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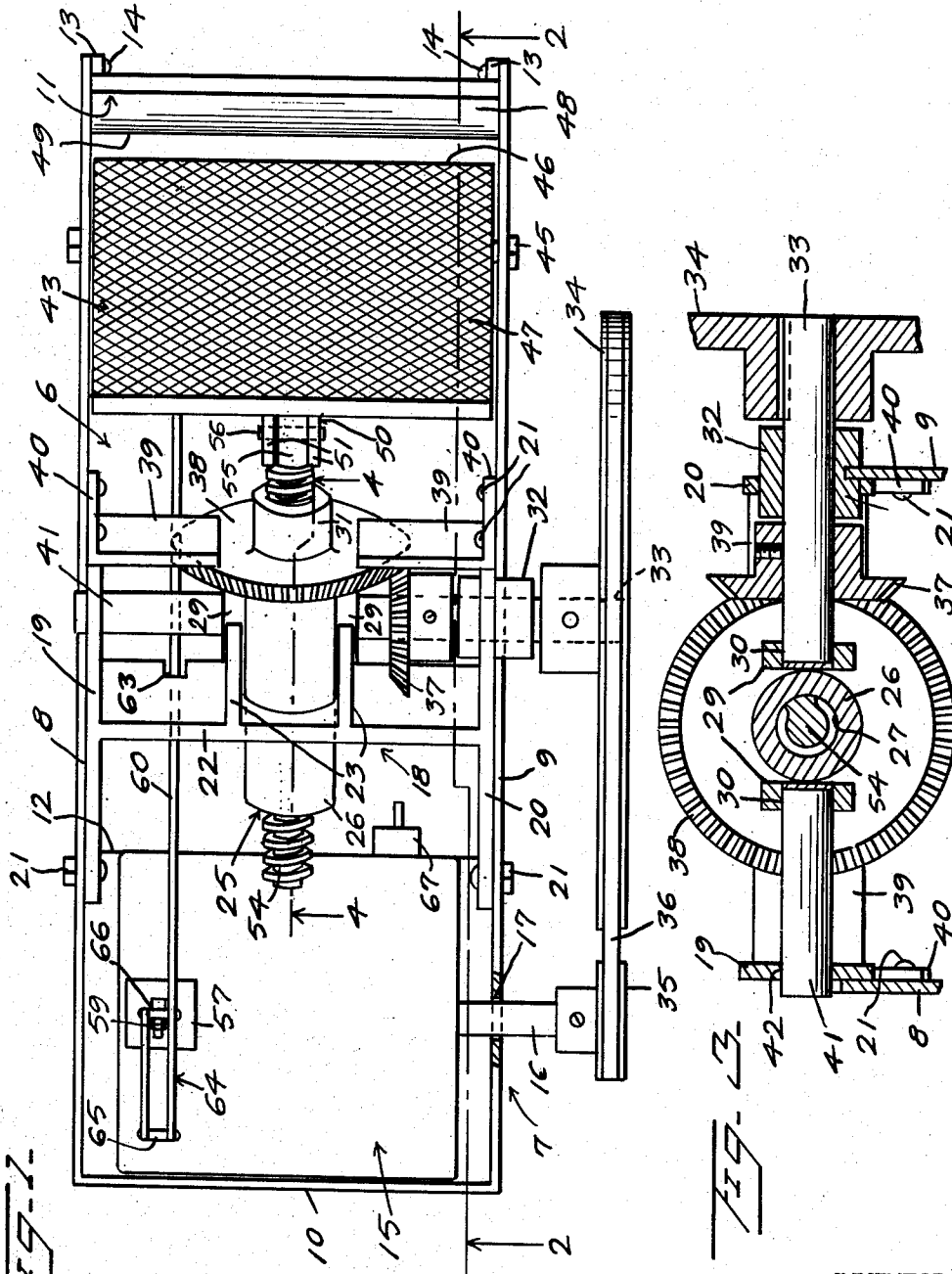
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JACKSCREW ACTUATED CRUSHING MACHINE

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2 Sheets-Sheet 1



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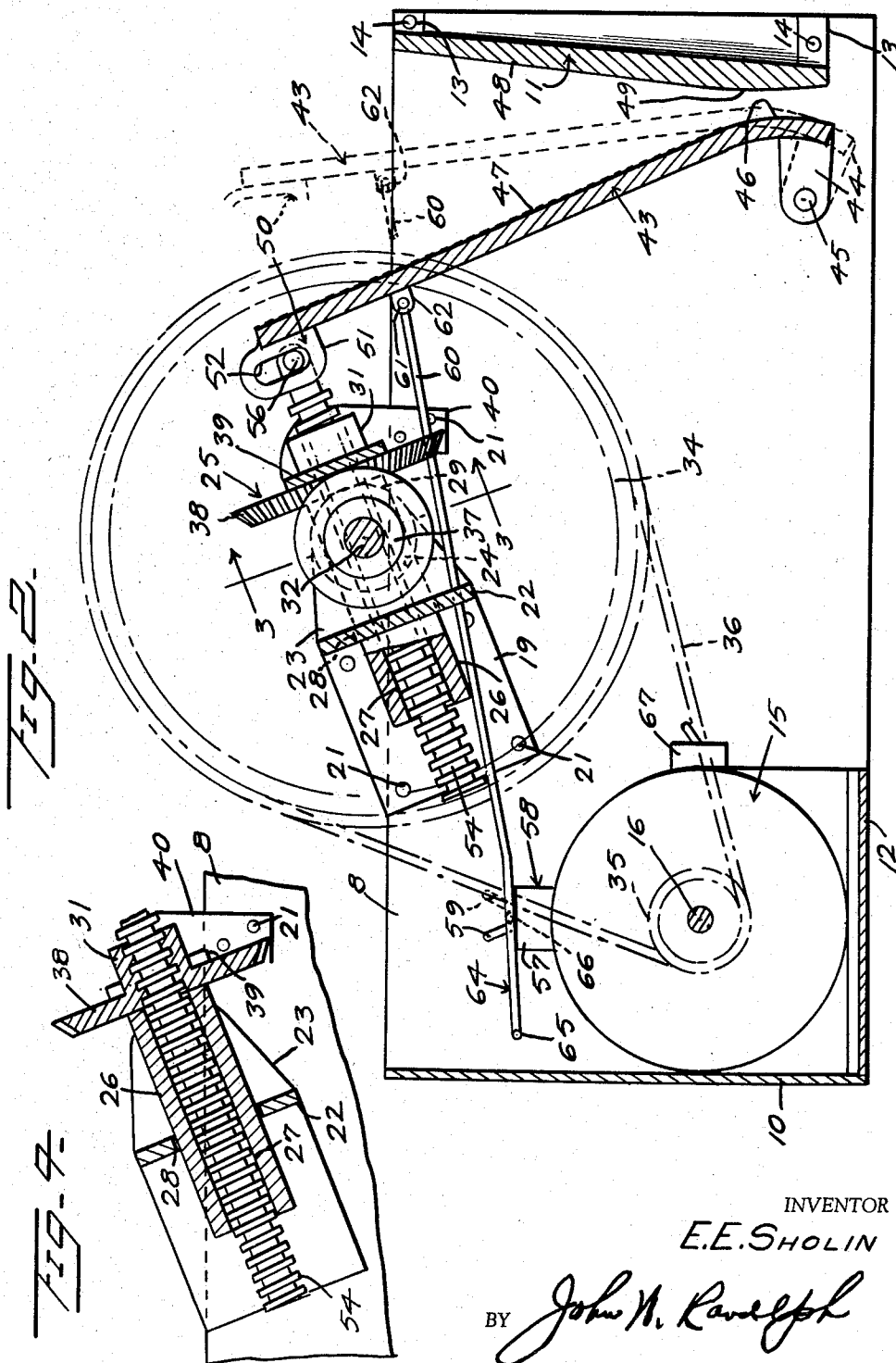
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1

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JACKSCREW ACTUATED CRUSHING MACHINE

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6 Claims. (Cl. 100—233)

This invention relates to a compact machine having a self-contained power source and which is capable of functioning for crushing various types of disposable containers including cans.

A primary object of the present invention is to provide a machine capable of being inexpensively manufactured and sold yet which will be extremely durable for accomplishing its intended purpose.

Another object of the invention is to provide a machine primarily adapted for household or domestic use but which is also well adapted for use in business establishments utilizing many disposable containers, such as restaurants and gasoline stations.

A further object of the invention is to provide a machine which will efficiently function to crush disposable containers for conserving space in waste receptacles and also for placing containers of reclaimable material, such as cans, in a condition so that such containers can be sold for salvage.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a top plan view, partly in section, of the crushing machine;

Figure 2 is a longitudinal sectional view thereof, taken substantially along a plane as indicated by the line 2—2 of Figure 1;

Figure 3 is a fragmentary cross sectional view, on an enlarged scale, taken substantially along a plane as indicated by the line 3—3 of Figure 2, and

Figure 4 is an enlarged fragmentary longitudinal sectional view, taken substantially along the line 4—4 of Figure 1.

Referring more specifically to the drawings, the jackscrew actuated crushing machine in its entirety is designated generally 6 and includes a supporting frame 7 composed of side walls 8 and 9, an end wall 10, a stationary crushing plate 11 and a bottom support member 12. The member 12 extends between and is secured to bottom portions of the side walls 8 and 9 and is located adjacent the end wall 10 but remote from the plate 11, so that the frame 7 is open at its bottom between the crushing plate 11 and member 12. The crushing plate 11 has bracket elements 13 projecting from an outer side thereof and at its side edges, which bear against the inner sides of the walls 8 and 9 and are secured thereto by fastenings 14 for securing the plate 11 to said side walls, remote from the end wall 10.

A power source, such as an electric motor 15, is mounted on and secured to the support 12, crosswise of the frame 7, and has a rotary driven shaft 16 projecting from one end thereof. The shaft 16 extends outwardly through and is loosely disposed in an opening 17 of the wall 9, as seen in Figure 1.

A supporting bracket 18 has end plates 19 and 20 disposed against the inner sides of the walls 8 and 9, respectively, and secured thereto by fastenings 21. The

2

bracket 18 also includes a bar 22 which is formed integral with and extends between the intermediate portions of the end plates 19 and 20 and which is supported thereby at an incline upwardly and away from the crushing plate 11. The bracket 18 is disposed between the power source 15 and crushing plate 11, and the bar 22 thereof has thrust receiving members 23 projecting from the upper side thereof in a direction away from the power source 15. Said thrust receiving members 23 are preferably formed integral with the bar 22 and are disposed in spaced apart substantially parallel relation to one another. The outer ends of the thrust receiving members 23 are provided with arcuate notches 24 which are disposed in transverse alignment with one another.

An elongated guide sleeve 26 has a bore 27 extending longitudinally therethrough, as best seen in Figure 4. The bar 22 is provided with an opening 28, disposed between the thrust receiving members 23, in which a portion of the sleeve 26 has a loose fitting engagement. Trunnions 29 are fixed to a forward end of the guide sleeve 26 which is located remote from the power source 15. Said trunnions 29 seat in the notches 24 of the thrust receiving members 23, as seen in Figure 2. The trunnions 29 are recessed to provide outwardly opening sockets 30, as seen in Figure 3.

The side plate 20 has a portion disposed above the upper edge of the side wall 9 in which a bearing 32 is mounted in alignment with the trunnions 29. A shaft 33 has an intermediate portion journaled in the bearing 32 and an inner end journaled in the socket 30 of the trunnion 29 which is located nearest said bearing 32. A large belt pulley 34 is fixed to the outer end of the shaft 33, on the outer side of the wall 9, and is disposed coplanar with a small belt pulley 35 which is fixed to the outer end of the drive shaft 16. The belt pulleys 34 and 35 are connected by an endless belt 36. Said pulleys and belt are preferably of the V-type, and a small bevel gear 37 is fixed to the shaft 33 on the inner side of the bearing 32. The shaft 33 is driven at a substantially reduced r.p.m. relative to the shaft 16 by said belt and pulley drive.

A jackscrew 25 comprises a threaded rod 54 and a nut 31. The threaded rod fits slidably and turnably in the guide sleeve 26 and the nut 31 threadedly engages said rod forwardly of the guide sleeve 26. A bevel gear 38 is formed integral with the nut 31 and bears against the forward end of the guide sleeve 26 and is disposed in meshing engagement with the bevel gear 37.

Corresponding stop members 39 extend inwardly from above the walls 8 and 9 and each partially overlies the outer side of the bevel gear 38 to prevent movement of the bevel gear out of engagement with the sleeve 26 to thus retain the trunnions 29 in the notches 24. Said stops 39 have angularly turned outer end portions 40 forming posts which are secured to the walls 8 and 9, by additional fastenings 21, and which extend upwardly from said walls.

A rod 41 has an outer end portion extending through an opening 42 of a part of the side plate 19 and which is disposed above the upper edge of the wall 8, and said rod 41 has an inner end seating in the socket 30 of the other trunnion 29, as best seen in Figure 3. The rod 41 cooperates with the shaft 33 to prevent any rocking movement of the sleeve 26, to maintain the gears 38 and 37 in properly meshing engagement and to prevent the shaft 33 from binding in its bearings. The sleeve 26 has a sufficiently close fitting engagement between the thrust receiving members 23 to prevent lateral rocking movement of the sleeve relative to the bracket 18.

A movable crushing plate 43 is mounted in the frame 7 between the stationary crushing plate 11 and the bracket 18 and is of a width slightly less than the spacing

between the walls 8 and 9. Ears 44 extend from the side edges of the lower end of the crushing plate 43 in a direction away from the stationary plate 11 and are disposed against the inner sides of the walls 8 and 9. Pivot fastenings 45 extend loosely through the ears 44 and through the walls 8 and 9 for mounting the plate 43 within the frame 7. The fastenings 45 are located at the ends of the ears 44, disposed remote from the lower end of the plate 43, for mounting said plate 43 for swinging movement toward and away from the stationary plate 11, as seen in full and dotted lines in Figure 2. The plate 43 is substantially flat from its upper end to near its lower end, and the lower end of the plate is curved away from the plate 11 to provide a convexly rounded surface 46 forming the lower end of the face 47 of the crushing plate 43, which faces toward the plate 11 and which is preferably roughened, as seen in Figure 1. The inner side or face 48 of the stationary crushing plate 11 has a substantially flat upper portion which is inclined downwardly toward the plate 43 and which merges with a convexly rounded lower portion 49 which is disposed in opposed relation to the rounded lower portion 46 of the face 47.

A bracket 50 is secured to the outer side of the upper end of the crushing plate 43 and includes transversely spaced ears 51 which are disposed substantially in vertical planes and which have aligned elongated slots 52, the axes of which are disposed substantially parallel to the plane of the plate 43.

Said feed screw 54 has an unthreaded and restricted end forming a head 55 which fits loosely in the bracket 50 between the ears 51. An intermediate portion of a pin 56 is secured in the head 55 and the end portions of said pin loosely engage in the slots 52. The rounded outer end of the head 55 bears against the inner surface of the bracket 50, formed by a part of the rear surface of the upper portion of the plate 43, which is disposed between the ears 51.

A housing 57 of a conventional tumbler or toggle switch 58 is fixed to and extends upwardly from a part of the casing of the electric motor 15. An arm or lever 59 of said switch 58 extends upwardly from the top portion of the housing 57 and is swingably movable by a snap action toward and away from the crushing plates for reversing the electric motor. A rod 60 has one end pivotally connected at 61 to an ear 62 which is fixed to and projects from the outer side of the crushing plate 43, for swinging movement of said rod 60 vertically or longitudinally relative to the crushing plate 43. An intermediate portion of the rod 60 extends loosely through a downwardly opening slot 63 of the bar 22. The rod 60 has an opposite free end which is provided with an elongated loop 64, as best seen in Figure 1, which rests slidably on the upper surface of the switch housing 57 and which slidably engages the switch arm or lever 59. The loop 64 has an outer end portion 65 and an inner end portion 66, which end portions are disposed crosswise of the rod 60 for alternately engaging and actuating the switch arm 59 for reversing the electric motor 15.

A conventional electric switch 67 may be mounted on any accessible part of the motor casing, or in any other convenient location, for making and breaking the electric circuit of the motor 15. The motor 15 may be supplied with electric current of any conventional outlet, not shown, in any suitable manner as by means of a conventional electrical extension cord, not shown.

The movable crushing plate 43 is shown in Figure 1 and in full lines in Figure 2, in a fully open position for receiving cans or other disposable containers, not shown, to be crushed and which are dropped into the space between the crushing plates 11 and 43 from above. Assuming that the switch 67 is closed and that current is being supplied to the motor 15, in the position of the parts as seen in Figures 1 and 2, the loop portion 66 has just moved the switch lever 59 from its dotted line to

its full line position of Figure 2 for reversing the direction of rotation of the motor shaft 16. When the switch lever 59 is in its full line position of Figure 2, the motor 15 will drive the shaft 16 counterclockwise so that the shaft 33 and bevel gear 37 will also be driven counterclockwise, as seen in Figure 2, and the bevel gear 38 will be driven counterclockwise, as seen in Figure 3, by the bevel gear 37 for causing the nut 31 to rotate on the threaded rod 54 in a direction for advancing said rod 54 from left to right through the nut 31, due to the fact that the bevel gear 38 bears rotatably against the forward end of the guide sleeve 26, so that the nut 31 cannot move from right to left of Figure 4. As the threaded rod 54 moves from left to right of Figures 2 and 4 the head 55 thereof will exert a thrust against the upper end of the crushing plate 43 for swinging said plate 43 from its full line to its dotted line position of Figure 2, for partially crushing cans or other containers, not shown, between the faces 47 and 48 of the plates 43 and 11, respectively. As the plate 43 moves from its full line toward its dotted line position the pin 56 slides upwardly in the slots 52. As the plate 43 moves toward its dotted line position of Figure 2 the rod 60 also moves from left to right with the plate 43 and as the plate 43 reaches its dotted line position, the transverse rod portion 65 engages and moves the switch lever 59 by a snap action to its dotted line position of Figure 2, for reversing the motor 15 so that the shafts 16 and 33 and bevel gear 37 are then driven clockwise for driving the bevel gear 38 clockwise, as seen in Figure 3. Since the bevel gear 38 and the nut 31 are prevented from moving from left to right of Figures 1 and 2 by engagement of the outer side of the bevel gear 38 with the stops 39, the feed screw or threaded rod 54 is fed back through said nut 31 and sleeve 26 to the full line position of the parts as seen in Figure 2, so that the partially crushed cans or containers will slide downwardly to or adjacent the throat portions 46 and 49 of the crushing plates 43 and 11, respectively. The previously described operation is then repeated for further crushing said cans or containers and until each can or container has been crushed sufficiently so that it can slide through the throat 46, 49, when the movable crushing plate 43 is in its open position of Figure 1 and its full line position of Figure 2.

It will be understood that additional containers can be dropped between the crushing plates, while the plate 43 is in its open position, to effect initial crushing of certain containers while other containers are being finally crushed between the throat portions 46 and 49.

Various modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A crushing machine comprising an elongated rigid frame, a reversible power source mounted in and secured to said frame and having a rotary drive shaft, a stationary crushing plate secured to the frame and disposed therein in substantially an upright position crosswise of the frame and remote from the power source, a movable crushing plate, means pivotally mounting said movable crushing plate in said frame in opposed relation to the stationary crushing plate and for swinging movement toward and away from the stationary crushing plate about a substantially horizontal axis disposed adjacent the bottom edge of said movable crushing plate, said movable crushing plate being disposed adjacent the stationary crushing plate and between said stationary crushing plate and the power source, a bracket mounted in and secured to the frame between said crushing plates and the power source, a jack screw including a threaded rod having one end pivotally and slidably connected to an outer side of the movable crushing plate above and spaced from the pivot means thereof and a nut threadedly engaging said threaded rod, a guide sleeve supported by said bracket and in

5

which said threaded rod is slidably and rotatably supported, a gear fixed to said nut and forming a part of the jackscrew, means forming a driving connection between said drive shaft and gear for driving the gear at a reduced r.p.m. relative to the drive shaft, and means confining said gear and preventing movement of the gear toward and away from the bracket whereby when the power source is driven in one direction the threaded rod will be fed through said nut toward the crushing plates for swinging the movable crushing plate toward the stationary crushing plate, and when the power source is driven in the opposite direction said threaded rod will be fed through the nut toward the power source for swinging the movable crushing plate away from the stationary crushing plate.

2. A crushing machine as in claim 1, said power source having a reversing unit including a lever swingably movable toward and away from the crushing plates, an actuating member connected to and movable with the crushing plate and having longitudinally spaced portions alternately engaging said lever as the movable crushing plate approaches the extremities of its swinging movement for reversing the power source.

3. A crushing machine as in claim 1, said crushing plates having opposed faces including substantially flat upper portions and opposed convexly rounded lower portions forming a restricted discharge throat.

6

4. A crushing machine as in claim 1, said bracket having transversely spaced thrust receiving portions extending toward the crushing plates and having outer ends provided with arcuate notches facing said crushing plates, said guide sleeve having trunnions engaging in said notches and limiting movement of the sleeve away from the crushing plates.

5. A crushing machine as in claim 4, at least one of said trunnions having an outwardly opening socket, said means forming a driving connection between the drive shaft and gear including a shaft having one end journaled in said trunnion socket.

6. A crushing machine as in claim 5, said gear bearing against an end of the guide sleeve, and stop members fixed to said frame and partially overlying the side of said gear, disposed remote from the guide sleeve, and combining with said guide sleeve end to form the means for confining the gear.

References Cited in the file of this patent

UNITED STATES PATENTS

131,395	Gates	Sept. 17, 1872
1,967,240	Guest	July 24, 1934
2,593,657	Coon et al.	Apr. 22, 1952
2,619,150	Smith	Nov. 25, 1952
2,920,554	Bunke	Jan. 12, 1960