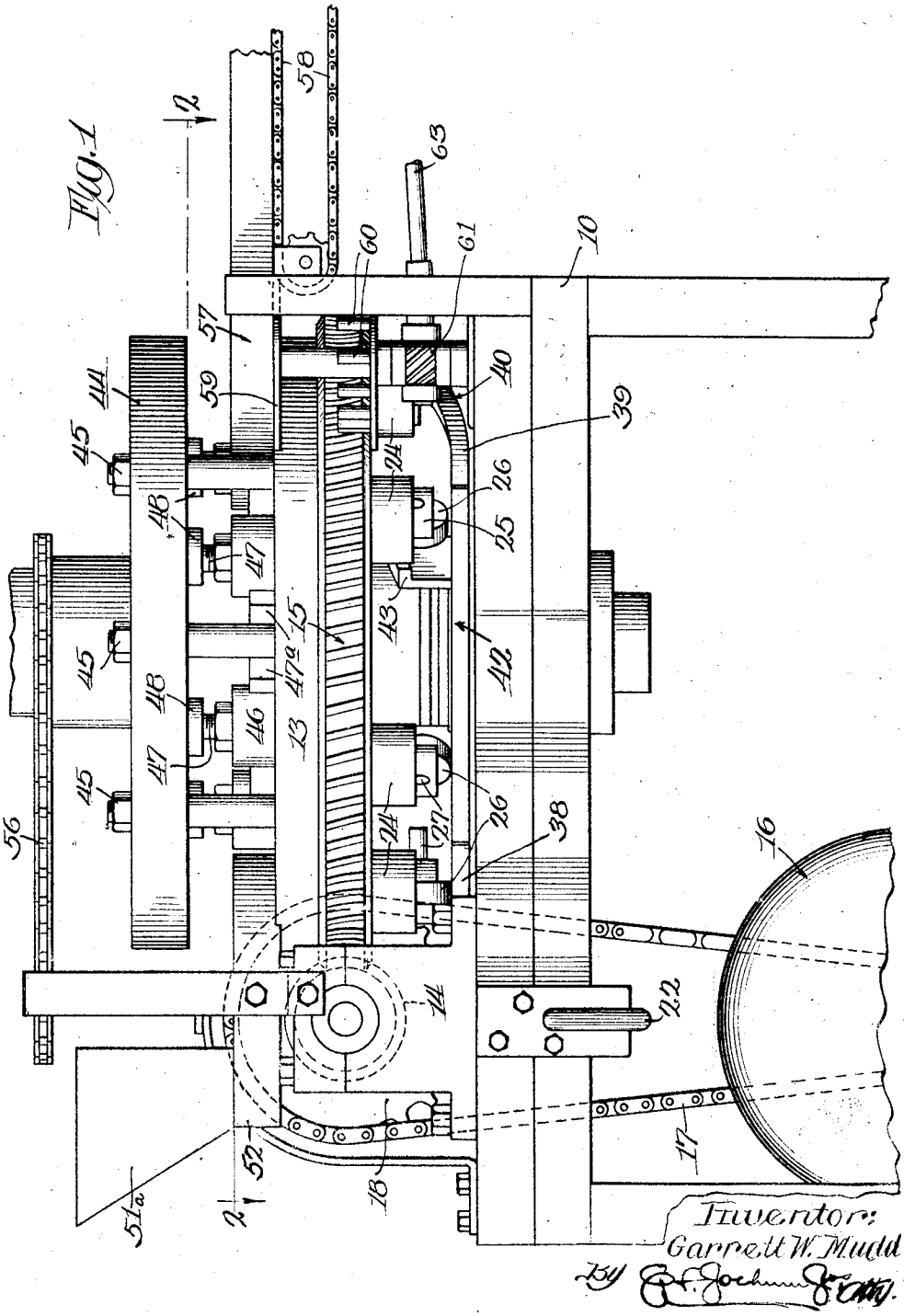
May 3, 1927. 1,626,860

G. W. MUDD

MACHINE FOR MAKING COMPACTS, TABLETS, WAFERS, AND THE LIKE

Original Filed Aug. 30, 1924 4 Sheets-Sheet 1

Fig. 1



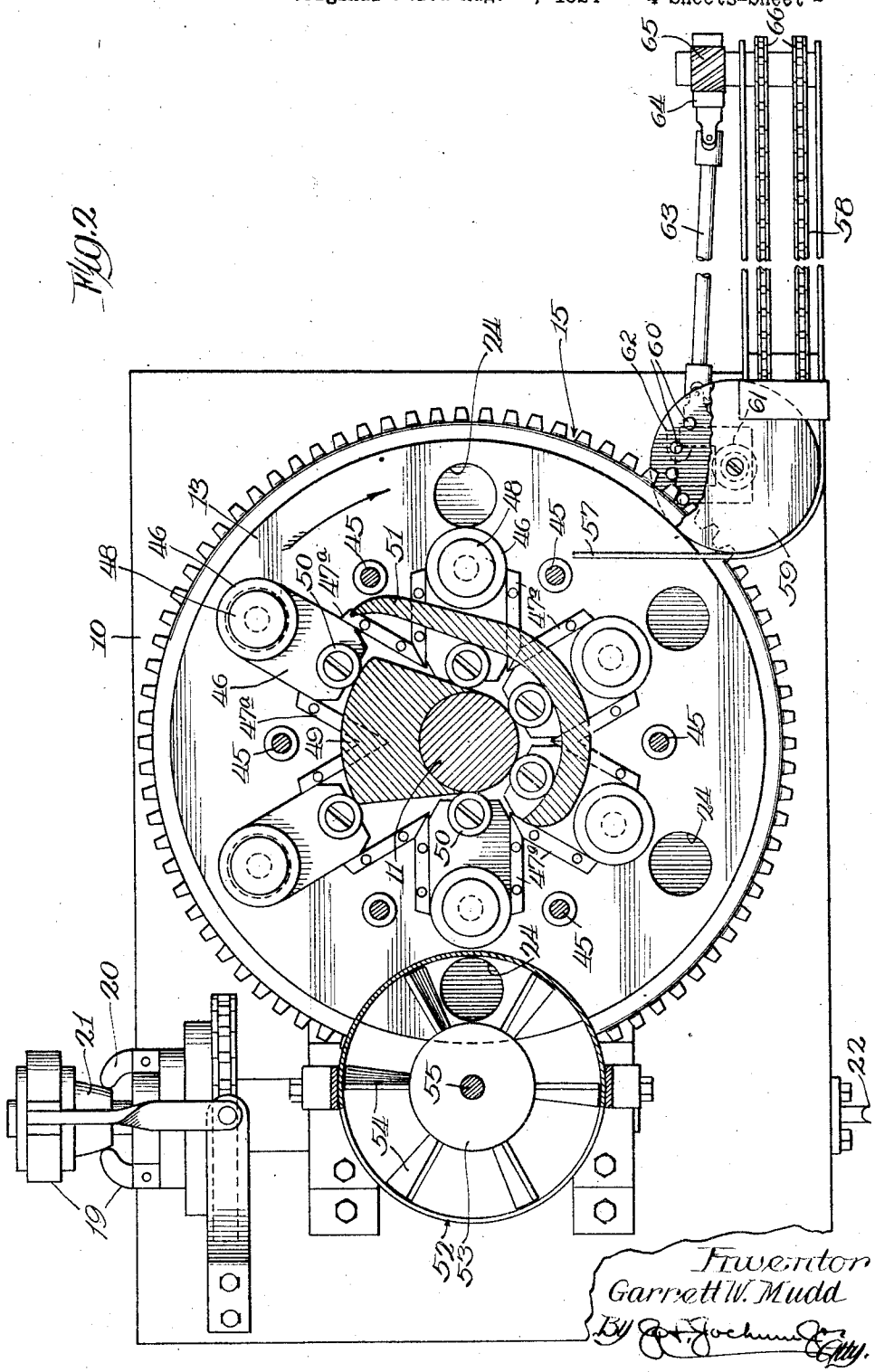
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MACHINE FOR MAKING COMPACTS, TABLETS, WAFERS, AND THE LIKE

Original Filed Aug. 30, 1924 4 Sheets-Sheet 2

Fig. 2.



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MACHINE FOR MAKING COMPACTS, TABLETS, WAFERS, AND THE LIKE

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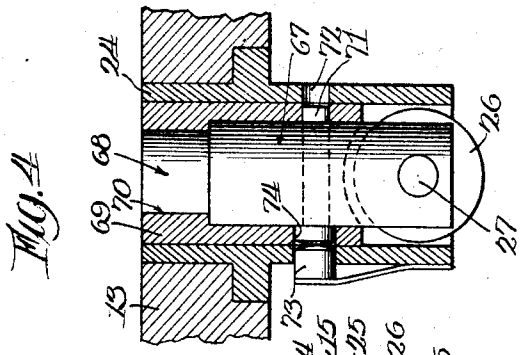


FIG. 4

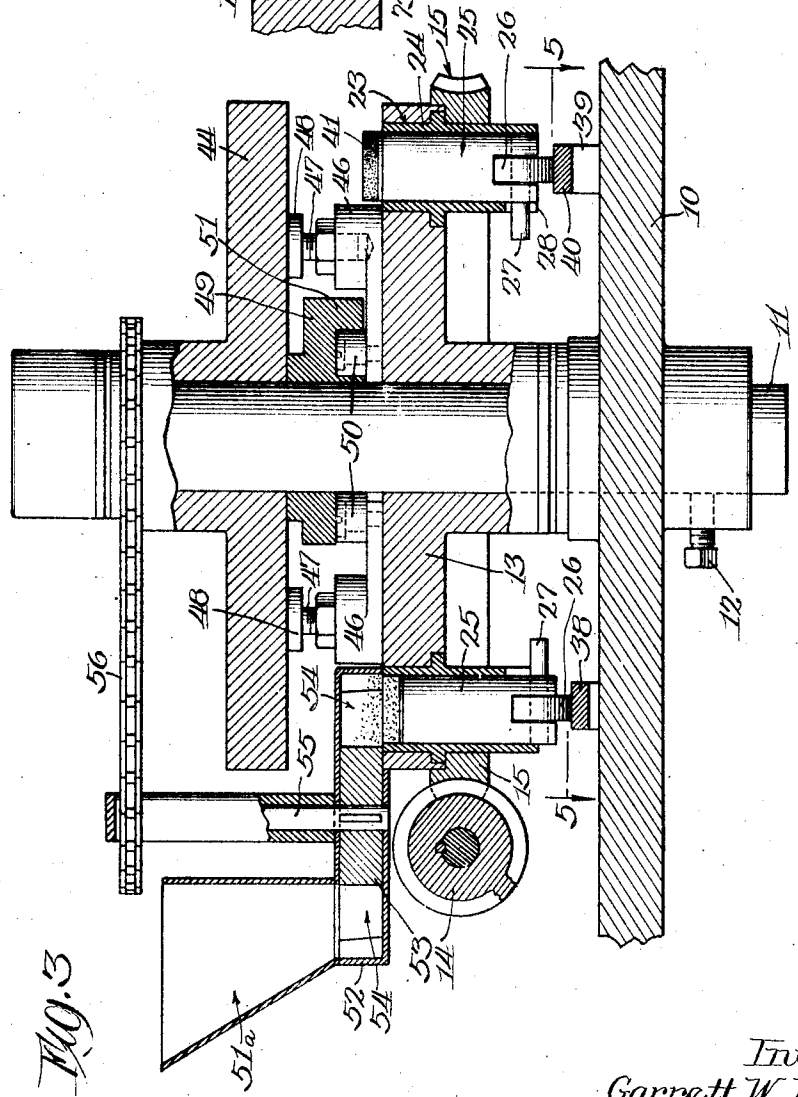


FIG. 3

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May 3, 1927. 1,626,860

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MACHINE FOR MAKING COMPACTS, TABLETS, WAFERS, AND THE LIKE

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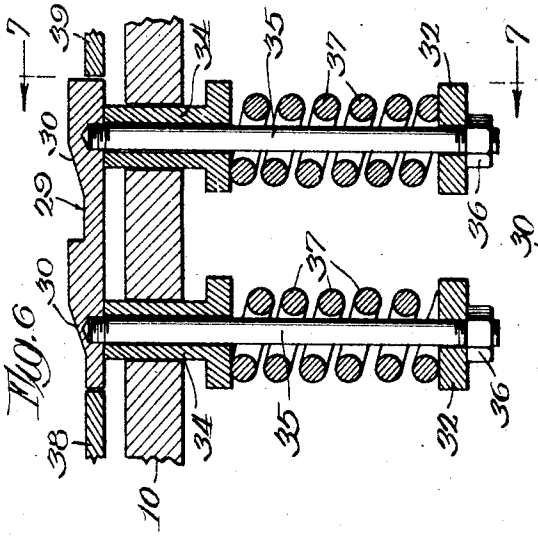


Fig. 6

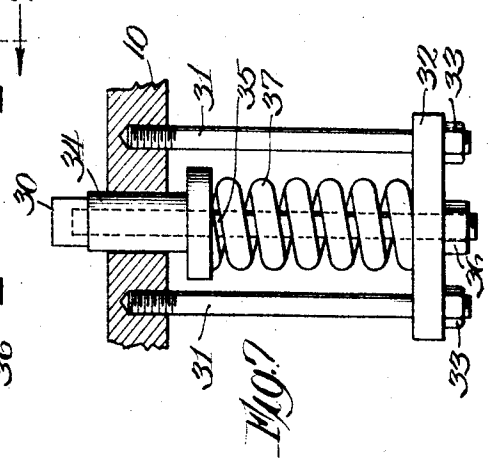


Fig. 7

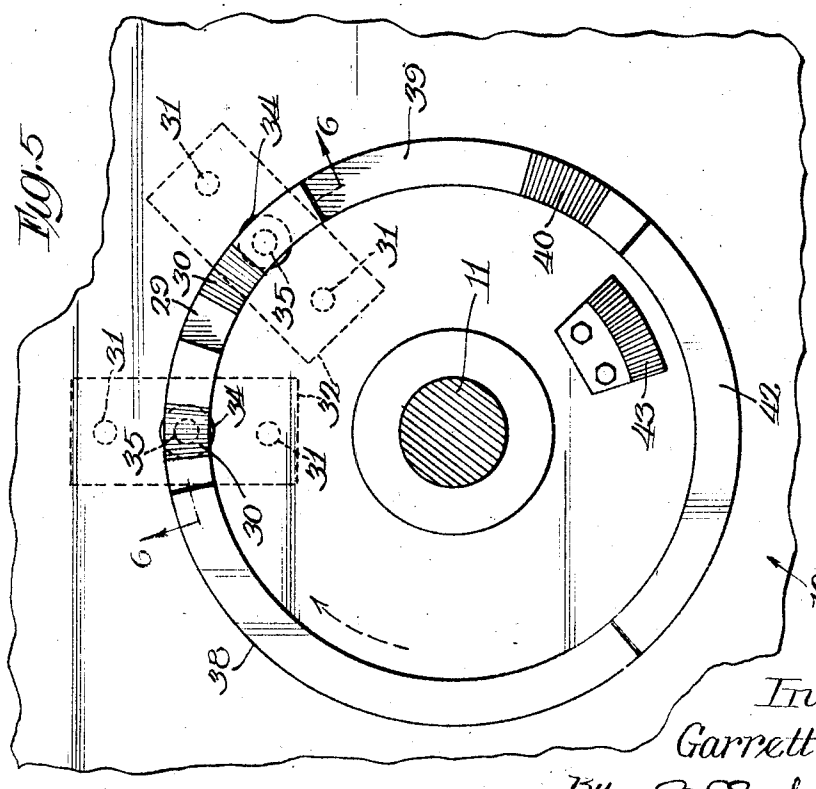


Fig. 5

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Patented May 3, 1927. 1,626,860

UNITED STATES PATENT OFFICE.

GARRETT W. MUDD, OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING COMPACTS, TABLETS, WAFERS, AND THE LIKE.

Application filed August 30, 1924, Serial No. 735,090. Renewed September 22, 1926.

This invention relates to improvements in machines for making compacts, tablets, wafers and the like, and one of the objects of the invention is to provide an improved machine of this character for compressing and forming powdered or semipowdered material into compacts, tablets or wafers, and to improved means whereby the material will be compressed and the surface of the finished article will not adhere to any of the members of the forming mold or die.

A further object is to provide in a machine of this character a mold or die for shaping the material and in which mold one of the abutment members operates with a sliding movement across the end of the mold and transversely with respect to the mold, so that the said abutment members will be scraped by the edge of the mold, obviating furthermore the necessity for the use of cloth or fabric in connection with the pocket, which would be necessary in the event that two opposed reciprocating plungers were employed as a compressing means for the material.

A further object is to provide an improved machine of this character which will be of a comparatively simple and durable construction and continuous in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which—

Figure 1 is a side elevation of an improved machine of this character constructed in accordance with the principles of this invention and with parts omitted.

Figure 2 is a horizontal sectional view taken on line 2—2 Figure 1 and with parts omitted.

Figure 3 is a detail vertical longitudinal sectional view with parts omitted.

Figure 4 is a detail sectional view of a modified form of plunger.

Figure 5 is a horizontal sectional view as taken on line 5—5 Figure 3 and with parts omitted.

Figure 6 is a vertical sectional view taken on line 6—6 Figure 5.

Figure 7 is a detail vertical sectional view taken on line 7—7 Figure 6.

Referring more particularly to the drawings the numeral 10 designates a suitable supporting structure and 11 designates an upright shaft which projects above the support 10 and is held against rotation by means of a suitable fastening device 12, and about which shaft the compacting mechanism is rotatable.

A member 13 rotates about the shaft 11 on a vertical axis and may be of any desired size and configuration, adapted to be rotated in any desired or suitable manner such as by means of a worm 14 which meshes with a worm gear 15 connected with the member 13. The worm 14 receives its motion from any suitable source such as a motor 16 and a chain and sprocket drive 17—18. A suitable clutch 19 controlled by clutch members 20 and 21, may be interposed in the drive so as to control the operation of the worm 14. This clutch may be actuated in any desired or suitable manner such as through the medium of an operating handle 22 located on the side of the machine on which operator works.

The member 13 is provided with a plurality of openings 23 within each of which is arranged a tubular member 24 which constitute open pockets or cylinders adapted to receive the material to be compacted. These pockets may be of any desired size and configuration and any number may be employed. Reciprocable in each of the pockets 24, is a plunger 25 which preferably carries an antifriction roller 26 on one end thereof. The shaft of the roller 26 preferably projects laterally beyond the pocket 24, as at 27, for a purpose to be hereinafter described, and the wall of the pocket is preferably slotted as at 28, so that the movement of the plunger 25 will be not interfered with by the projection 27. Mounted upon the support 10 and below the member 13, is a sectional track or runway over which the rollers 26 move. One of the sections 29 of the track is arranged at a predetermined point in the path of movement of the rollers on the plungers 25, and the track, is provided with one or more cam surfaces 30 and over which surfaces the rollers 26 of the successive plungers travel during the operation of the machine. The purpose of the cam surfaces 30 is to cause the plunger 25 to impart an impact to the material being compressed, and if desired, and in order to impart a plurality of impacts upon the same material within the pocket, a plurality of cam or inclined surfaces 30 may be provided.

The track section 29 is adjustable so as to control the extent of movement of the plunger in the pocket, and if desired, the track section may be yieldingly supported to permit the plunger to yield under abnormal conditions and thereby prevent injury.

Any suitable means may be provided for supporting the track section such as hangers, any number of which may be provided, and which hangers consist of pendent members 31 in the form of bars or rods which are threaded by one end into the track section 29. These members 31 are preferably arranged in pairs and sleeved upon the lower ends thereof is a bar 32 held in position by means of nuts or collars 33, threaded upon the lower extremities of the members 31 below the member 32. A guide collar 34 passes through the member 13, adjacent the track section 29 and also projects below said member. Connected with the track section 29 is a bar or rod 35 which passes through the member 32 and is engaged by a nut or collar 36 below the member 32. A resilient member 37, preferably in the form of a coil spring encompasses the member 35, one end of the spring engaging the end of the collar 34 and the other end of the spring engages the member 32. It will thus be manifest that this track section 29 may be elevated or lowered with respect to the adjacent sections of the track by adjusting the nuts or collars 33, upon the ends of the members 31 to vary or alter the degree of movement of the plunger in the pocket. By adjusting the nut or collar 36 the tension of the spring 37 may be varied.

The track section 38 is also adjustably supported in any desired or suitable manner (not shown) so as to control or regulate the amount of material to be compressed, and which material is fed into the pocket at a predetermined point in the path of movement of the pocket. By adjusting the track section 38 it will be manifest that the degree of receding movement of the plunger 25 may be controlled and the amount of material which will be received by the pocket will also be controlled, (see Figure 3). The track section 38 is arranged just in advance of the track section 29. The track section 39 is adapted to receive the rollers on the plungers after the material has been compacted in the pocket, and the section 39 is provided with a cam or inclined portion 40 over which the roller 26 operates to raise the plunger 25 and thereby cause the latter to eject the compacted article 41 (see Figure 3).

From the track section 29 the roller 26 will pass on to the section 39 and then down the incline 40 on to the track section 42 which latter is arranged so as to permit the plunger 25 to recede so that material may be fed into the pocket. As a means for assisting in the movement of the plunger 25, there may be provided a member or device 43, which latter is also preferably of a cam shape formation, and is arranged adjacent the portion 40 of the track section 29, so that as the roller 26 is passing down the incline of the portion 40 of the track section 29 or if desired at any point thereafter, the lateral projection 27 connected with the roller 26, will pass thereunder, thereby providing a positive means for retracting the plunger. The rollers 26 on the plungers 25 will then pass upon the track section 38 so as to regulate, if necessary the desired distance the plunger moves in the pocket 25 to control the amount of material deposited into the pocket.

It will therefore, be manifest that during the cycle of operation of one of the pockets 24 and plunger 25, and assuming the roller of the plunger to be moving over the portion 38 of the track, the material will be deposited in the pocket above the plunger. From the track section 38 the roller will travel to the track section 29 and over the cam surfaces 30, which latter will cause the plunger to impart the desired number of impacts to the material in the pocket, for compressing the material. The roller will then pass to the track section 39, and from there to the raised portion 40 of the section 39, so that the compacted article 41 will be ejected from the pocket, at which time the ejected article may be conveyed away in a manner to be set forth.

As the pocket further advances after the article has been ejected therefrom, the plunger will be retracted by the cam device or member 43 engaging the projection 27 on the axle of the roller 26.

Rotatably mounted upon the shaft 11 and above the member 13, parallel thereto and spaced thereabove, is a co-operating member 44, and the members 13 and 44 are connected together for rotation in unison in any suitable manner such as by means of connecting bars or rods 45. Slidably mounted between the members 13 and 44 and upon the member 13 are a plurality of abutment members or slides 46 which preferably move in guide ways 47ª on the member 13. One of these members 46 is provided for each of the pockets 24 and they are maintained, by means of the guide members 47ª, in a fixed position with relation to the respective pockets. The lower faces of the abutments 46 contact with the face of the member 13, which latter is substantially flush with the upper ends of the pockets to close the latter, and will co-operate with the respective pocket to close the latter, and will co-operate with the respective plungers 25 so that the material will be compacted therebetween. The abutments 46 are held against lateral

displacement with respect to the pockets 25 in any suitable manner such as by means of screws 47 threaded into the abutment and having a head 48 which engages the lower or proximate face of the member 44. When the screw 47 is adjusted the abutment 46 will be held in position during its movement upon the member 13, by the contact of the head 48 of the screws with the face of the member 44 and the contact of the face of the abutment 46 with the face of the member 13. The friction between these parts will not be sufficient to retard or impair the sliding movement of the abutment 46.

The abutment is adapted to be moved in one direction as the members 13, 44 rotate, by means of a stationary cam device 49 which engages anti-friction rollers 50 on each of the abutments 46, and on one side of the center of the roller. The abutment 46 is moved in the opposite direction by another cam device 51 which engages on the opposite sides of the rollers 50. These cam devices 49 and 51 are arranged between the members 13 and 44 and may be anchored to the shaft 11.

The material to be compacted is supplied from a suitable hopper 51ª arranged at a convenient position adjacent the track section 38 and above the member 13. A housing 52 is arranged at the bottom of the hopper and within the housing is arranged a rotatable filling device, preferably in the form of radially arranged and spaced blades 54 which move over the bottom of the housing 52, the housing bottom being provided with an opening with which the ends of the pockets 24 are successively brought into register. As the member 53 is rotated the material will be scraped into the pocket 24.

The member 53 may be rotated in any suitable manner such as by means of a shaft 55 connected thereto and journaled in a suitable bearing to rotate on a vertical axis. To the shaft is connected a sprocket wheel over which the drive chain 56 passes and the drive chain also passes over another sprocket wheel (not shown) carried by the member 44, so that when the member 44 is rotated motion will be imparted by the chain 56 to the member 53.

It will therefore be manifest that with the portion of the machine thus far described, the material which has been supplied to the hopper 51 will be moved by the blades 54 of the member 53 and delivered through the opening in the bottom of the housing and into the pocket 24 in register therewith, the plunger 25 being in lowered position at that time. As the pockets are advanced the material will be compacted therein in a manner as has already been described, it being understood that the abutments 46 will move over the respective pockets to close them in advance of the point in the operation of the machine at which the compacting commences.

As the abutments have a sliding movement across and transversely of the ends of the respective pockets 24, the face of the abutment will be kept clean by reason of the fact that the end of the wall of the pocket will serve as a scraper. Furthermore when the abutments are being returned after the article has been compacted, they will not scrape off the top face of the compacted article.

As a means for carrying away the compacted article 41 after it has been ejected by the plunger 25 from the pocket 24, there may be provided a guide or deflector 57 (see particularly Figure 2) arranged in such a position that as the member 13 advances after the article has been ejected, the article will engage the guide 57 and will be directed thereby, preferably to a rotatable platform or support 59 connected to rotate with the gear 60. The surface of this platform is substantially flush with the upper surface of the member 13 across which latter the article is moved by the guide 57. From the platform or support 59 the article is moved to a conveyor 58 of any suitable type, to be conveyed away.

Motion may be imparted to the conveyor 58 in any suitable manner but preferably by means of the worm gear 15, the teeth of which are suitably spaced so that they will mesh with another gear 60, the latter being preferably of the pin type. Connected to rotate with the gear 60 is another gear 61 which in turn meshes with a gear 62 on a universally mounted shaft 63. To the end of the shaft 63 is connected a gear 64 which meshes with a gear 65 on the operating shaft of driving pulleys of the conveyor 58.

As a means for varying the size of the pockets 24 to vary the size of the compacted article, the plunger which operates in the pockets may be of a sectional construction such as shown in Figure 4. The plunger section 67 is of an external diameter somewhat less than the internal diameter of the pocket 24 and the end of the plunger is reduced as at 68 for a considerable distance. A cap 69 having a closed end with the exception of an opening 70 therethrough is sleeved over the end of the plunger section 67, so that the reduced end 68 of the plunger will enter the opening 70. The bottom of the cap 69 is of such thickness that the opening 70 will be a considerable length and when in position upon the plunger 67 the outer end or face of the sleeve or cap 69 will be flush with the end of the plunger 67.

The sleeve 69 is locked or secured to the

plunger 67 for reciprocation therewith in any suitable manner such as by means of a pin or fastening device 71.

When these parts are locked together it will be manifest that the transverse area of the portion of the pocket which receives the material to be compacted will be equal to the area of the end of the plunger 67 and the adjacent end of the sleeve 69. By detaching the sleeve 69 from the plunger 67, which may be accomplished by removing the pin or fastening device 71 through an opening 72 in the wall of the pocket 24, and securing the sleeve against reciprocation with the plunger, by the means of a suitable fastening device 73 adapted to enter a suitable opening 74 in the wall of the sleeve, the sleeve will then, when the plunger 67 is retracted, be held against movement therewith. The reduced end 68 of the plunger will then move in the opening 70 in the sleeve 69 and this opening will then constitute the pocket in which the reduced end 68 of the plunger 67 reciprocates. The material to be compacted and being fed to the pocket will then enter only the opening 70. This opening being of a diameter considerably less than the internal diameter of the opening 70 and the sleeve 24, a smaller article may be produced when the machine is then operated.

Obviously many changes may be made in the details of construction and in the combination and arrangement of the several parts of the invention, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. A machine of the character described including a member having a cavity or pocket therein for receiving the material to be compacted, the top of the pocket being flush with the face of the member, a separate bottom for the pocket, means for moving the bottom with respect to the pocket to compress the material, a closure for the pocket, said closure forming an abutment against which the material is compressed, the entire lower face of the said abutment being uninterrupted and flat and sliding in contact with the face of the said member and also with the face of the formed article, and means for positively moving the abutment in forward and backward direction.

2. A machine of the character described including a member having a cavity or pocket therein for receiving the material to be compressed, the top of the pocket being flush with the face of the member, a plunger for the pocket, means for reciprocating the plunger, an abutment adapted to form a closure for the pocket and co-operating with the plunger to compress the material therebetween, the face of the said abutment being uninterrupted and flat and sliding in contact with the said face of the member and the face of the formed article and in directions transverse to the direction of movement of the plunger and means operating to positively move the abutment in forward and backward directions.

3. A machine of the character described including a member having a cavity or pocket therein, for receiving the material to be compressed, the top of the pocket being flush with the face of the member, a separate bottom for the pocket, means for moving the bottom with respect to the pocket to compress the material, a closure for the pocket, said closure having an uninterrupted and flat face forming an abutment against which the material is compressed, said closure having a sliding movement directly in contact with the said face and the material and of the article transversely across the end of the pocket, means for varying at will the degree of pressure of the said plunger upon the material in the pocket, means for positively moving the abutment in forward and backward directions.

4. A machine of the character described including a member having a cavity or pocket therein for receiving the material to be compressed, the top of the pocket being flush with the face of the member, the plunger operable in the pocket, means for moving the plunger, an abutment adapted to form a closure for the pocket and cooperating with the plunger to compress the material therebetween, the entire face of said abutment being uninterrupted and flat and sliding in contact with the face of said member and the forming article, and means for positively moving the abutment forward and backward.

5. A machine of the character described including a support having a pocket for receiving the material to be compressed, a plunger movable in the pocket, an abutment movable across the end of the pocket in directions transverse to the direction of movement of the plunger, means for thus moving the abutment, said abutment cooperating with the plunger to compress the material therebetween, and means for causing the plunger to impart a plurality of impacts to the material in the pocket.

6. A machine of the character described including a support having a pocket for receiving the material to be compressed, a plunger movable in the pocket, an abutment movable across the end of the pocket in directions transverse to the direction of movement of the plunger, means for thus moving the abutment, said abutment cooperating with the plunger to compress the material therebetween, means for causing the plunger to impart a plurality of impacts to the material in the pocket, and means for

causing the plunger to eject the compacted material from the pocket when the said abutment is removed.

7. A machine of the character described including a support having a pocket for receiving the material to be compressed, a plunger movable in the pocket, an abutment movable across the end of the pocket in directions transverse to the direction of movement of the plunger, means for thus moving the abutment, said abutment co-operating with the plunger to compress the material therebetween, means for causing the plunger to impart a plurality of impacts to the material in the pocket, and positive means for retracting the plunger.

8. A machine of the character described including a plurality of pockets for receiving the material to be compacted, the tops of said pockets being flush with the face of the member, means for continuously advancing the pockets, means for feeding material to the pockets at predetermined points in their cycle of movement, plungers movable in the pockets, slides individual to the pockets and forming abutments co-operating with the plungers to compress the material therebetween, the active faces of said slides being uninterrupted and flat, said faces moving in directions transverse to the direction of movements of the plungers in the pockets and having a sliding movement in contact with the face of the compacted article, and means for positively moving the slides in both directions.

9. A machine of the character described including a plurality of pockets for receiving the material to be compacted, means continuously advancing the pockets, means for feeding material to the pockets at predetermined points in their cycle of movement, plungers movable in the pockets, slides individual to the pockets and forming abutments cooperating with the plungers to compact the material therebetween, the active faces of said slides being uninterrupted and flat, said faces moving in directions transverse to the direction of movement of the plungers in the pockets and having a sliding movement in contact with the face on the compacted article, means for positively moving the slides in both directions, and means operating to cause the plunger to eject the said articles from the respective pockets.

10. A machine of the character described including a plurality of pockets for receiving the material to be compacted, means continuously advancing the pockets, means for feeding material to the pockets at predetermined points in their cycle of movement, plungers movable in the pockets, slides individual to the pockets and forming abutments co-operating with the plungers to compact the material therebetween, the active faces of said slides being uninterrupted and flat, said faces moving in directions transverse to the direction of movement of the plungers in the pockets and having a sliding movement in contact with the face of the compacted article, means for positively moving the slides in both directions, means operating to cause the plunger to eject the said article from the respective pockets, and positive means for retracting the plunger after the articles have been ejected thereby.

11. A machine of the character described including a rotatable support, pockets carried thereby for receiving the material to be compacted, plungers individual to and movable within the pockets, means for actuating the plungers as the support is advanced, slides individual to the pockets and movable thereover in directions transverse to the directions of movements of the respective plungers and co-operating therewith to compact the material, positive means for moving the slides in one direction, and positive means for moving them in the opposite direction, the active faces of the slides being uninterrupted and flat, the said faces having a sliding movement with respect to and in contact with the face of the compacted article.

12. A machine of the character described including a rotatable support, pockets carried thereby for receiving the material to be compacted, plungers individual to and movable in the pockets, means for actuating the plungers as the support is advanced, slides individual to the pockets and movable thereover in directions transverse to the directions of movements of the respective plungers and co-operating therewith to compact the material, positive means for moving the slides in one direction, positive means for moving them in the opposite direction, the active faces of the slides being uninterrupted and flat, the said faces having a sliding movement with respect to and in contact with the face of the compacted article, and means for causing the plungers to eject the compacted article from the said pockets.

13. A machine of the character described including a rotatable support, pockets carried thereby for receiving the material to be compacted, plungers individual to and movable in the pockets, means for actuating the plungers as the support is advanced, slides individual to the pockets and movable thereover in directions transverse to the directions of movement of the respective plungers and co-operating therewith to compact the material, positive means for moving the slides in one direction, positive means for moving them in the opposite direction, the active faces of the slides being uninterrupted and flat, the said faces having a sliding movement with respect to and in contact with the face of the compacted article, means for

causing the plungers to eject the compacted articles from the respective pockets, and means for conveying away the said ejected article.

14. A machine of the character described including a rotatable support, pockets carried thereby for receiving the material to be compacted, plungers individual thereto and movable in the pockets, means for actuating the plungers as the support is advanced, slides individual to the pockets and movable thereover in directions transverse to the direction of movement of the plungers and co-operating therewith to compact the material, positive means for moving the slides in one direction, positive means for moving them in the opposite direction, the active faces of the slides being uninterrupted and flat, the said faces having a sliding movement with respect to and in contact with the face of the compacted article, and means for supplying the material to the said pockets.

15. A machine of the character described including a rotatable support, pockets carried thereby for receiving the material to be compacted, plungers individual thereto and movable in the pockets, means for actuating the plungers as the support is advanced, slides individual to the pockets and movable thereover in directions transverse to the direction of movement of the respective plungers, and co-operating therewith to compact the material, positive means for moving the slides in one direction, positive means for moving them in the opposite direction, the active face of the slides being uninterrupted and flat, the said faces having a sliding movement with respect to and in contact with the face of the compacted article, means for causing the plungers to eject the compacted articles from the respective pockets, means for retracting the plungers, and means for supplying the material to the pockets when the plungers are retracted.

16. A machine of the character described including a pocket for receiving the material to be compacted, a plunger movable in the pocket, and an abutment fixed with respect to and movable over the pocket and co-operating with the plunger to compact the material therebetween, the active face of said abutment being interrupted and flat and having a sliding contact with the face of the compacted article.

17. A machine of the character described including a pocket for receiving the material to be compacted, a plunger movable in the pocket, an abutment movable over the pocket and co-operating with the plunger to compress the material therebetween, the said abutment having a sliding contact with the face of the compacted article, and means for causing the plunger to impart a plurality of impacts to the material being compacted.

18. A machine of the character described including a pocket for receiving the material to be compacted, a plunger movable in the pocket, an abutment with respect to and fixed with respect to and movable over the pocket and co-operating with the plunger to compress the material therebetween, the active face of said abutment being uninterrupted and flat and having a sliding contact with the face of the compacted article, positive means for moving the abutment in both directions and means for holding the said abutment in contact with the end of the pocket.

19. A machine of the character described including an open cylinder for receiving the material to be compacted, a plunger reciprocable therein, said plunger being of a diameter somewhat less than the interior diameter of the cylinder, means movable over the end of the cylinder to close the same and co-operating with the plunger to form an abutment for compressing the material therebetween, the end of the plunger being reduced, and a sleeve removably telescoping over the end of the plunger and between the plunger and the cylinder wall, the end of the sleeve being closed with the exception of an opening to receive the reduced end of the plunger.

20. A machine of the character described including an open cylinder for receiving the material to be compacted, a plunger reciprocable therein, said plunger being of a diameter somewhat less than the interior diameter of the cylinder, means movable over the end of the cylinder to close the same and co-operating with the plunger to form an abutment for compacting the material therebetween, the end of the plunger being reduced, and a sleeve removably telescoping over the end of the plunger and between the plunger and the cylinder wall, the end of the sleeve being closed with the exception of an opening to receive the reduced end of the plunger, the outer surface of the sleeve co-operating with the end of the piston to increase the area of the end of the plunger.

21. A machine of the character described including a cylinder for receiving the material to be compacted, a plunger movable in the cylinder, an abutment adapted to be moved over the cylinder to co-operate with the plunger, said plunger being formed of telescoping sections whereby the area of the cylinder in which the material is compacted may be varied, and means for locking the said sections in operative relation.

22. A machine of the character described including a cylinder for receiving the material to be compacted, a plunger movable in the cylinder, an abutment adapted to be moved over the cylinder to co-operate with the plunger, said plunger being formed of telescoping sections whereby the area of the

cylinder in which the material is being compacted may be varied, and means for detachably securing the said sections together.

23. A machine of the character described including a cylinder for receiving the material to be compacted, a plunger movable in the cylinder, an abutment adapted to be moved over the cylinder to co-operate with the plunger, said plunger being formed of telescoping sections whereby the area of the cylinder in which the material is being compacted may be varied, and means for holding one of the plunger sections against reciprocation while the other section is reciprocated.

24. A machine of the character described including a cylinder for receiving the material to be compacted, a plunger reciprocable therein, the exterior diameter of the plunger being considerably less than the internal diameter of the cylinder, the end of the plunger being reduced, a cap sleeved over the end of the plunger and co-operating with the end of the plunger to increase the area thereof, said cap having an opening through its end to receive the reduced end of the plunger, means for locking the cap for reciprocation with the plunger, and means for locking the sleeve against reciprocation with the plunger.

25. A machine of the character described including a cylinder for receiving the material to be compacted, a plunger reciprocable therein, the exterior diameter of the plunger being considerably less than the internal diameter of the cylinder, the end of the plunger being reduced, a cap sleeved over the end of the plunger and co-operating with the end of the plunger to increase the area thereof, said cap having an opening through the end thereof to receive the reduced end of the plunger, means for locking the cap for reciprocation with the plunger, and means for locking the sleeve against reciprocation with the plunger, the said opening in the end of the cap forming a cylinder in which the reduced end of the plunger operates when the sleeve is restrained against movement with the plunger.

26. A machine of the character described including a pocket for receiving the material to be compacted, a plunger movable in the pocket, an abutment movable over the pocket and co-operating with the plunger to compress the material therebetween, and means for causing the plunger to impart a plurality of impacts to the material being compacted.

In testimony whereof I have signed my name to this specification, on this 25th day of July, A. D. 1924.

GARRETT W. MUDD.