm 57 and thus moves the forked lever 50 through the connections previously described. This results first in turning the apple gripping device from the vertical position to a horizontal position and then in sliding the same toward the apple fork, the apple then being directly in line with the fork. The apple is thus positioned upon the fork, being accurately centered thereon, and if the apple happens to be a large one, it will be stopped by the member 70, though the lever 57 will be allowed to complete its full stroke by slightly expanding the spring 65. The position of the parts at the end of the stroke, just after the apple has been placed on the fork 11, is illustrated in Figure 5. The apple is impaled on the fork by a quick action and with considerable force, the impact being such as to cause the gripping jaws 25 to spring outwardly just a trifle, and sufficiently so that the frictional engagement between the fork and the apple overcomes the gripping action of the jaws 25 on the apple and causes it to be retained on the fork as the gripping device moves away. An instant after this, continued rotation of the cam gear 52 will bring the end of the cam 53 past the roller 58, and the forward end of the cam 54 will then engage the other side of the roller and pull the lever 57 back moving the apple gripping device back to the other end of the guideway 38 and oscillating it from the horizontal position into the vertical position. As the gripping device reaches

this position, the front end of the cam 73 engages the nose 76 on the lever 75, and thus raises the arm 72 to open the jaws of the gripping device. This completes the cycle of operation, the operator now placing another apple in the device and the same operation above described being repeated.

While I have disclosed one embodiment of my invention, it is to be understood that the inventive idea may be carried out in a number of ways. Therefore, I do not desire to be limited to the precise details shown, but this application is intended to cover all modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim:

1. The combination with an apple paring machine having an apple fork, of a normally vertical apple gripping device including movable jaws, means for turning said gripping device to a horizontal position, devices acting to open and close said jaws while the gripping device is in vertical position and before it commences to move toward horizontal position and means for moving said gripping device horizontally toward said fork, whereby an apple held by said gripping device will be affixed to said fork, the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

2. The combination with an apple paring machine having an apple fork, of a reciprocating gripping device movable toward and away from said fork and including movable jaws, means for partially rotating said device at one end of its line of travel, and devices acting to open and close said jaws while the gripping device is stationary and before it commences said partially rotating movement, the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

3. In an apple paring machine, the combination of an apple fork, an apple gripping device movable toward and away from said fork in alinement therewith and including movable jaws, means operating during the movement of said gripping device for moving it out of alinement with the fork at one end of its travel, and devices acting to open and close said jaws while the gripping devices are at rest between successive actuations thereof.

4. In an apple paring machine, the combination with an apple fork, of an apple gripping device including jaws for gripping an apple, said device being movable as a whole toward and away from said fork, guideways for guiding said gripping device in its movement, and mechanism mounted externally of said gripping device and including operating means movable toward the gripping device when the latter is stationary, to open the gripping jaws the impact of the apple on the fork and the friction engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

5. In an apple gripping device, the combination of a plurality of movable jaws having diagonal slots intermediate their ends, a frame member, pins on said frame member extending through said slots, a movable member, pivotal connections between one end of each of said jaws and said movable member, and means for moving said movable member, thereby causing said jaws to open or close.

6. In an apple gripping device, the combination with a plurality of movable jaws having diagonal slots intermediate their ends, of a frame member, pins on said frame member engaging said slots, a shaft connected to said frame member, a sleeve slidable on said shaft, one end of each of said jaws being pivoted to said sleeve, whereby movement of the sleeve will move the jaws to open or close them, resilient means tending to keep said sleeve in jaw-closing position, and an arm adapted to engage said sleeve to move it to jaw-opening position.

7. In an apple paring machine, the combination with an apple fork, of an apple gripping device movable back and forth toward and from said fork about an axis passing approximately through its central part from a position in which the longitudinal axis of the gripping device is in alinement with the fork to a position in which said longitudinal axis is out of alinement with the fork, means operated by the movement of said gripping device near the end of its line of travel farthest from the fork for partially rotating said gripping device, said gripping device including movable jaws, and devices acting to open and close said movable jaws while the gripping device is stationary and before it commences said partial rotation, the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

8. In an apple paring machine, the combination with a reciprocating slide, of an apple gripping device mounted upon said slide and oscillable with respect to the slide, a control block mounted upon said gripping device, said block having a cam nose, a control guide cooperating with the control block, and a stop member near one end of the control guide, said parts being so arranged that one face of said control block slides along the

control guide during a reciprocating movement, holding said block and the gripping device in one angular position, and near one end of said reciprocation said cam nose comes in contact with said stop member, thus turning said control block to another angular position and oscillating the gripping device.

9. In an apple paring machine, the combination with an apple fork, of an apple gripping device including jaws for gripping an apple, said device being movable as a whole toward and away from said fork, guideways for guiding said gripping device in its movement, and a movable member operating to open the gripping jaws when the gripping device is stationary, the jaws automatically closing again while the gripping device is stationary, and the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

10. In an apple paring machine, the combination with an apple fork, of an apple gripping device including movable jaws, mechanism for moving the apple gripping device toward the apple fork, and movable actuating means for opening said jaws and permitting the latter to close and grip an apple before the gripping device commences to move toward the apple fork, the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

11. In an apple gripping device, the combination with a plurality of movable jaws, a movable actuating member to which one end of each jaw is pivoted, said jaws having slots intermediate their ends which extend outwardly and slightly endwise of the jaws, and stationary supporting elements engaging said slots and permitting the jaws to pivot thereon.

12. In an apple gripping device, the combination with a plurality of movable jaws, of a movable actuating member having pivotal connection with one end of the jaws, and spring means engaging the actuating member and holding the jaws normally closed, the jaws having a pivotal and sliding connection with stationary supports intermediate their ends which permit the jaws to yield readily to lateral outward pressure applied at their free ends.

13. In an apple paring machine, the combination with a reciprocating slide, of an apple gripping device, a control block mounted on the slide for partial rotation and upon which the gripping device is mounted, a cam member on the block, and a stationary abutment cooperating with said cam member and operating to engage the same and tilt the control block and gripping device on the slide as the latter reaches one end of its path of travel.

14. In an apple paring machine, the combination with an apple fork, of an apple gripping device including movable jaws, said device being movable toward and away from the fork, and a movable operating member that engages and disengages the gripping jaws to open the latter and permit them to close while the gripping device is stationary and removed from the fork, the impact of the apple on the fork and the frictional engagement of the fork with the apple being such as to cause the fork to remove the apple from the jaws of the gripping device as the latter withdraws.

In witness whereof, I have hereunto signed my name.

CHARLES S. FISH.