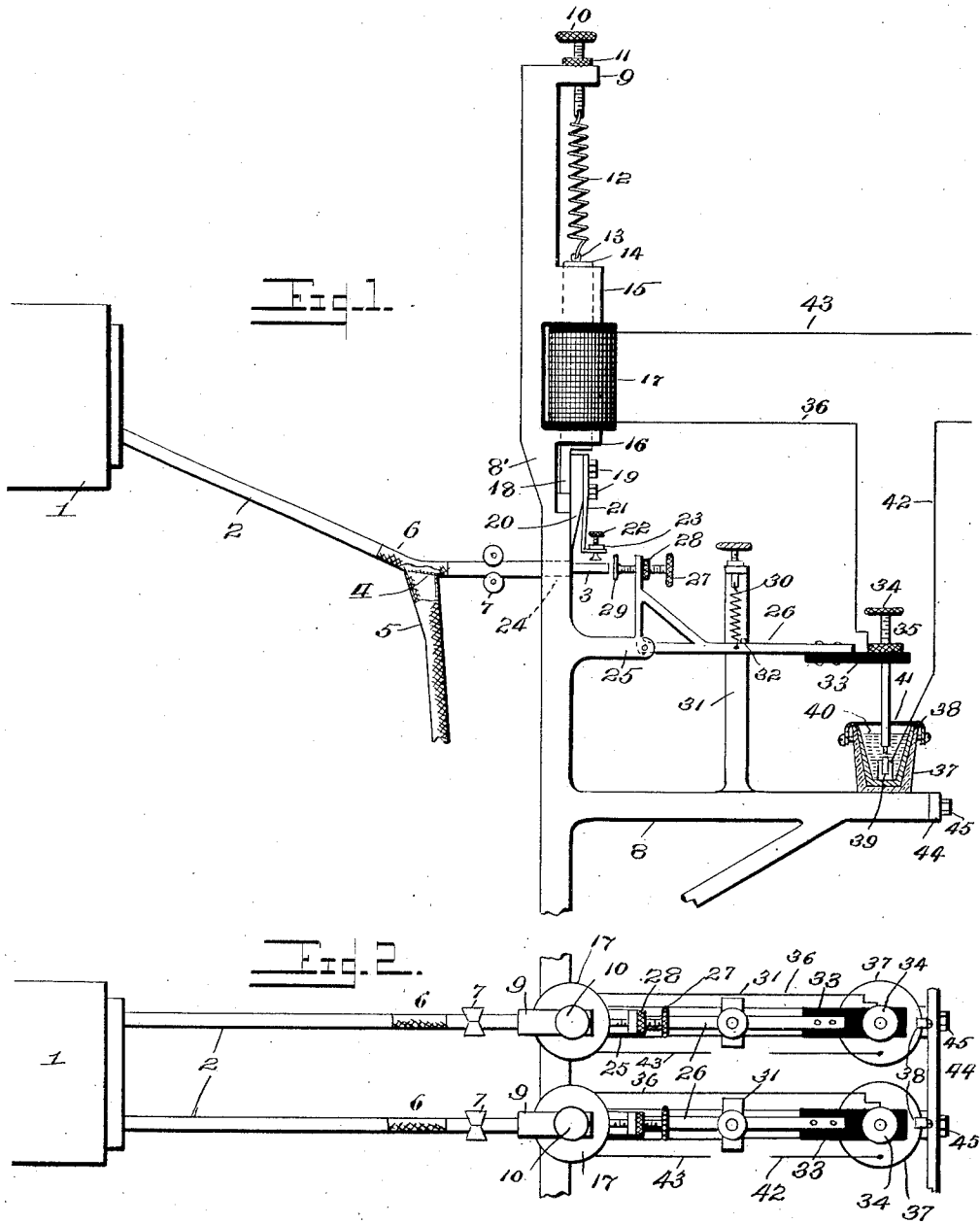


R. M. MANN.
 AUTOMATIC POWDER CUTTER.
 APPLICATION FILED DEC. 24, 1918.

1,367,513.

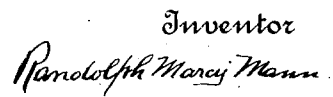
Patented Feb. 1, 1921.
 2 SHEETS—SHEET 1.



Inventor
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2 SHEETS--SHEET 2.



UNITED STATES PATENT OFFICE.

RANDOLPH MARCY MANN, OF THE UNITED STATES ARMY, ASSIGNOR TO NEWTON D. BAKER, SECRETARY OF WAR, TRUSTEE.

AUTOMATIC POWDER-CUTTER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RANDOLPH M. MANN, lieutenant, Ordnance Dept., U. S. A., a citizen of the United States, resident of Nyack, N. Y., stationed at Washington, District of Columbia, have invented an Improvement in Automatic Powder-Cutters, of which the following is a specification.

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment of any royalty thereon.

The subject of this invention is an automatic powder cutter which, while designed especially for cutting powder, may be used for cutting any other substance, such as candy, macaroni and the like, into uniform lengths.

A main object of the invention is to provide means for feeding powder from a press or container together with automatic means, actuated by the advancing powder, for cutting the powder into uniform lengths.

Another object of the invention is the provision of adjustable means for regulating the lengths into which the powder is to be cut.

It is also one of the objects of this invention to provide for the recovery of the ether fumes given off by the powder.

The invention also contemplates providing unitary structures which may be joined or combined to care for a predetermined number of streams of powder.

With these and other objects in view, the invention consists in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed.

In the accompanying drawings wherein like reference numerals indicate the same or similar parts:

Figure 1 is a diagrammatic view in side elevation of a cutter constructed in accordance with the invention;

Fig. 2 is a plan view of the same;

Fig. 3 is a detail view showing diagrammatically a modified form of the automatic switch and its connections.

The usual horizontal powder press or container 1 is shown, and a chute or sluice-way 2 leads from the press for the purpose of conducting the stream of powder 3 from the press to the cutting mechanism. It will be understood that the powder herein referred to is smokeless powder and is in a pliable condition when expressed from the press.

The chute 2 has an opening formed in its bottom which opening is covered by an aperture plate 4, and a branch pipe or suction tube 5 is connected to this chute and communicates therewith through the apertures of the plate 4. The suction tube 5 leads to the usual recovery mechanism or pipes through which the ether fumes, drawn through the tube, are recovered. As this system may be any of the usual well known ones now in use, and as the structure thereof forms no part of the present invention, the same has not been illustrated herein. A sleeve or covering 6 encircles the chute at its point of connection with the suction tube 5 to aid in the action of drawing the fumes through the tube 5.

Grooved or V-shaped rollers 7 are journaled adjacent the discharge end of the chute, and these rollers are made of soft bristles or other yielding material and engage the powder stream to aid in the passage of the powder through the chute.

A suitable supporting frame 8 is provided and to an upright 8' of this frame the discharge end of the chute is connected. The upper end of the upright member 8' of the frame is formed with an offset 9 which is tapped to receive an adjusting screw which screw may be locked in its adjusted position by a jam nut 11 or otherwise.

The depending end of the adjusting screw 10 is apertured to receive the hook end of a tension element, herein shown as a coiled retractile spring 12, the other end of which spring is connected to an eye 13 secured to the upper end of a plunger 14.

The plunger 14 passes, with a sliding fit, through slots formed in extensions or bearings 15 and 16 on the upright 8' of the frame 8. The extensions or bearings, and the parts of the upright adjacent thereto, are formed of non-magnetic material so that the proper working of the device may not be interfered with.

The upper end of the plunger 14 is con-

constructed of laminated iron, while the lower end is of brass or other diamagnetic metal. The plunger extends through a solenoid 17, which is supported between the projections 5 or bearings 15 and 16 of the upright 8' of the frame 8. The lower end of the plunger is cut away or reduced to provide an end 18, which is tapped to receive screws 19, which serve to bind a knife blade 20 to the end 18 of the plunger.

The screws 19 bind an arm 21 against the outer face of the knife blade and the lower end of this arm is angled and tapped to receive an adjusting screw 22 which is 15 locked in adjusted position by a jam nut 23, or otherwise, and the lower end of which is positioned to strike the extending end of the powder stream as the knife blade descends.

The frame 8 is provided with an aperture 24, immediately below the normal position of the knife blade, and the chute 2 communicates with this aperture so that the powder stream may be fed through the aperture and beneath the knife blade.

An arm 25 extends from the upright 8' below the aperture 24 and to this arm is pivotally secured a bell-crank lever 26. One arm of the bell-crank lever is vertically disposed and terminates before the aperture 24, and the upper end of this arm is apertured to receive an adjustable stop, herein shown as an adjusting screw 27, which is 30 locked in adjusted position by the nut 28 and the end of which is formed with an enlargement 29 against which the advancing end of the powder stream may strike.

The other arm of the bell-crank lever is disposed substantially horizontally and is 40 held in position by a tension member such as the coiled spring 30, one end of which is connected to an arm of the lever and the other end of which is secured for adjustment to an upright 31 formed on the frame 8. To limit the upward movement of the horizontal arm of the lever 6 under the tension of member 30, a stop pin 32 may be secured in the upright 31 and project laterally therefrom above the horizontal arm 50 of the lever 26.

An insulating strip 33 is riveted or otherwise secured to the end of the horizontal arm of the lever 26, and forms an extension therefor. This insulating strip is apertured 55 and threaded to receive an adjusting screw 34 which is locked in adjusted position by suitable means such as the jam nut 35. The screw 34 is connected through a conductor 36 with one terminal of the solenoid 17 and the depending platinum tipped end of the screw forms one terminal of an electric switch.

The switch consists of an insulating receptacle 37 in which is hung a stirrup 38, 65 bearing the terminal 39, which is positioned

to be contacted by the end of the adjustable screw 34 when the same is in lowered position. The receptacle 37 is partly filled with oil, the level of which is indicated at 40, to prevent wear on the contacts and to 70 offset danger from fire due to sparking at make and break. A cover 41 of fiber or other insulating material may be provided for closing the receptacle 37 and this cover is centrally apertured to permit the passage 75 therethrough of the adjusting screw 34.

A conductor 42 connects the terminal 39 with one pole of a source of electric current supply (not shown) the other pole of which is connected by a conductor 43 to the re- 80 maining terminal of the solenoid 17.

When a number of the structural units are used they are connected by a tie bar 44, which may be secured to each unit by a screw bolt 45, as shown. 85

The operation is as follows:

The pliable powder is expressed from the press 1 and travels down the sluice-way 2, being assisted in its forward movement by the rapidly revolving rollers 7, and is pro- 90 jected through the aperture 24. The adjusting screw 27 is threaded in or out, as the case may be, to bring the end 29 in proper position to contact the powder stream so that a desired length of powder 95 may be severed therefrom.

When the advancing powder stream contacts the stop 29 it will rock the lever 26 against the tension of member 30, causing the adjustable contact 34 to engage the terminal 39 and close the circuit from the elec- 100 tric generator through the solenoid 17. This circuit is traced as follows: from the generator, through conductor 42, terminal 39, adjustable contact 34, conductor 36, solenoid 17 and conductor 43 to the generator. 105

The flow of current from the generator through this circuit will energize the solenoid causing it to draw the plunger 14 downwardly against the tension of the member 12. The force tending to drive the plunger downwardly will be greatest when the plunger has advanced to a sufficient extent to bring the edge of the knife blade into contact with the advancing powder 115 stream 3. The downward movement of the plunger causes the blade to sever the projecting end of the powder stream and, at the same time, the lower end of the screw 22 engages the severed end of the powder 120 and forces it from contact with the stop 29, thereby allowing the lever 26 to rock to normal position under the tension of the tension element 30, thus setting the parts for another cutting operation. 125

From this it will be seen that the operation of the cutting device is automatic and continuous as long as powder is fed from the press, and that the severed particles of powder will be of uniform length irrespec- 130

tive of variations in the speed with which the powder is fed from the press.

During the operation heretofore described the recovery mechanism is actuated in the usual manner drawing ether fumes through the tube 5 and thereby recovering such fumes and effecting a saving of ether, as well as rendering the operation sanitary and less liable to injure the attendants or operatives about the machine.

In the modification of the device, as shown in Fig. 3, the parts are the same as heretofore described with the exception of the automatic switch. In this instance the switch consists of a straight bar 26', the upper end of which is attenuated to form a resilient connecting member 26'' that is attached to the extension or bearing 16' by screws 19' or otherwise. An insulating strip 51 is interposed between the bar 26'' and the extension 16' to prevent electrical contact between these parts.

The arm 26' is tapped at a point between its ends for the reception of an adjusting screw 27', which may be locked in adjusted position in any suitable manner, as by means of a jam nut 28'. One end of the screw 27' is enlarged as at 29' to provide a stop against which the advancing end of the powder stream 3 may push.

The lower end of the arm 26' is provided with a platinum contact point 50 which is adapted to engage a contact or terminal 39' secured in a receptacle 37', which receptacle is made of glass or other insulating material.

This receptacle is partly filled with oil and a conductor 42' connects the terminal 39' with one pole of an electric generator (not shown), the other pole of which is connected by a conductor 43' with one terminal of the solenoid 17'. The other terminal of the solenoid is connected through a conductor 36' to one end of the arm 26'.

The operation of this form of the device is substantially the same as that heretofore described except that the arm 26' swings, as contact is made and broken under the respective impulses of the advancing powder stream and the resilient end of the arm, whereas, in the preferred showing, the lever 26 rocks on its pivot for this purpose.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a receiver for explosive powder in a plastic state, of means for conducting the powder from the receiver, an adjustable stop adapted to be contacted by the forward end of the conducted powder, and mechanism actuated by the contact of the powder with the stop for severing the powder.

2. The combination with a receiver for explosive powder in a plastic state, of means for conducting the powder from the re-

ceiver, an adjustable stop adapted to be contacted by the forward end of the conducted powder, and electrically operated mechanism actuated by the contact of the material with the stop to sever the powder.

3. The combination with a receiver for explosive powder in a plastic state, of means for conducting the powder from the receiver, a lever, an adjustable stop on the lever positioned to be contacted by the forward end of the conducted powder to move the lever, a normally opened electrical contact closed by the movement of the lever, and electrically operated mechanism actuated by the closing of the contact to sever the powder.

4. The combination with a receiver for explosive powder in a plastic state, of means for conducting the powder from the receiver, a lever, a stop carried by the lever and positioned to contact the conducted powder to move the lever, a normally opened electrical circuit closed by the movement of the lever, said circuit including a solenoid, and a severing element actuated by the energization of the solenoid to cut the powder.

5. The combination of a conveyer for explosive powder in a plastic state, a tiltable element, a stop adjustably carried by said tiltable element and disposed in the path of movement of the powder as fed from the conveyer and engageable by said powder to tilt said tiltable element, and mechanism actuated by the movement of said tiltable element to sever the powder.

6. The combination of a conveyer for explosive powder in a plastic state, a severing element, a tiltable element, a stop carried by said tiltable element and adjustable toward and away from said severing element and engageable by the powder as fed from the conveyer to tilt said tiltable element, and mechanism actuated by the movement of said tiltable element to control the movement of said severing element.

7. The combination of a conveyer for explosive powder in a plastic state, a tiltable element, a stop adjustably carried by said tiltable element and engageable by said powder to tilt said tiltable element, mechanism actuated by the movement of said tiltable element to sever the powder, and means for automatically returning said tiltable element to normal position.

8. The combination of a conveyer for explosive powder in a plastic state, a tiltable element, a stop adjustably carried by said element and engageable by said powder to tilt said tiltable element, mechanism actuated by the movement of said tiltable element to sever the powder, and a tension element automatically returning said tiltable element to normal position.

9. The combination of a conveyer for ex-

plosive powder in a plastic state, a tiltable element, a stop adjustably carried by said tiltable element and engageable by said powder to tilt said tiltable element, mechanism actuated by the movement of said tiltable element to sever the powder, and means for positively disengaging the severed portion of said powder from said stop.

10. The combination of a conveyer for explosive powder in a plastic state, a severing element, a tiltable element, a stop adjustably carried by said tiltable element and engageable by said powder to tilt said tiltable element, mechanism actuated by the movement of said tiltable element to sever the powder, and means movable with said severing element to positively disengage the severed portion of said powder from said stop.

11. The combination of a conveyer for material to be cut, a tiltable element engageable by the material to tilt the tiltable element, a normally open electric circuit closed by the tilting of the tiltable element, a solenoid in said circuit, a resiliently held plunger encircled by the solenoid and a severing element carried by the plunger.

12. The combination of a conveyer for material to be cut, a tiltable element, an adjustable stop carried by said tiltable element and engageable by the material to tilt said tiltable element, a normally open electric circuit closed by the tilting of the tiltable element, a solenoid in said circuit, a plunger encircled by the solenoid and a severing element carried by the plunger.

RANDOLPH MARCY MANN.