A. SCHAFFER.

DICING MACHINE.

APPLICATION FILED MAY 4, 1918.

1,286,796.

Patented Dec. 3, 1918.

4 SHEETS—SHEET 1.

Fig. I.

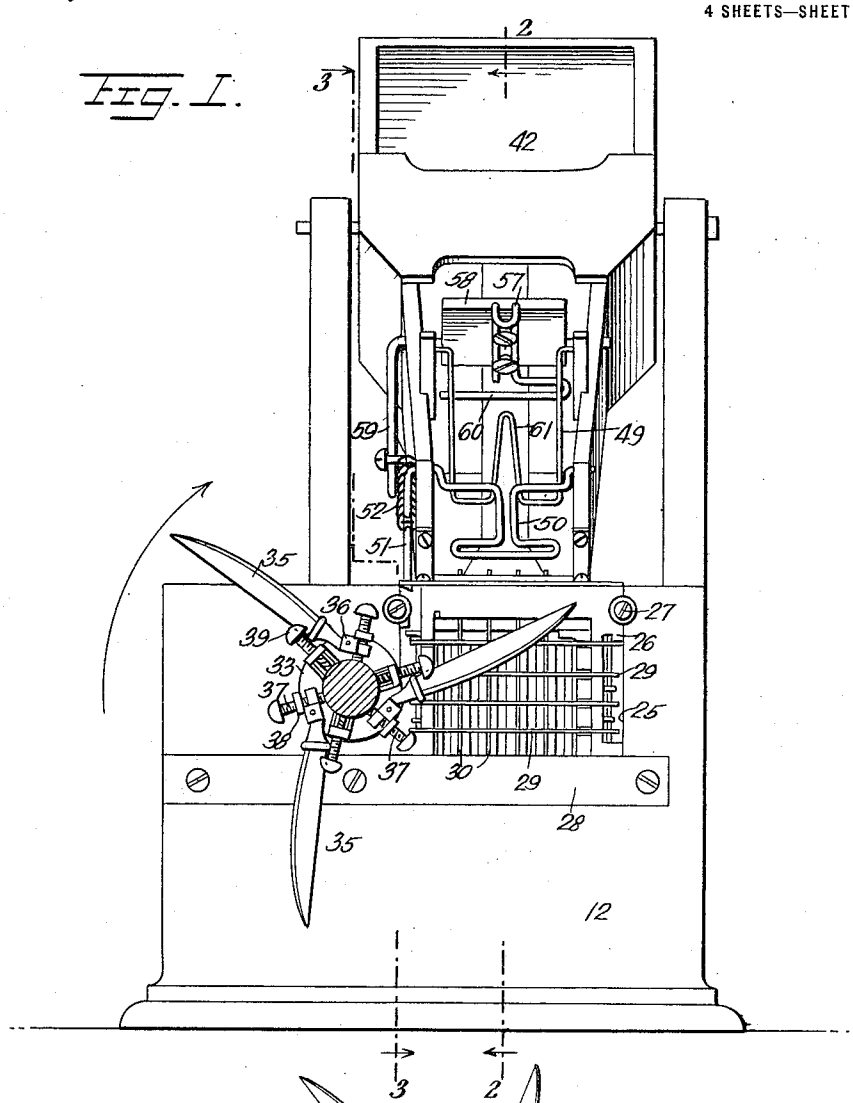
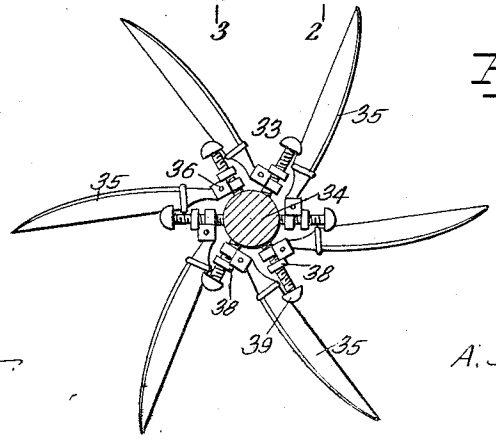


Fig. 10.



WITNESSES

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4 SHEETS—SHEET 2.

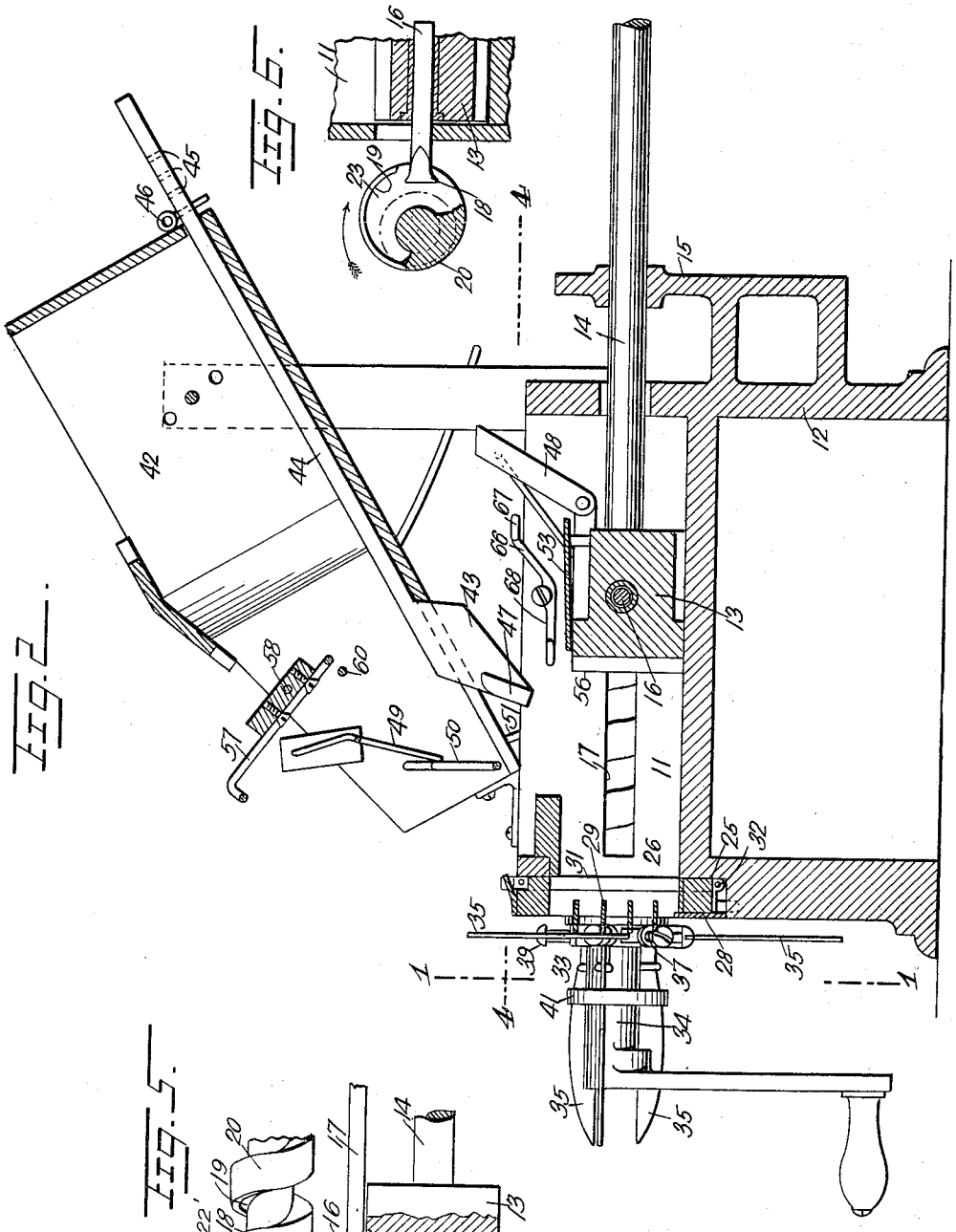


Fig. 2.

Fig. 5.

Fig. 5.

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4 SHEETS—SHEET 3.

Fig. 3.

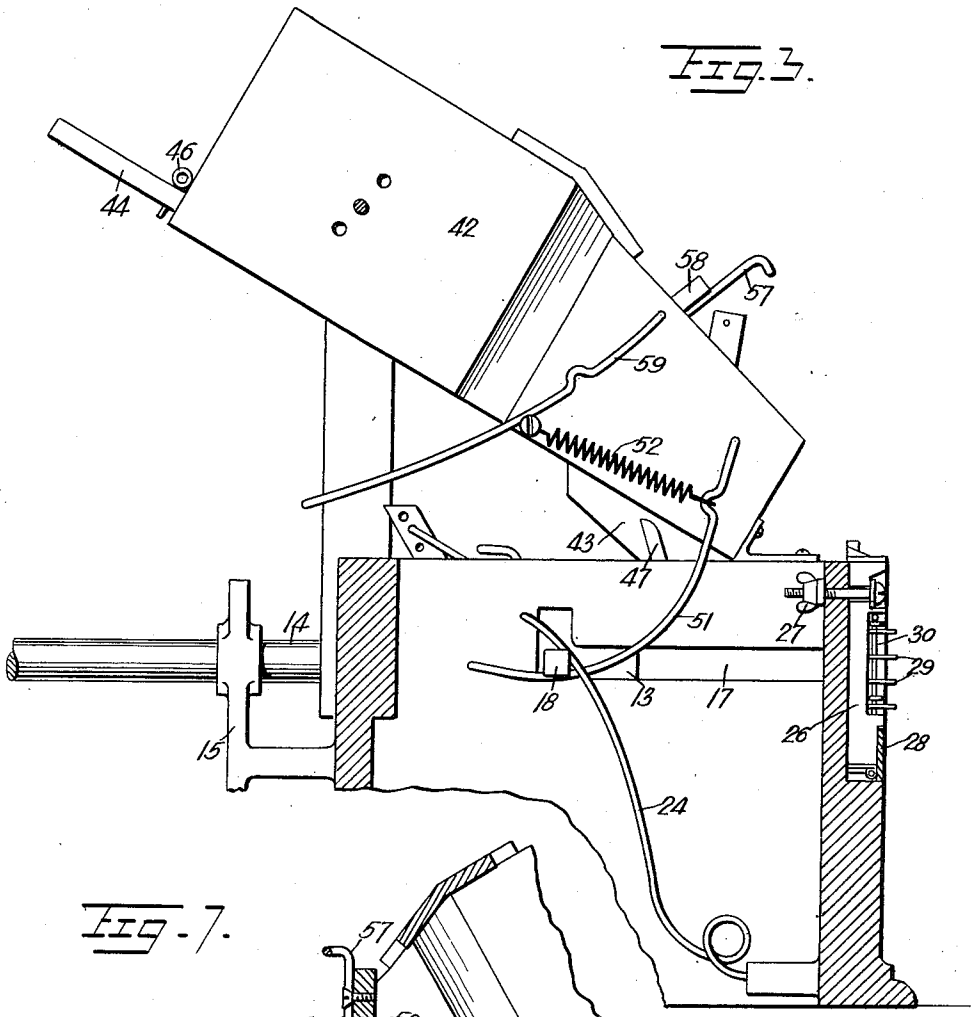
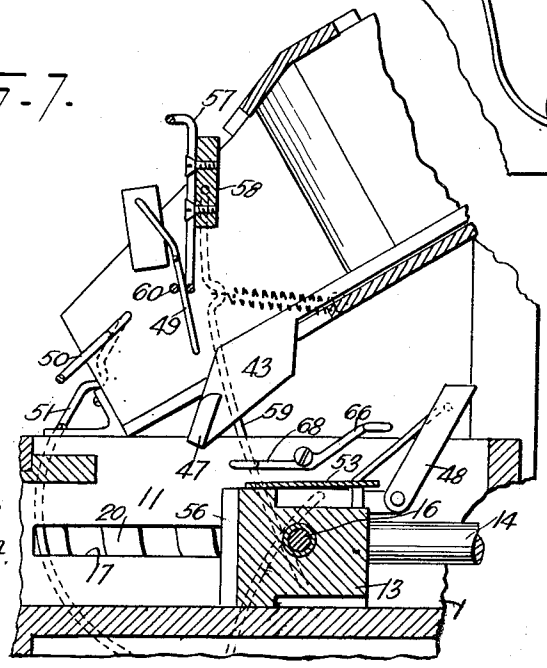


Fig. 7.



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4 SHEETS—SHEET 4.

Fig. 4.

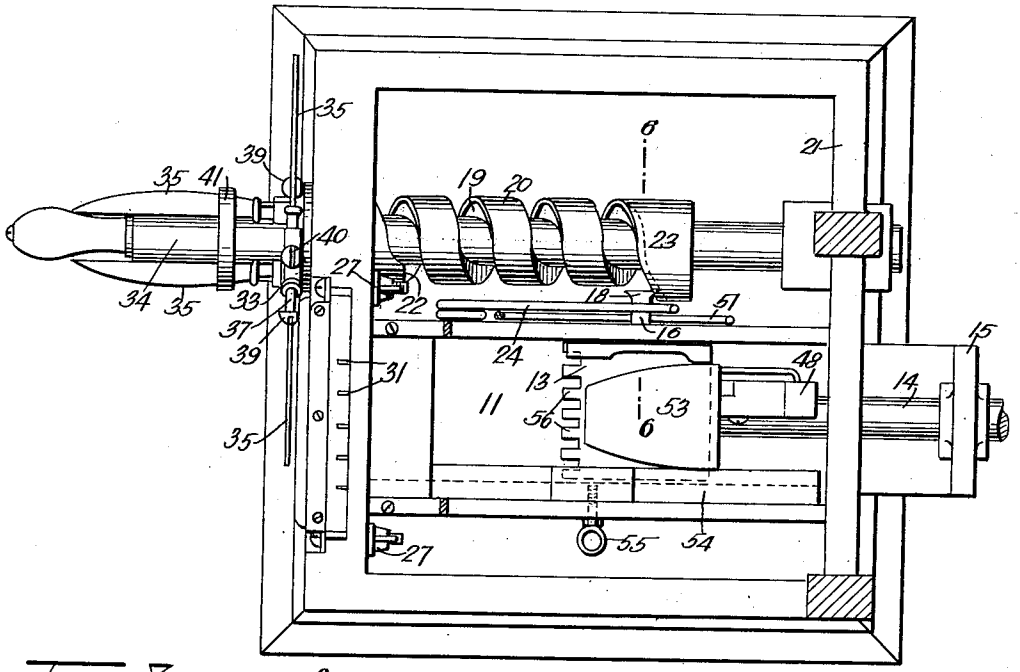
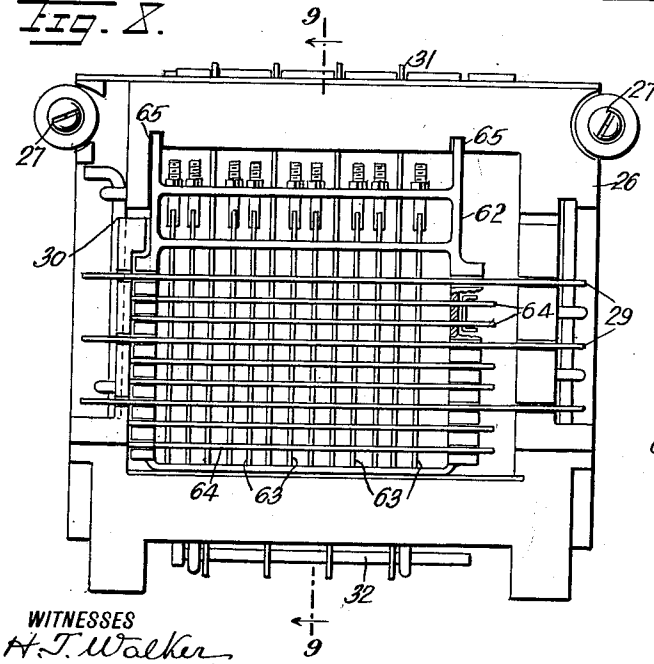


Fig. 8.



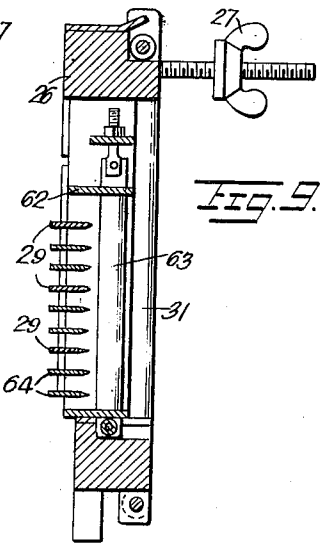


Fig. 9.

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UNITED STATES PATENT OFFICE.

ANDREAS SCHAFFER, OF NEW YORK, N. Y.

DICING-MACHINE.

1,286,796. Specification of Letters Patent. Patented Dec. 3, 1918.

Application filed May 4, 1918. Serial No. 232,513.

To all whom it may concern:

Be it known that I, ANDREAS SCHAFFER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Dicing-Machine, of which the following is a full, clear, and exact description.

My invention relates to a machine whereby fruit or vegetables can be automatically cut in any desired size of piece of angular cross section.

An object of my invention is to provide an automatic machine which is simple in construction and operation and with which dicing can be easily and quickly accomplished.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed.

In the accompanying drawings, forming part of the application, similar characters of reference indicate corresponding parts in all the views.

Figure 1 is an elevation of the machine, the extension of the feeding screw being shown in section on line 1—1, Fig. 2.

Fig. 2 is a vertical section on line 2—2, Fig. 1;

Fig. 3 is a partial elevation and partial section of the machine taken on line 3—3, Fig. 1;

Fig. 4 is a horizontal section on line 4—4, Fig. 2;

Fig. 5 is a fragmentary plan of the feeding screw and plunger head at the end of the feeding stroke, the plunger being broken out to show the details of construction of the means coupling the plunger to the feeding screw;

Fig. 6 is a vertical cross section on line 6—6, Fig. 4;

Fig. 7 is a fragmentary vertical section similar to that shown in Fig. 2;

Fig. 8 is an elevation of the die and carrier for same which controls the size and the configuration of the pieces;

Fig. 9 is a vertical section on line 9—9, Fig. 8; and

Fig. 10 is the elevation of the cutting tool.

Referring to the drawings, 11 is a receiver in the shape of a rectangular box open in front and at the top and provided with a suitable support or base 12 with which it forms the frame of the machine. A plunger 13 is mounted in the receiver to rest on the bottom. The plunger has a rearwardly extending rod 14 projecting out of the receiver whereat a suitable extension 15 is provided from the support 12 to serve as a guide for the rod. The plunger carries a pin 16 disposed transversely of the plunger and which projects through a slot 17 provided in one of the sides of the receiver (see Figs. 2 and 5).

The pin is slidably mounted within the plunger.

The pin has a head 18 which engages the under-cut face 19 of the thread of a screw 20 which is mounted to revolve beside the receiver 11 in an extension 21 of the base 12. The screw 20 terminates with a cam portion 22 at the front end of the machine, which causes the pin 16 to move into the plunger. At the other end the screw has its thread enlarged so that the pin pushed in by the cam 22 will be unable to pass the enlarged portion 23 of the thread when the plunger is moved rearwardly by a spring 24 (see Fig. 3). The enlarged portion 23 of the thread, therefore, limits the movement of the plunger rearwardly and maintains the engagement of the head of the pin with the thread. To facilitate the return of the plunger and prevent the sticking of the spring 24, I provide a push cam 22′ which engages the pin as soon as the pin is moved out of the thread to give an initial push to the plunger away from the front.

The receiver 11 has a recess 25 framing the opening of the receiver and which recess forms a seat for a die carrier 26, the upper part of which carries threaded studs 27 adapted to project through the wall of the receiver so that the carrier can be firmly secured thereto. The lower end of the carrier is retained in position by a plate 28 provided above the lower part of the recess 25. The die carrier is in the shape of a rectangular frame to which front blades 29 are attached pivotally to swing in the horizontal plane, suitable locking means 30 being provided for locking said blades in the die carrier. The carrier has also rear blades 31 mounted to swing in a vertical plane and which can also be locked to the carrier by

suitable locking means 32. Therefore, the material forced through the die formed by the blades will pass out in the shape of rectangular prisms.

The material passing out of the die is further cut by a cutting tool 33 mounted on an extension 34 of the screw 20. The tool is formed of a plurality of cutting blades 35 each pivotally connected to a corresponding collar 36. Each of the collars is mounted to slide and turn on a corresponding stud 37 extending radially from the extension 34 of the screw. The collars are prevented from sliding radially away from the center on the studs by nuts 38 threaded on the studs. Each of the studs terminates with a head 39 which has a slot 40 serving as a bearing for the knife mounted on the preceding stud with reference to the direction of rotation as indicated by the arrow in Fig. 1. Each knife is limited in its swinging movement outwardly in its collar. In consequence, each of the knives after being engaged in the slot of the succeeding stud can be rendered rigid by forcing the nut 38 toward the center on its stud. As shown, there are six knife blades for the cutting tool, and two, three or six knives may be used at a time, according to the size of the pieces it is desired to cut. As shown in Fig. 1, three knives are placed into operative position, the other three being retained along the extension 34 by a yielding split ring 41. The extension carries the crank for operating the machine.

The material may be fed to the plunger manually but preferably an automatic feed is provided. For this purpose a trough 42 is mounted over the receiver in a slanting position, the delivery end of the trough being near the front end of the receiver. A portion of the bottom of the trough near the delivery end is cut out so that the enlarged end 43 of a tongue 44 may project therethrough, the tongue extending along the bottom and out through the rear of the hopper where the tongue is provided with a series of apertures 45 each of which may receive a pin 46 whereby the end 43 of the tongue 44 may be adjusted within the cut-out in the bottom, bringing said end of tongue nearer or farther away from the delivery end of the trough. The end 43 of the tongue has lateral shoulders 47 which are engageable by a yielding projection 48 mounted on the plunger 13, whereby said tongue is moved into the trough and the material stocked therein shaken up thereby preventing the material in the hopper from sticking.

The material is prevented from dropping out through the front end by a guard 49 which is made of wire shaped into an M and suspended in an inverted position in the sides of the trough (see Fig. 1). An extension guard 50 is mounted in front of the guard 49 to swing in the sides of the trough. The guard 49 is maintained against the extension by the material in the trough. The pivot of the extension 50, on the side where the screw is provided, has an arm 51 integral with the pivot which is maintained against the pin 16 by a spring 52. As the plunger moves forward it will move the arm 51 toward the front end of the receiver. The material in the trough will, therefore, be allowed to descend through the cut-out in the bottom of the trough and will fall on to the plate 53 provided on the top of the plunger. But as the plunger reaches the end of its stroke the member 48 will force the tongue 44 into the trough thereby preventing crowding at the discharge. Since the plunger disengages the tongue as soon as the plunger begins to retract the tongue drops and shoves off the plate 53 the articles that remain on said plate and causes said articles to drop into the receiver. The guard returned to its normal position blocks the feed from the trough.

In view of the fact that the sizes of fruit and vegetables vary not only in different classes of vegetables but in the same class, it becomes necessary to vary the width of the receiver. For this purpose I provide fillers 54 of different thicknesses which are adapted to be placed against the side of the receiver (see Fig. 4) remote from the screw and retained against that side by securing means 55. The introduction of the filler into the receiver necessitates a change of plunger; therefore, different plungers are provided for that purpose. To remove the plunger, the pin 16 must be removed, and for this reason the rear end of the slot 17 is in the shape of a bayonet slot, permitting a slight turning movement to the plunger, whereby the pin may be extracted without interference by the screw. The attacking end of the plunger is preferably grooved to present a toothed surface 56 so that the teeth of said surface can enter into the die to be able to force the articles from the die.

To adapt the hopper to material of smaller size, I provide an additional guard extension 57 (see Fig. 7) which is slidably mounted on a block 58 pivotally mounted in the rear of the guard 49. The block 58 has its pivot nearest to the screw extending into an arm 59 which passes the pin 16. The spring 52 is detachable from the arm 51 and can be hooked on the arm 59, as shown in dotted line in Fig. 7, and whereby said arm will be maintained against the pin. The guard extension 57 has a loop 60 into which the portion 61 of the guard 49 may be engaged and whereby the guard 49 may be caused to participate in the movement of the guard extension 57. The engagement of the guard 49 with the loop 60 prevents said

guard from being moved by the material tending to drop out through the cut-out but normally prevented by the engagement of the guard with the extension. This arrangement, as will be noted, brings the guard 49 considerably nearer to the end 43 of the tongue and thereby the clearance between the two is considerably smaller than in the arrangement shown in Fig. 2.

To cut material in smaller cross section, I provide an additional die adapted to be interposed in the die carrier between the blades 29 and 31. This additional die comprises a frame 62 which can be brought against the rear edges of the blades 31 (see Fig. 9). It has suitable notches for the blades 29, which blades lock said frame in the carrier when said blades are locked to the carrier. The frame 62 carries vertical blades 63 and horizontal blades 64 which are so mounted in the frame 62 as to be disposed between the blades 31 and 29 respectively. To maintain this proper disposition of the cutting blades in the frame 62 and in the die carrier, suitable notches 65 are provided in the carrier for which the frame 62 has extensions. This is best shown in Fig. 8.

When the die of the type shown in Figs. 8 and 9 is used, then the cutting tool 33 has preferably all the blades in operative position, as shown in Fig. 10; otherwise the pieces may be too long for their cross section. It will be noted that as the screw is turned the plunger is drawn forward, and while the plunger forces the material through the blades of the die, the material forced through the die will be cut by the cutting tool 33. As the plunger reaches the end of its travel, it is returned to its initial position by the spring 24 from where, by the continuous rotation of the screw the plunger is again drawn toward the forward end, repeating the cycle of operation.

In cases where it is desirable to operate the cutting tool without reciprocating the plunger, I provide a pawl 66 which has an eye 67 which is adapted to abut against the upper edge of the side of the receiver when the branch 68 is placed into vertical position after the plunger has been drawn forward. And when the rear of the plunger comes in contact with the branch 68 the same is stopped before the head 18 of the pin 16 comes against the enlarged portion 23 of the screw, thereby the screw can be rotated without reciprocating the plunger. To release the plunger the pawl must be moved to force the plunger against the resistance of the spring 24 until the end of the branch 68 allows the spring 24 to force the plunger back to bring the head of the pin in engagement with the enlarged part of the screw.

The blades 29 and 31 in the die carrier 26 being pivotal can be swung out so that larger pieces can be cut therethrough when desired. It is self-evident that this displacement of the blades 29 and 31 takes place only when the larger die is used.

I claim:

1. In a dicing machine, a receiver having an open end, a cutting tool at the open end, a plunger in the receiver, a spring for restoring the plunger to the initial position remote from the cutting tool, a screw, a pin sliding in the plunger and adapted to engage the screw, means associated with the screw for engaging the pin at the initial position of the plunger to bring said pin into engagement with the thread of the screw when the screw is revolved, and means associated with the screw for forcing said pin out of engagement with the thread when the plunger reaches the end of its stroke and whereby the spring restores said plunger to its initial position.

2. In a dicing machine, a receiver having cutting means at one end, a plunger for feeding material to the cutting means, means for restoring the plunger to the initial position remote from the cutting means, a feeding screw having an under-cut thread, a pin sliding in the plunger and having means for engaging the under-cut thread, means on the screw for leading the pin into engagement with the under-cut thread of the screw, whereby the plunger is coupled to the screw at the initial position of said plunger, and means at the end of the thread of the screw for forcing the pin into the plunger whereby the plunger is restored to the initial position.

3. In a dicing machine, a receiver having at one end a cutting tool, a plunger in the receiver, a feeding screw for the plunger revoluble in one direction for moving the plunger toward the cutting tool, means for coupling the plunger to the screw at the end of its return stroke and uncoupling the plunger from the screw at the end of its final stroke, and means for moving the plunger rearwardly while the plunger is uncoupled from the screw.

4. In a dicing machine, a receiver having an open end, a frame at the open end detachably associated with the receiver, vertically and horizontally disposed cutting blades in said frame, the vertical and horizontal blades being disposed on opposite faces of the frame, all of said blades having their cutting edges directed inwardly of the receiver, and means for feeding material through the frame.

5. In a dicing machine, a receiver having an open end, a blade frame at the open end, vertical cutting blades on one face of said frame, horizontal cutting blades at the other face of said frame, the two sets of blades being spaced and having their cutting edges directed toward the receiver, the blades disposed on the outer face of the frame swing-

ing outwardly whereby another frame with cutting blades may be introduced into the first frame between the two sets of blades, said second frame having means for engaging the swinging blades so that the said blades are adapted to be disposed midway between the blades in said second frame which are disposed parallelly to said swinging blades, said second frame having a set of blades disposed parallelly to the set of blades on the inner face of the first frame and midway therebetween, and means for feeding material to said blades.

6. In a dicing machine, a receiver having an open end, a frame at the open end, a set of vertical blades at one face of said frame, a set of horizontal blades at the other face, the blades on the outer face of the frame swinging outwardly to accommodate a second frame within the first frame between the two sets of blades, said second frame having a set of vertical blades at one face and a set of horizontal blades at the other face, the two frames having means so that the blades of the second frame run midway between the blades of the first frame, and means for feeding material through said blades.

7. In a dicing machine, a revoluble cutting tool having a plurality of blades each mounted to be moved into operative or into inoperative relation, and means for retaining any of the blades of the cutting tool in operative or in inoperative relation.

8. In a dicing machine, a cutting tool comprising a member mounted to revolve, studs radiating from said member, a collar on each stud mounted to revolve and slide, a blade for each of the collars pivotally connected therewith, said collar having means limiting the outward swinging movement of the blade, each of said studs having means for engaging the rear edge of a blade mounted on the adjacent stud whereby the blade with the collar is prevented from turning on the stud, and means threaded on the stud for limiting an outward movement of the collar.

9. In a dicing machine, a receiver, a plunger, a revoluble cutting tool forming an extension of the feeding means and toward which the plunger is fed, said cutting tool comprising a plurality of blades adapted to be disposed parallelly to the axis or transverse of same, means associated with the extension whereby any of the blades may be locked in the transverse position, and means for retaining any of the blades parallelly to the axis whereby a predetermined number of blades may be placed into operative or into inoperative position.

10. In a dicing machine, a receiver having a cutting tool at one end, a plunger in the receiver, means for reciprocating the plunger to and from the cutting tool, a feeding trough above the receiver, a guard in said trough normally preventing the discharge of the material from the trough into the receiver, and means interposed between the guard and plunger for operating said guard by the movement of the plunger.

11. In a dicing machine, a receiver having cutting means at one end, means in the receiver for feeding material to the cutting means, a feeding trough disposed above the receiver, a guard in the trough normally preventing the material from dropping into the receiver, and means for displacing the guard operable by the movement of the feeding means.

12. In a dicing machine, a receiver having a cutting tool at one end, a plunger in the receiver, means for reciprocating the plunger to and from the cutting tool, a feeding trough, a guard in the trough normally preventing the material from dropping into the receiver, means from the guard to the plunger for operating the guard, a member extending from the trough, and a projection on the plunger for engaging said member for moving the same into the trough when the plunger reaches the end of its stroke toward the cutting tool.

13. In a dicing machine, a receiver having a cutting tool at one end, a plunger in the receiver, means for reciprocating the plunger to and from the cutting tool, a feed trough above the receiver, a guard pivotally mounted in the trough, an extension guard adapted to engage the guard, and means from the extension guard to the plunger whereby said extension is operated and whereby the feed into the receiver is controlled.

14. In a dicing machine, a receiver having a cutting tool at one end, a plunger in the receiver, means for reciprocating the plunger to and from the cutting tool, a feed trough above the receiver, a guard pivotally mounted in the trough, a pivotally-mounted extension guard to which the guard may be connected, a member extending from the extension guard to the plunger, and yielding means maintaining said means in connection with the plunger, said yielding means normally tending to maintain the guard and its extension in a position such as to prevent the feed of the material from the trough into the receiver, the movement of the plunger toward the cutting tool displacing the extension guard to permit the feed of the material from the trough into the receiver.

15. In a dicing machine, a receiver having a cutting tool at one end, a plunger in the receiver, means for reciprocating the plunger to and from the cutting tool, a feed trough, a guard in the trough normally preventing the material from dropping into the receiver, means connecting the guard to the plunger for displacing the guard when

the plunger moves toward the cutting tool, a tongue in the bottom of the trough having an enlarged portion projecting out, and a yielding projection on the plunger for engaging the enlarged tongue portion to raise the tongue into the trough, said projection being adapted to engage the tongue when the plunger approaches the cutting tool.

16. In a dicing machine, a cutting tool comprising a plurality of blades mounted to be disposed parallel to the axis or transverse of same, means for locking the blades in the transverse or operative position, and means for retaining any of the blades parallel tc the axis or in inoperative position.

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Witnesses:
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J. LUFF.