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G. K. BAINBRIDGE

PLASTIC CUTTING MACHINE

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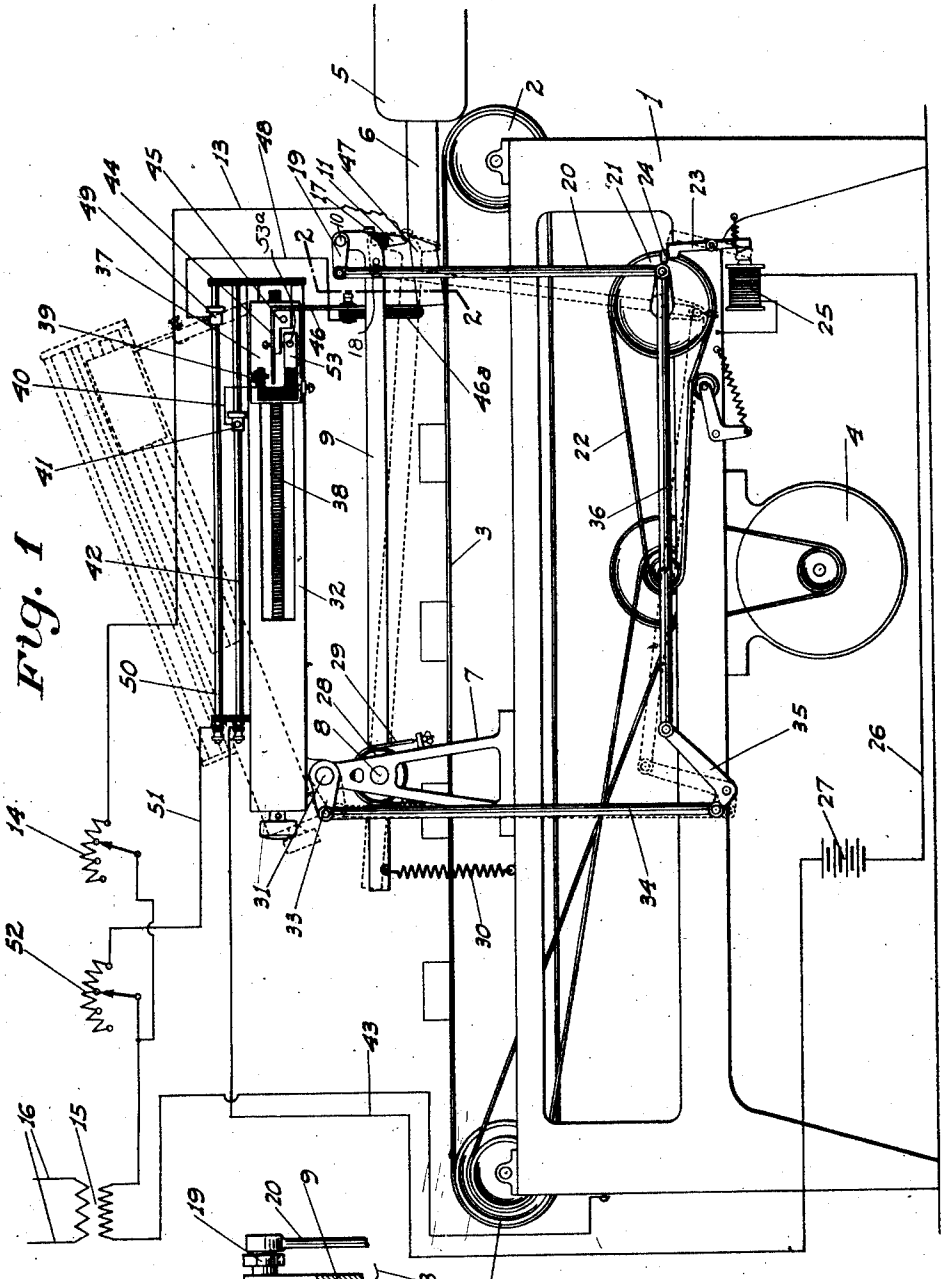


Fig. 1

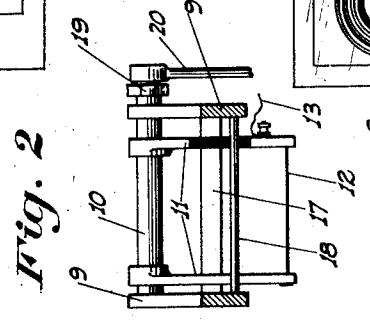


Fig. 2

INVENTOR

Geo. K. Bainbridge

BY Percy J. Webster

ATTORNEY

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UNITED STATES PATENT OFFICE.

GEORGE K. BAINBRIDGE, OF RIPON, CALIFORNIA.

PLASTIC-CUTTING MACHINE.

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This invention relates to improvements in machines for cutting plastic material, especially candy of a plastic nature or which is in a plastic condition during the process of manufacture.

My machine is particularly intended to be used in cutting plastic bar candy, as fed from a press, into predetermined lengths of a size to sell at five or ten cents each.

My principal object is to provide an apparatus for the purpose so constructed that the length of all the pieces cut will be exactly the same, so that the weights of all the pieces are the same; and in which the cutting and length measuring operations are automatically controlled by the material itself as it issues from the press. In other words a length of material will not be cut through and severed from the material issuing from the press spout until the material has projected from the spout a predetermined length. No attention to the operation of the machine is therefore necessary other than to see that the material is fed from the spout at a speed consonant with the operation of the machine; and even if such feeding should fail no harm will be done, since, as above stated, the cutting mechanism will not function until a predetermined length of the material has been fed from the spout.

A further object is to provide means for enabling the length of the material, which controls the cutting operations, to be easily altered to suit without disturbing or altering the operation of the machine in any way.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of the machine showing the parts as at rest or inoperative, and just before the cutting operations start.

Fig. 2 is a fragmentary cross section on the line 2—2 of Fig. 1 showing the mounting of the cutting structure.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a suitable frame, at the opposite ends of which are mounted pulleys 2 over which travels an endless belt 3 of suitable character. One of these pulleys is driven at a predetermined speed by a suitable connection with an electric motor 4 or other desired form of drive means. Disposed beyond one end of the belt is a material feed press 5 of common and suitable character having a discharge nozzle or spout 6 of desired cross sectional shape and overhanging the end of the belt in longitudinal alinement therewith.

Projecting upwardly from the frame 1 intermediate the ends of the belt are standards 7 in which is journaled a transverse shaft 8. Fixed on this shaft are substantially horizontal arms 9 projecting forwardly toward the spout. Turnably mounted in the arms at their forward ends is a transverse shaft 10 from which arms 11 depend, said arms being disposed to the sides of the spout. A taut cutting wire 12 extends between the lower ends of the arms 11, said wire being normally substantially in vertical alinement with the top of the spout. This wire is constantly maintained in a heated condition by means of a wire 13 connected to one end of said wire 12, the wire 13 leading through a rheostat or resistance 14 to a transformer 15 which is connected to the ordinary house circuit wiring 16, so that the voltage through the cutting wire is lower than that in the wiring 16. This hot-wire cutting structure is substantially the same in its function and purpose to that shown in my Patent No. 1,368,685, dated February 15th, 1921, as will be evident.

Transverse stops 17 and 18 disposed on the arms 9 ahead of and behind the arms 11 respectively, permit a limited rocking movement of said arms; the arms normally abutting against the stop 17 so that the wire is prevented from moving ahead of the top edge of the spout, which has a slight rearward slope toward its lower end.

Projecting rearwardly from the shaft 10 is a horizontal arm 19, on the outer end of which is connected the upper end of a rod 20. The lower end of this rod is pivoted in eccentric or crank relation with a pulley 21 which is driven from the motor 4 by a slip belt 22 suitably arranged. These parts are so disposed that when the cutting wire is adjacent the top of the spout, the connection of the rod with the pulley is horizontally alined with the axis of the pulley; and the pulley is arranged to rotate in a direction such that said rod will be pulled down from such position. The throw of the rod about the pulley is sufficient to cause the cutting wire to move the full depth of the spout by the time the

rod reaches its lowermost position relative to the axis of the pulley.

The pulley is normally held from rotation when the rod connection with the pulley is horizontally alined with the axis of the pulley by means of a spring pressed pawl 23 engaging a rigid stop 24 projecting from the pulley, the belt 22 then slipping. The pawl is formed as the armature of an electromagnet 25 which is so disposed relative to said armature that when the magnet is energized the pawl will be disengaged from the stop and the pulley 21 will then be driven by the belt 22. One terminal of the magnet is grounded on the frame 1, while the other terminal is connected by a wire 26 to a source of current such as a low voltage battery 27 of suitable character.

Mounted on the shaft 8 is a brake drum 28 engaged by an adjustable friction band 29, so that a certain resistance to the movement of the arms 9 is offered. A spring 30 between the arms and frame acts to counterbalance the same relative to the pivotal shaft 8. Mounted on the standards 7 above the shaft 8 is a transverse shaft 31 on which is fixed a forwardly extending auxiliary frame 32. An arm 33 projects rearwardly from the shaft 31, a rod 34 being connected to and depending from the outer end of this arm. The lower end of the rod 34 is connected to one arm of a bellcrank 35 mounted on the frame 1, the other arm of which bellcrank is connected by a rod 36 with the pulley 1 in common with the rod 20. These parts are so arranged that when the rod 20 descends with the turning of the pulley, the frame 32 will be raised about the shaft 31 as an axis, said frame being normally horizontal.

Mounted on the frame 32 for longitudinal sliding movement thereon is a block 37 held in any desired position on said frame and adjustable as to such position by a longitudinal screw 38 mounted in the frame 32. Fixed on the block in insulated relation thereto is a downwardly depending contact member 39, which is connected by a wire 40 to a slide 41 mounted on a longitudinal rod 42 fixed on the frame 32 in insulated relation therewith. One end of this rod is connected to the battery 27 by a wire 43. The contact 39 is adapted to be engaged by a rigid strip 44 fixed on a bracket 45 which is pivoted on the block 37, said strip being normally depressed from the contact. The strip, bracket, block, frame 32, and standards 7 are of metal, as is the frame 1, so that said strip is connected by metal parts to the electromagnet 25 which is grounded on the frame 1. It will therefore be seen that when the strip engages the contact 39 (which is insulated from said metal parts) a circuit through the magnet will be closed.

Fixed on the bracket 45 and depending therefrom is a rigid arm 46, which, when the frame 32 is in its normal horizontal and inoperative position, projects somewhat below the top of the material 47 issuing from the spout, and is positioned so as to be engaged by said material after the latter has moved a certain distance from the spout. The lower portion 46^a of the arm 46 is of a material adapted to be electrically heated by means of a wire 48 connected thereto and extending to a connection with a slide 49 which is mounted on a rod 50. This rod is mounted on the frame 32 in insulated relation thereto and to the rod 42. From one end of the rod 50 a wire 51 leads to a rheostat or resistance 52 which is connected to the transformer 15.

In operation the block 37 is set by adjustment of the screw 38 so that the stop arm 46 will be disposed a desired distance beyond the spout, which distance determines the length of the bars of material to be cut. Normally, as previously stated, the stop 46 is in the path of the advancing material, the contacts 39 and 44 are separated, the cutting wire 12 is disposed just above the top of the spout, and the pawl 23 is engaged with the pulley 21 holding the same against rotation, the magnet being deenergized. The belt 3 travels constantly at a speed somewhat in excess of the speed of the feeding of the material from the spout. The material thus issuing from the spout is not drawn along by the belt, since the latter is dusted and the adhesion of the material for itself is greater than the pull of the belt thereon. The material therefore proceeds unbroken from the spout until it reaches the stop 46, when such material will move the stop rearwardly to an extent sufficient to engage the contact 39. This closes the magnet circuit, as previously stated, and the pawl-armature 23 will be immediately drawn away from the stop 24. The belt 22 then takes hold of the pulley 21 and rotates the same one complete revolution, since there is only one stop 24.

The first quarter of this revolution pulls the rod 20 down, causing the arms 9 to move down and the wire 12 to cut through the material issuing from the spout. At the same time the frame 32 with the stop arm 46 mounted thereon is raised by reason of said frame being connected up with the rod 20, as previously stated. This allows the cut bar, now engaged by and moving with the belt, to pass under the stop 46 without interference. With the further rotation of the pulley 21 the rod 20 will be raised. This initially causes the arms 11 to swing rearwardly against the stop 18, drawing the wire 12 rearwardly of the spout and clear of the material still slowly issuing therefrom. As soon as the arms 11 thus engage said stop, the arms 9 will be raised

with a further forward movement of the rod 20, raising the wire 12 above the spout. When the rod passes beyond the top of its stroke and is pulled down, it first pulls the arms 11 so that they abut against the forward stop 17 and then pulls the arms 9 down to their original position. In the meantime the frame 32 has been raised and lowered also and the contacts 39 and 44 will have been separated, since there is now no pressure against the stop 46. The magnet will therefore be deenergized, allowing the pawl 23 to move into the path of the stop 24 and reengage the same with the return of the pulley 21 to its original position after said complete revolution has taken place. No further movement of the parts will take place until the magnet is again energized by the engagement of the arm 46 with a succeeding bar of material issuing from the spout, when the above described cycle of operations is repeated.

The brake structure 28—29 is for the purpose of placing a resistance on the movement of the arms 9 sufficient to insure that with the movement of the rod 20 at the beginning of its up and down strokes, the arms 11 will be moved to abut against the opposed stops 17 and 18 before any movement is imparted to the arms 9, so that the cutting wire will be positively moved out of and into position with respect to the spout at the proper time.

In order to prevent having to make either the strip 44 or the arm 46 flexible (which would tend to destroy the accuracy of the operation) and yet permit of the rearward movement of the arm 46 after the contact 39 has been engaged, the member 53 on which the contact 39 is mounted is pivoted onto the block 37, as at 53^a, so that said contact can lift after the strip 44 has engaged the same and upward pressure on said strip is still being exerted by the material pressing against the arm 46.

The wire 12 and arm member 46^a being constantly heated, there is no tendency for these members to become encrusted with the sticky material which they engage.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A plastic cutting machine including a spout from which the plastic issues, a belt traveling away from the spout on which the plastic is received from said spout, cutting means mounted in predetermined relationship to the spout to cut through the plastic issuing from said spout, means for operating the cutting means, releasable means normally holding said operating means inactive, an arm depending into the path of movement of the plastic to be engaged by the forward end thereof when a predetermined distance from the spout, means causing said releasable means to be released when said arm is thus engaged, whereby the cutting means will then function, and means directly connected to the cutter operating means for causing the arm to be moved clear of the plastic immediately as the said operating means begins to function.

2. A plastic cutting machine including a spout from which the plastic issues, a belt traveling away from the spout on which the plastic is received from said spout, a transverse cutting element normally disposed above and adjacent the spout, operating means for the element arranged when functioning to cause said element to first descend to the bottom of the spout and then to move upwardly to reassume its normal position, an arm depending into the path of movement of the plastic to be engaged thereby when a predetermined distance beyond the spout, means including a releasable member normally preventing functioning of the cutter operating means, means actuated by the engagement of the arm with the plastic for causing said member to be released, and means between said arm and operating means for causing said arm to be raised as the cutting element is being lowered, and to be restored to its normal position only with the return movement of the element to its normal position.

3. In combination with a press-spout from which plastic material issues, a cutting wire to move across the face of the spout, an arm extending longitudinally of and away from the spout, pivot means at the outer end of the arm, arms pivoted onto said other arm adjacent the spout end thereof and supporting the wire therebetween, said last named arms being disposed substantially at right angles to said first named arm, and so that the wire is located in the plane of the face of the spout, means permitting limited swinging movement of said last named arms on the first named arm, and operating means applied to said last named arms to turn the same on their pivot so that the wire is moved toward the spout and to also turn the first named arm about its pivot means to cause the wire to be then drawn across the face of the spout.

4. In a plastic cutting machine, a spout from which the plastic issues, a cutter mounted in predetermined relationship to

the spout to cut through the plastic issuing from said spout, and means for operating the cutter and releasable means normally holding the cutter actuating means inactive; and operating means for said releasable means including a heated arm depending into the path of movement of the plastic to be engaged thereby.

5. A plastic cutting machine including a spout from which the plastic issues, conveying means on which the plastic is received from the spout, a cutting element mounted adjacent the spout to cut through the plastic issuing from said spout, cutter operating means, releasable means normally holding said operating means inactive, control means for said release means including an arm depending into the path of movement of the plastic, a support movable away from the surface of the conveying means, and a block mounted on said support for longitudinal adjustment with respect to the spout and on which the arm is mounted.

6. A plastic cutting machine including a spout from which the plastic issues, conveying means on which the plastic is received from the spout, a cutting element mounted adjacent the spout to cut through the plastic issuing from said spout, means for reciprocating the cutter across the face of the spout, releasable means normally holding said reciprocating means inactive, a frame extending lengthwise of and above the conveying means and pivoted at its end opposite the spout, an arm supported by and depending from said frame into the path of movement of the plastic, means controlled by the engagement of the arm by the plastic for actuating the release means to permit the cutter operating means to function, and means between said cutter operating means and the frame for lifting the latter clear of the plastic as soon as said operating means starts to function.

7. A plastic cutting machine including a spout from which the plastic issues, conveying means on which the plastic is received from the spout, a cutting element mounted adjacent the spout to cut through the plastic issuing from said spout, means for reciprocating the cutter across the face of the spout, releasable means normally holding said reciprocating means inactive, a frame extending lengthwise of and above the conveying means and pivoted at its end opposite the spout, an arm supported by and depending from said frame into the path of movement of the plastic, means controlled by the engagement of the arm by the plastic for actuating the release means to permit the cutter operating means to function, and means between said cutter operating means and the frame for lifting the latter clear of the plastic as soon as said operating means starts to function, to move the cutter across the face of the spout in one direction, and for causing the frame to be lowered to its normal position as the cutter is being moved in the opposite direction.

In testimony whereof I affix my signature.

GEORGE K. BAINBRIDGE.