

Aug. 16, 1960

L. L. REED
CRUSHING MACHINE

2,949,078

Filed Jan. 26, 1959

3 Sheets-Sheet 1

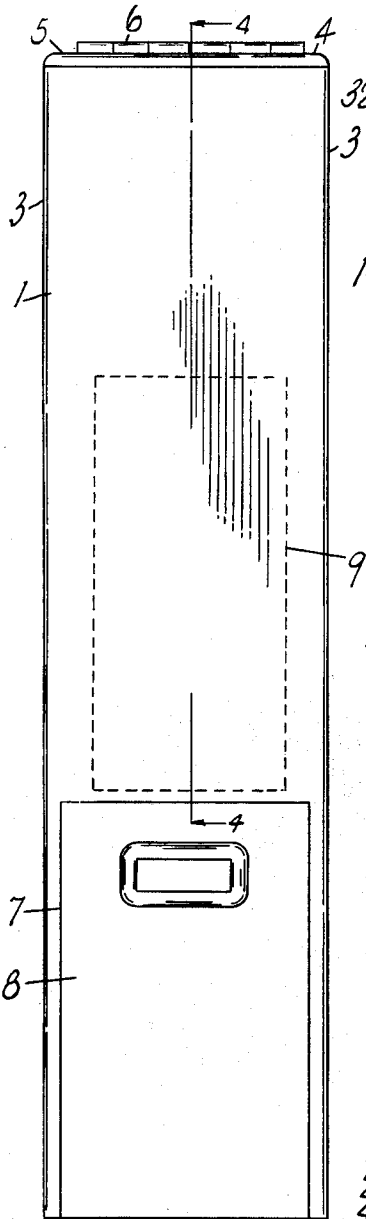


Fig. 1.

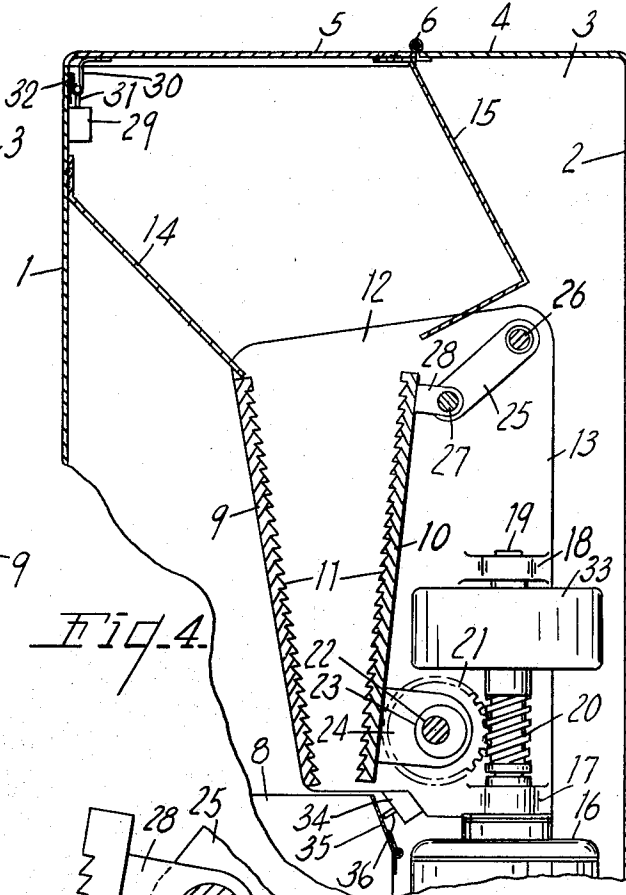


Fig. 4.

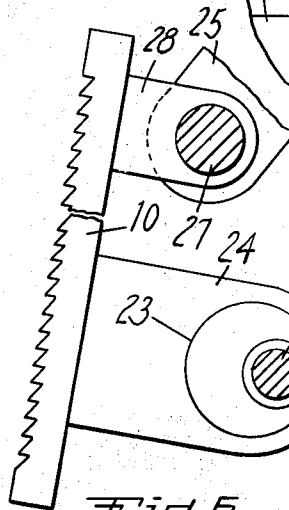
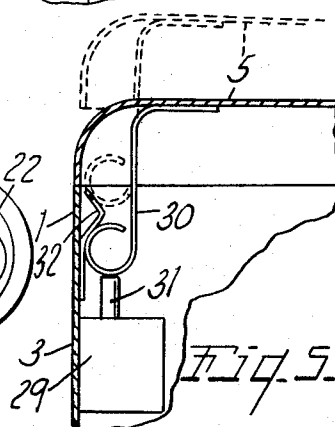


Fig. 6.



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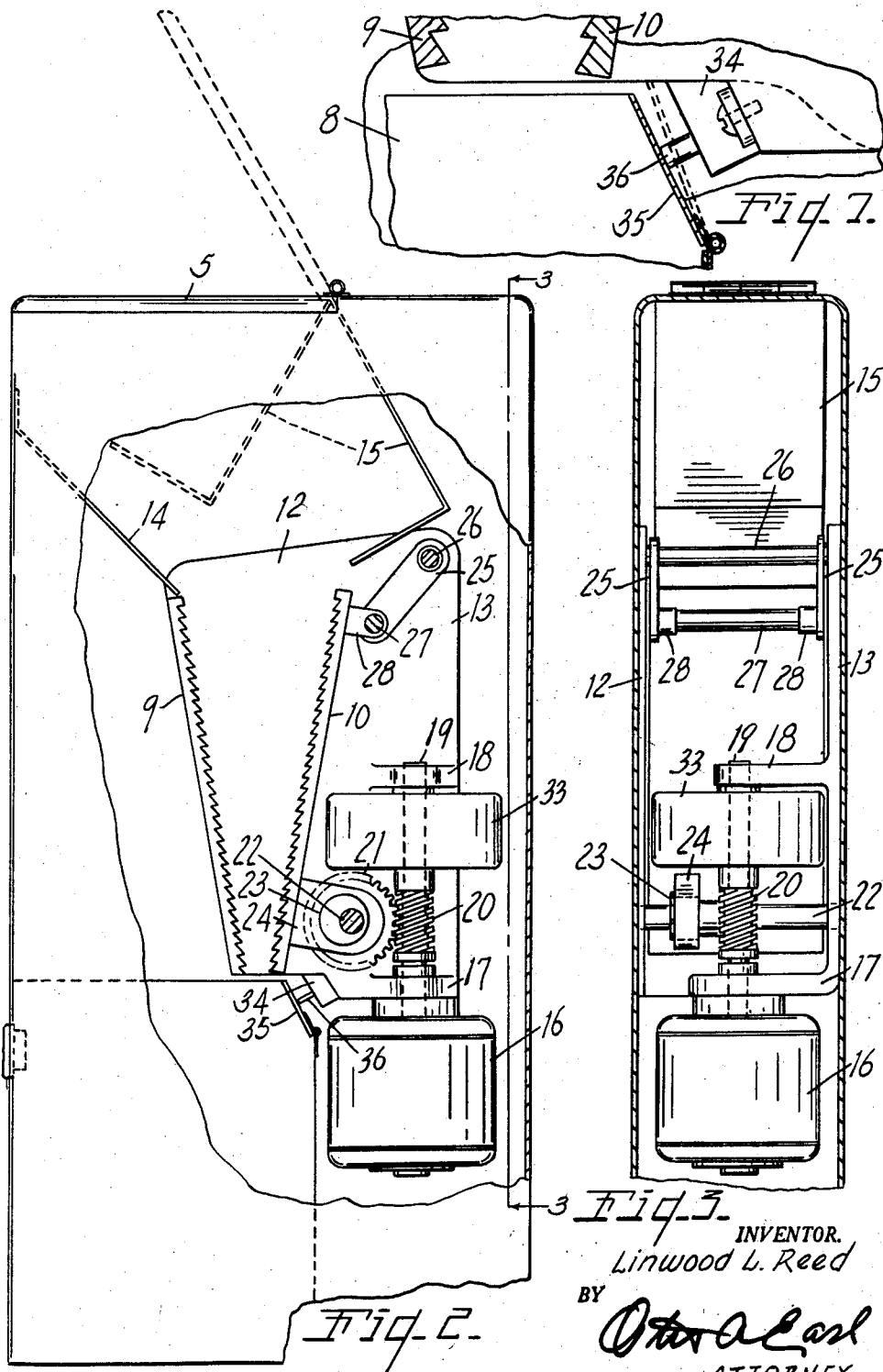
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3 Sheets-Sheet 2



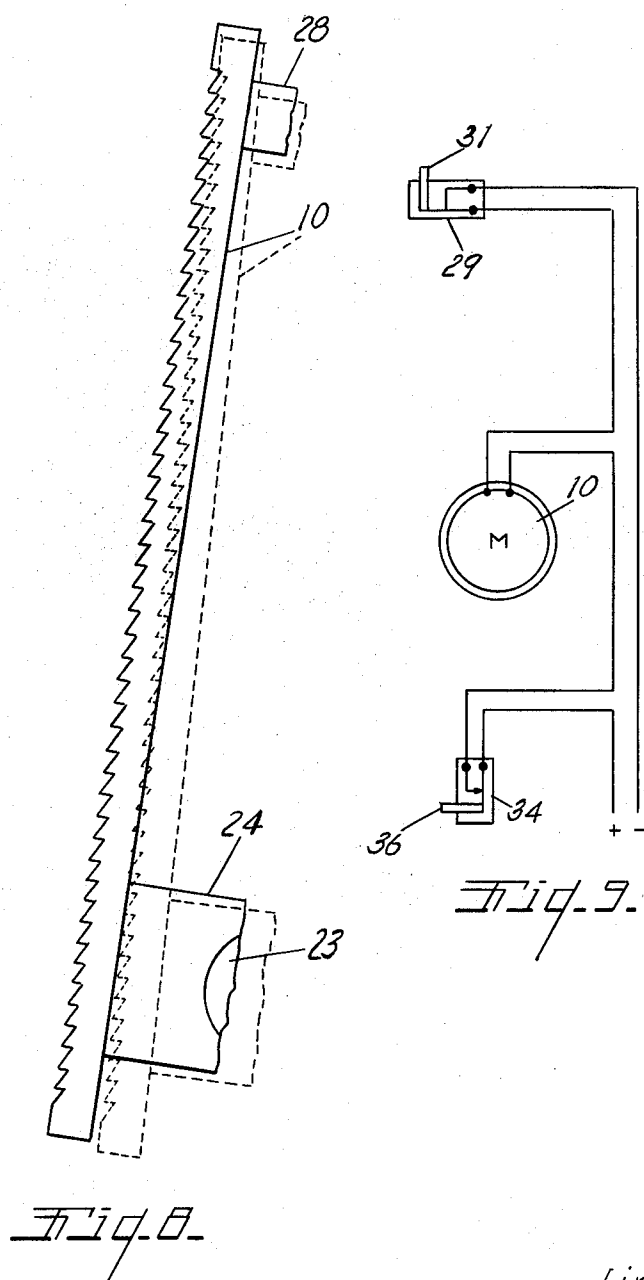
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3 Sheets-Sheet 3



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2,949,078

CRUSHING MACHINE

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16 Claims. (Cl. 100—43)

This invention relates to improvements in crushing machines. The main objects of this invention are:

First, to provide a crushing machine which is of relatively large capacity in proportion to its size.

Second, to provide a crushing machine which is well adapted for domestic use and for use in hotels, restaurants, saloons and the like and one which is highly efficient and easy to operate, being largely automatic in operation.

Third, to provide a crushing machine with charging means which prevent overloading and one in which the movable jaw is in operation before material is discharged into the jaws.

Fourth, to provide a crushing machine having these advantages in which the motor is automatically stopped when the crushed material receptacle is filled.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a front elevational view of a crushing machine embodying my invention.

Fig. 2 is a fragmentary side elevational view, a portion of the housing being broken away, the closure and the feed hopper relatively connected thereto being shown in open position by dotted lines.

Fig. 3 is a fragmentary view in transverse section on a line corresponding to line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary view partially in vertical section on a line corresponding to line 4—4 of Fig. 1.

Fig. 5 is an enlarged fragmentary view corresponding to that of Fig. 4 with the closure member shown in partially open switch disengaging position by dotted lines.

Fig. 6 is an enlarged fragmentary view of the movable jaw and its supporting and actuating means in section on a line corresponding to that of Fig. 2.

Fig. 7 is an enlarged vertical section corresponding generally to that of Fig. 4 and illustrating certain of the structural details of a debris actuated motor stop switch.

Fig. 8 is a fragmentary view illustrating the movement of the movable jaw relative to the fixed jaw by full and dotted lines.

Fig. 9 is a conventionalized diagrammatic view of the motor control switches and their connections to the motor.

The embodiment of my invention illustrated comprises a housing, desirably of general rectangular section, and including front wall 1, rear wall 2, side walls 3 and top 4, the top having a charging opening therein provided with a closure 5 hinged at 6. These parts are desirably formed of sheet metal. The details of the connections for the parts are not illustrated as they form no part of this invention.

The front wall 1 is provided with an opening 7 at the lower end thereof adapted to receive the debris receiving receptacle 8 which is open at the top. The crushing jaws 9 and 10 are disposed in downwardly converging relation

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and are provided with transversely disposed serrations or teeth 11. The jaw 9, desirably the front jaw, is fixedly mounted on the forward edges of the supporting members 12 and 13 which are fixedly mounted in opposed relation on the inner sides of the side walls 3 and in downwardly spaced relation relative to the top of the housing.

A chute member 14 extends from the front wall to the upper end of the front jaw 9. A charging hopper 15 is connected to the hinged end of the closure member 5 so that it is swung to receiving position when the closure member is open, as shown by dotted lines in Fig. 2, and to discharging position when the closure member is swung to the partially closed position, shown by dotted lines in Fig. 5. The purpose of this will be apparent as the description proceeds.

The movable or driven jaw 10 is supported and actuated to provide a crushing and material discharge movement, as generally illustrated in Fig. 8. The driven jaw 10 is powered from the electric motor 16 mounted on the vertically spaced brackets 17 and 18 on the support member 13. The motor shaft 19 is provided with a worm 20 with which the gear 21 coacts. The shaft 22 of the gear 21 is provided with an eccentric 23 which coacts with the bearing member 24 on the rear side of the jaw 10.

The upper end of the jaw 10 is movably supported by the downwardly and forwardly inclined links 25 which are mounted on the shaft 26 and pivotally connected at 27 to the rearwardly projecting supporting ears or lugs 28 on the rear side of the jaw 10 adjacent its upper end. This mounting and driving means gives a compound movement to this movable jaw 10, as is illustrated by the full and dotted lines in Fig. 8, and provides both a crushing and feed discharge action which is highly effective.

The main motor switch 29 is mounted on the inner side of the front wall adjacent the top thereof and is of the automatic closing type. The closure 5 is provided with a springable latch 30 which when the closure is in closed position, as shown by full lines in Fig. 5, engages the tappet 31 on the switch to open the switch. The latch in that position is in retaining engagement with the keeper 32. However this latch 30 supportedly engages the keeper as shown by dotted lines in Fig. 2, when the cover is in partially closed position.

With this arrangement, as soon as the cover or closure is opened, the switch 29 automatically closes and starts the motor. When the cover is opened, as shown by dotted lines in Fig. 2, the hopper 15 is in charge receiving position. This insures that the motor and the movable jaw shall be in operation before the material is discharged between the jaws.

The shaft 19 of the motor is desirably provided with a balance wheel 33 of substantial weight which minimizes the likelihood of the motor being stalled by the discharge of material between the jaws. To minimize the likelihood of clogging the jaws as the result of neglecting the emptying of the receptacle 8 a motor cut-out switch 34 is provided, the receptacle being provided with a pivoted switch actuating member 35 disposed adjacent to but rearwardly of the discharge of the jaws, see Fig. 7. This switch 34 is conventionally shown provided with a tappet or actuating member 36.

The embodiment of my invention illustrated is especially designed for home or domestic use and in hotels, restaurants, saloons and the like and various other places. Certain of the parts are shown conventionally as the structural details form no part of this invention, however, the disclosure is such that it will enable those skilled in the art to embody or adapt the same as may be desired.

I have illustrated and described my invention in a desirable and practical embodiment thereof. I have not

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attempted to illustrate various adaptations and modifications which I contemplate may be desirable for particular uses and capacities as it is believed this disclosure will enable those skilled in the art to embody or adapt the invention as may be desired.

What is claimed as new is:

1. In a crushing machine, the combination of a housing comprising front, rear and side walls and a top having a charging opening therein provided with a closure hinged at its rear edge, a pair of plate like support members mounted on the inner sides of the side walls, a rearwardly facing forwardly inclined fixed jaw extending between said support members, a forwardly facing rearwardly inclined movable jaw disposed between said support with its edges closely adjacent thereto, a forwardly and downwardly inclined supporting link pivotally mounted on said support members and pivotally connected to said movable jaw adjacent the upper end thereof, said movable jaw having a rearwardly projecting bearing member adjacent its lower end, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing and with a gear, one of said support members being provided with vertically spaced brackets disposed at the rear of said movable jaw, a motor provided with a vertically disposed shaft mounted in said brackets and provided with a worm gear coacting with said gear on said driven shaft and with a fly wheel disposed above said gears, an automatically closing main control switch for said motor mounted on the front wall of said housing adjacent the top thereof, a keeper mounted on said front wall above said main switch, a springable latch positioned on said closure to supportedly engage said keeper when the closure is in partially closed position and adapted to open said switch when the closure is in fully closed position and said latch engaged with said keeper, a stop switch for said motor disposed below and rearwardly of said movable jaw, and a material receiving receptacle adapted to be introduced into and removed from said housing through an opening in a wall thereof and having a pivotally supported stop switch opening member positioned therein to be actuated by material in said receptacle when it reaches a predetermined height.

2. In a crushing machine, the combination of a housing comprising front, rear and side walls and a top having a charging opening therein provided with a closure hinged at its rear edge, a pair of plate like support members mounted on the inner sides of the side walls, a rearwardly facing forwardly inclined fixed jaw extending between said support members, a forwardly facing rearwardly inclined movable jaw disposed between said support with its edges closely adjacent thereto, a forwardly and downwardly inclined supporting link pivotally mounted on said support members and pivotally connected to said movable jaw adjacent the upper end thereof, said movable jaw having a rearwardly projecting bearing member adjacent its lower end, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing and with a gear, one of said support members being provided with vertically spaced brackets disposed at the rear of said movable jaw, a motor provided with a vertically disposed shaft mounted in said brackets and provided with a worm gear coacting with said gear on said driven shaft and with a fly wheel disposed above said gears, an automatically closing main control switch for said motor mounted on the front wall of said housing adjacent the top thereof, a keeper mounted on said front wall above said main switch and a springable latch positioned on said closure to supportedly engage said keeper when the closure is in load discharge position and adapted to open said switch when the closure is in fully closed position and said latch engaged with said keeper.

3. In a crushing machine, the combination of a housing comprising front, rear and side walls and a top hav-

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ing a charging opening therein provided with a closure hinged at its rear edge, a pair of plate like support members mounted on the inner sides of the side walls, a rearwardly facing forwardly inclined fixed jaw extending between said support members, a forwardly facing rearwardly inclined movable jaw disposed between said support with its edges closely adjacent thereto, a forwardly and downwardly inclined supporting link pivotally mounted on said support members and pivotally connected to said movable jaw adjacent the upper end thereof, said movable jaw having a rearwardly projecting bearing member adjacent its lower end, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing and with a gear, one of said support members being provided with vertically spaced brackets disposed at the rear of said movable jaw, a motor provided with a vertically disposed shaft mounted in said brackets and provided with a worm gear coacting with said gear on said driven shaft and with a fly wheel disposed above said gears, a forwardly facing angled charging hopper mounted on said closure member adjacent the hinge thereof, an automatically closing main control switch for said motor mounted on the front wall of said housing adjacent the top thereof, a keeper mounted on said front wall above said main switch, a springable latch positioned on said closure to supportedly engage said keeper when the closure is in load discharge position and adapted to open said switch when the closure is in fully closed position and said latch engaged with said keeper.

4. In a crushing machine, the combination of a housing comprising front, rear and side wall and a top having a charging opening therein provided with a hinged closure, a pair of plate like support members mounted on the inner sides of the side walls, downwardly converging relatively fixed jaw members, a relatively fixed jaw extending between and mounted on said support members, a movable jaw disposed between said support members, said jaws being arranged in downwardly converging relation, a supporting link for the upper end of the movable jaw pivotally mounted on said support members and pivotally connected to the upper end of said movable jaw, said movable jaw having a bearing on the rear side thereof, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing and with a gear, one of said support members having vertically spaced bearings thereon, a motor provided with a shaft mounted in said bearings and having a gear coacting said gear on said driven shaft, a main switch disposed within said housing and adapted to be automatically closed on the the opening of said closure member and to be opened on the complete closing of said closure member, a charging hopper operatively associated with said closure member to be positioned in receiving position on the opening of the closure member and moved to discharge position when the closure member is in partially closed position, a springable member on said closure member adapted to support it in partially closed load discharge position and adapted to open said switch when the closure is in fully closed position with the latch engaged with said keeper, a second normally closed switch for said motor, and a material receptacle receiving the discharge from said jaws and provided with a movable actuating member for said stop switch mounted on said receptacle to be actuated by material accumulating therein when reaching a predetermined height.

5. In a crushing machine, the combination of a housing comprising front, rear and side wall and a top having a charging opening therein provided with a hinged closure, a pair of plate like support members mounted on the inner sides of the side walls, downwardly converging relatively fixed jaw members, a relatively fixed jaw extending between and mounted on said support members, a movable jaw disposed between said support members, said jaws being arranged in downwardly converging rela-

tion, a supporting link for the upper end of the movable jaw pivotally mounted on said support members and pivotally connected to the upper end of said movable jaw, said movable jaw having a bearing on the rear side thereof, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing and with a gear, one of said support members having vertically spaced bearings thereon, a motor provided with a shaft mounted in said bearings and having a gear coacting with said gear on said driven shaft, a main switch disposed within said housing and adapted to be automatically closed on the opening of said closure member and to be opened on the complete closing of said closure member, a charging hopper operatively associated with said closure member to be positioned in receiving position on the opening of the closure member and moved to discharge position when the closure member is in partially closed position, and a springable member on said closure member adapted to support it in partially closed load discharge position and adapted to open said switch when the closure is in fully closed position.

6. In a crushing machine, the combination of a housing comprising front, rear and side wall and a top having a charging opening therein provided with a hinged closure, a pair of plate like support members mounted on the inner sides of the side walls, downwardly converging relatively fixed jaw members, a relatively fixed jaw extending between and mounted on said support members, a movable jaw disposed between said support members, said jaws being arranged in downwardly converging relation, a supporting link for the upper end of the movable jaw pivotally mounted on said support members and pivotally connected to the upper end of said movable jaw, said movable jaw having a bearing on the rear side thereof, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing, a motor having a driving connection to said eccentric, a main switch disposed within said housing and adapted to be automatically closed on the opening of said closure member and to be opened on the complete closing of said closure member, a charging hopper operatively associated with said closure member to be positioned in receiving position on the opening of the closure member and moved to discharge position when the closure member is in closed position, a yieldable member on said closure member adapted to support it in partially closed position and adapted to open said switch when the closure is in fully closed position, a second normally closed stop switch for said motor and a material actuated stop switch actuating member positioned to be actuated by material discharged from said jaws when it reaches a predetermined height.

7. In a crushing machine, the combination of a housing comprising front, rear and side wall and a top having a charging opening therein provided with a hinged closure, a pair of plate like support members mounted on the inner sides of the side walls, downwardly converging relatively fixed jaw members, a relatively fixed jaw extending between and mounted on said support members, a movable jaw disposed between said support members, said jaws being arranged in downwardly converging relation, a supporting link for the upper end of the movable jaw pivotally mounted on said support members and pivotally connected to the upper end of said movable jaw, said movable jaw having a bearing on the rear side thereof, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing, a motor having a driving connection to said eccentric, a main switch disposed within said housing and adapted to be automatically closed on the opening of said closure member and to be opened on the complete closing of said closure member, a charging hopper operatively associated with said closure member to be positioned in receiving position on the opening of the closure member and to discharge when the closure is in partially closed position,

a yieldable member on said closure member adapted to support it in partially closed position and adapted to open said switch when the closure is in fully closed position when engaged with a latch with said keeper.

8. In a crushing machine, the combination of a housing comprising front, rear and side wall and a top having a charging opening therein provided with a hinged closure, a pair of plate like support members mounted on the inner sides of the side walls, a relatively fixed jaw extending between and mounted on said support members, a movable jaw disposed between said support members, said jaws being arranged in downwardly converging relation, a supporting link for the upper end of the movable jaw pivotally mounted on said support members and pivotally connected to the upper end of said movable jaw, said movable jaw having a bearing on the rear side thereof, a driven shaft mounted on said support members and provided with an eccentric coacting with said bearing, said link and eccentric coacting to support and impart a combined inward and downward crushing stroke to said movable jaw relative to said fixed jaw, a motor having a driving connection to said eccentric, a main switch disposed within said housing and adapted to be automatically closed on the opening of said closure member and to be opened on the complete closing of said closure member, and a yieldable member on said closure member adapted to support it in partially closed position.

9. In a crushing machine, the combination with a housing having a charging opening at the top thereof and provided with a hinged closure for said opening, a rearwardly facing forwardly inclined fixed jaw disposed transversely of said housing, a forwardly facing rearwardly inclined movable jaw, a supporting link for the upper end of said movable jaw pivotally connected thereto adjacent its upper end, said movable jaw having a bearing on the rear side thereof adjacent its lower end, a driven shaft provided with an eccentric coacting with said bearing and with a gear, a motor provided with a shaft having a worm gear thereon coacting with said gear on said driven shaft, said motor shaft being provided with a fly wheel, a charging hopper member mounted on said closure to be automatically adjusted to receiving and jaw closing position on the opening of the closure and to discharged position on the closing of the closure, a main control switch for said motor operatively associated with said closure so that it is closed on the opening of the closure and opened on the complete closing of the closure and a springable latch for said closure adapted to supportingly hold the closure in partially closed load discharge position and acting to open said switch when the closure is in fully closed position and said latch is engaged.

10. In a crushing machine, the combination with a housing having a charging opening at the top thereof and provided with a hinged closure for said opening, a rearwardly facing forwardly inclined fixed jaw disposed transversely of said housing, a forwardly facing rearwardly inclined movable jaw, a supporting link for the upper end of said movable jaw pivotally connected thereto adjacent its upper end, said movable jaw having a bearing on the rear side thereof adjacent its lower end, a driven shaft provided with an eccentric coacting with said bearing, a motor geared to said shaft, a charging hopper member mounted on said closure to be automatically adjusted to receiving and jaw closing position on the opening of the closure and to discharge position on the closing of the closure, a main control switch for said motor operatively associated with said closure so that it is closed on the opening of the closure and opened on the complete closing of the closure, and a springable latch for said closure adapted to supportingly hold the closure in partially closed load discharge position and acting to open said switch when the closure is in fully closed position and said latch is engaged.

11. In a crushing machine, the combination with a housing having a charging opening at the top thereof and provided with a hinged closure for said opening, a rear-

wardly facing forwardly inclined fixed jaw disposed transversely of said housing, a forwardly facing rearwardly inclined movable jaw, a supporting link for the upper end of said movable jaw pivotally connected thereto adjacent its upper end, said movable jaw having a bearing on the rear side thereof adjacent its lower end, a driven shaft provided with an eccentric coacting with said bearing, a motor geared to said shaft, a charging hopper member mounted on said closure to be automatically adjusted to receiving and jaw closing position on the opening of the closure and to discharged position on the closing of the closure, a main control switch for said motor operatively associated with said closure so that it is closed on the opening of the closure and opened on the complete closing of the closure, a springable latch for said closure adapted to supportingly hold the closure in partially closed load discharge position and acting to open said switch when the closure is in fully closed position and said latch is engaged, a second normally closed control switch for said motor, and a crushed material receiving receptacle positionable to receive the discharge from said jaws, and a member mounted on said receptacle and positioned in operative relation to said second switch when the receptacle is in receiving position and adapted to be actuated by material discharged from said jaws into said receptacle when the material reaches a predetermined height.

12. In a crushing machine, the combination with a housing having a charging opening at the upper end thereof and provided with a closure for said opening, a pair of downwardly converging jaws disposed transversely of the housing, one of said jaws being movable relative to the other, a supporting link for the upper end of the movable jaw, said movable jaw having a bearing on its outer side adjacent its lower end, a driven eccentric coacting with said bearing and with said link in supporting said movable jaw, an electric motor having driving connection to said eccentric, a charging hopper operatively associated with said closure to be automatically positioned in receiving position on the opening of the closure and to discharge position on the closing of the closure, a main control switch for said motor operatively associated with said closure so it is automatically closed on the opening of the closure and opened on the complete closing of the closure, means acting to support said closure in partially closed hopper discharge position, and means on said closure member acting to open said switch when the closure member is in fully closed position, a second normally closed control switch for said motor, a switch opening member for said second switch positioned to be actuated by the discharged material from said jaws when the material reaches a predetermined height.

13. In a crushing machine, the combination with a housing having a charging opening at the upper end thereof and provided with a closure for said opening, a pair of downwardly converging jaws disposed transversely of the housing, one of said jaws being movable relative to the other, a supporting link for the upper end of the movable jaw, said movable jaw having a bearing on its outer side adjacent its lower end, a driven eccentric coacting with said bearing and with said link in supporting said movable jaw, an electric motor having driving connection to said eccentric, a charging hopper operatively associated with said closure to be automatically positioned in receiving position on the opening of the closure and to discharge position on the closing of the closure, a main control switch for said motor operatively associated with said closure so it is automatically closed on the opening of the closure and opened on the complete closing of the closure, a means acting to support said closure in partially closed hopper discharge position, and means on said closure member acting to open said switch when the closure member is in fully closed position.

14. In a crushing machine, the combination with a housing having a charging opening at the upper end there-

of and provided with a closure for said opening, a pair of downwardly converging jaws disposed transversely of the housing one of said jaws being movable relative to the other, a supporting link for the upper end of the movable jaw, said movable jaw having a bearing on its outer side adjacent its lower end, a driven eccentric coacting with said bearing and with said link in supporting said movable jaw, said link and eccentric coacting to support and impart a combined inward and downward crushing stroke to said movable jaw relative to said fixed jaw, an electric motor having driving connection to said eccentric, a main control switch for said motor operatively associated with said closure so it is automatically closed on the opening of the closure and opened on the complete closing of the closure, and means on said closure member acting to open said switch when the closure member is in fully closed position.

15. In a crushing machine, the combination of a housing provided with a charging opening and a closure therefor, a pair of downwardly converging jaws having transversely serrated faces, one of said jaws being movably supported relative to the other, the support therefor comprising a pivotally mounted downwardly inclined supporting link for the upper end thereof and an eccentric engaging bearing adjacent its lower end, a driven eccentric coacting with said bearing, an electric motor having a driving connection to said eccentric, a charging hopper operatively associated with said jaws and operatively connected to said closure member to be automatically adjusted to receiving position on the opening of the closure and actuated to discharge position on the partial closing of the closure, a main control switch for said motor operatively associated with said closure so that it is automatically closed on the opening of the closure, means acting to support the closure in partially closed hopper discharge position in which position said main control switch is in closed position, said switch being opened on the complete closing of said closure member, and a second and normally closed control switch for said motor, and means for opening said second switch actuated by material discharged from said jaws when such material reaches a predetermined height.

16. In a crushing machine, the combination of a housing provided with a charging opening and a closure therefor, a pair of downwardly converging jaws having transversely serrated faces, one of said jaws being movably supported relative to the other, the support therefor comprising a pivotally mounted downwardly inclined supporting link for the upper end thereof and an eccentric engaging bearing adjacent its lower end, a driven eccentric coacting with said bearing, an electric motor having a driving connection to said eccentric, a charging hopper operatively associated with said jaws, and operatively connected to said closure member to be automatically adjusted to receiving position on the opening of the closure and actuated to discharge position on the partial closing of the closure, a main control switch for said motor operatively associated with said closure so that it is automatically closed on the opening of the closure, means acting to support the closure in partially closed hopper discharge position in which position said main control switch is in closed position, said switch being opened on the complete closing of said closure member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,408,221	Michel	Sept. 24, 1946
2,619,150	Smith	Nov. 25, 1952
2,686,466	Lee	Aug. 17, 1954

FOREIGN PATENTS

26,206	Great Britain	Dec. 4, 1908
34,098	Norway	Feb. 6, 1922