

[54] **SHORT FILLER CIGAR MACHINE**

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[51] Int. Cl. **A24c 1/02**

[58] Field of Search **131/22 A, 22 R, 109 AB, 131/109 R, 81 A, 108**

[56] **References Cited**

UNITED STATES PATENTS

1,107,047	8/1914	Du Brul.....	131/109 AB
2,253,362	8/1941	Broekhuysen.....	131/109 AB X
2,275,103	3/1942	Gooch et al.....	131/108 X

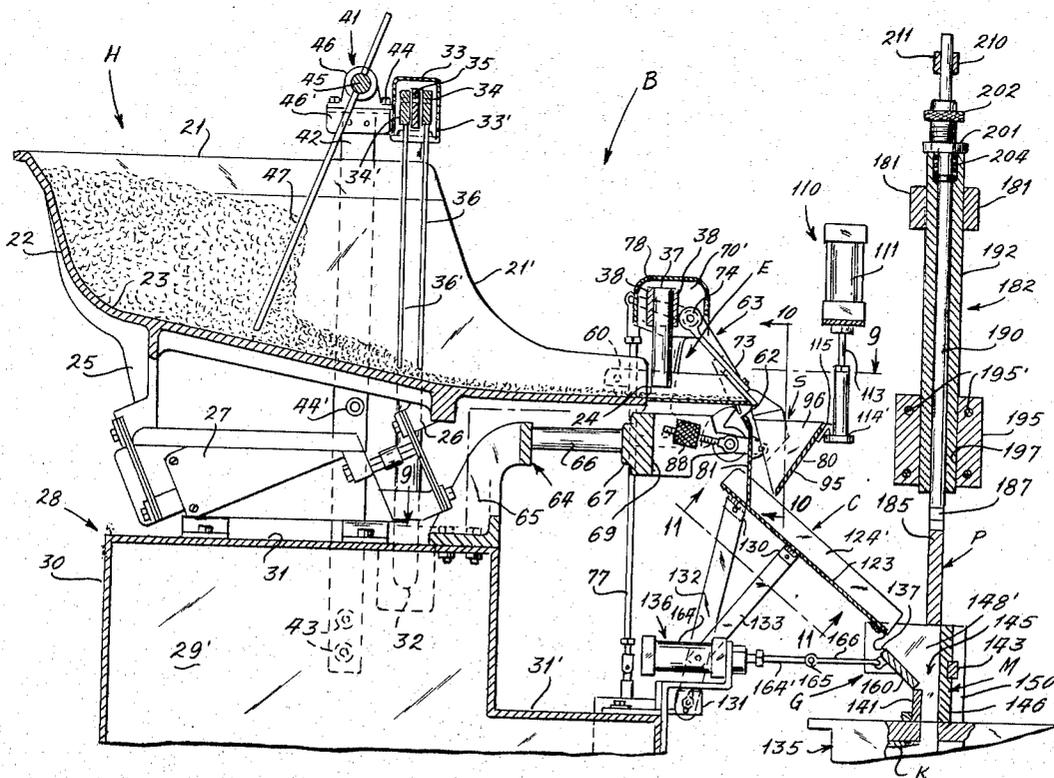
2,306,381	12/1942	Durning.....	131/22 A
2,311,373	2/1943	Durning.....	131/109 AB X
3,033,210	5/1962	Clausen et al.....	131/29

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[57] **ABSTRACT**

A novel short filler bunch forming apparatus for a cigar machine in which short filler material from a hopper reservoir is spread laterally and longitudinally over a hopper extension and intermittently discharged therefrom into a weighing scale from which it is discharged upon demand through a delivery chute to a bunch forming magazine for subsequent compaction and transfer for conventional finishing into a cigar, and positive control means for maintaining an even flow pattern of short filler material through each stage of its movement.

12 Claims, 15 Drawing Figures



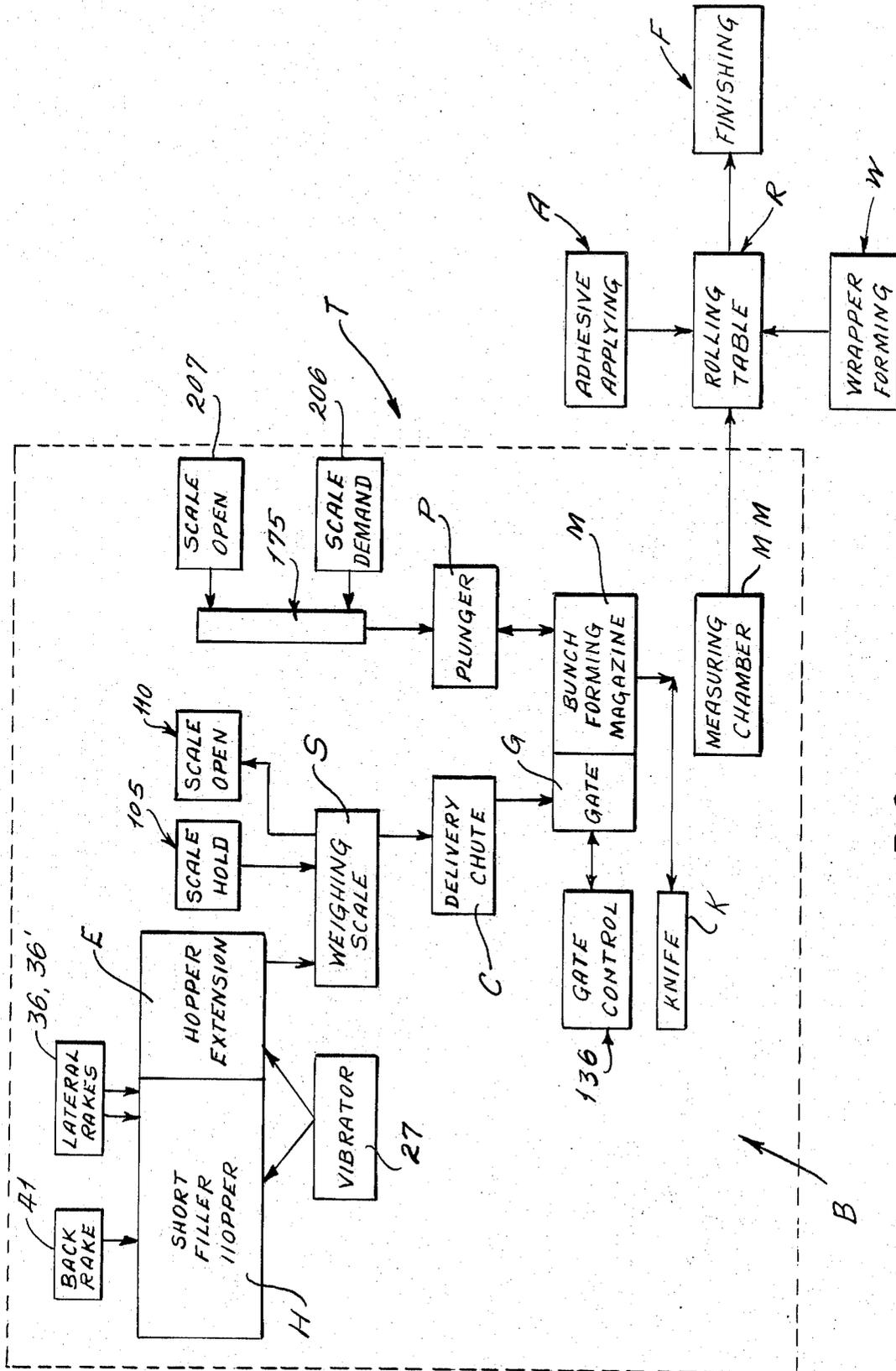


FIG. 1

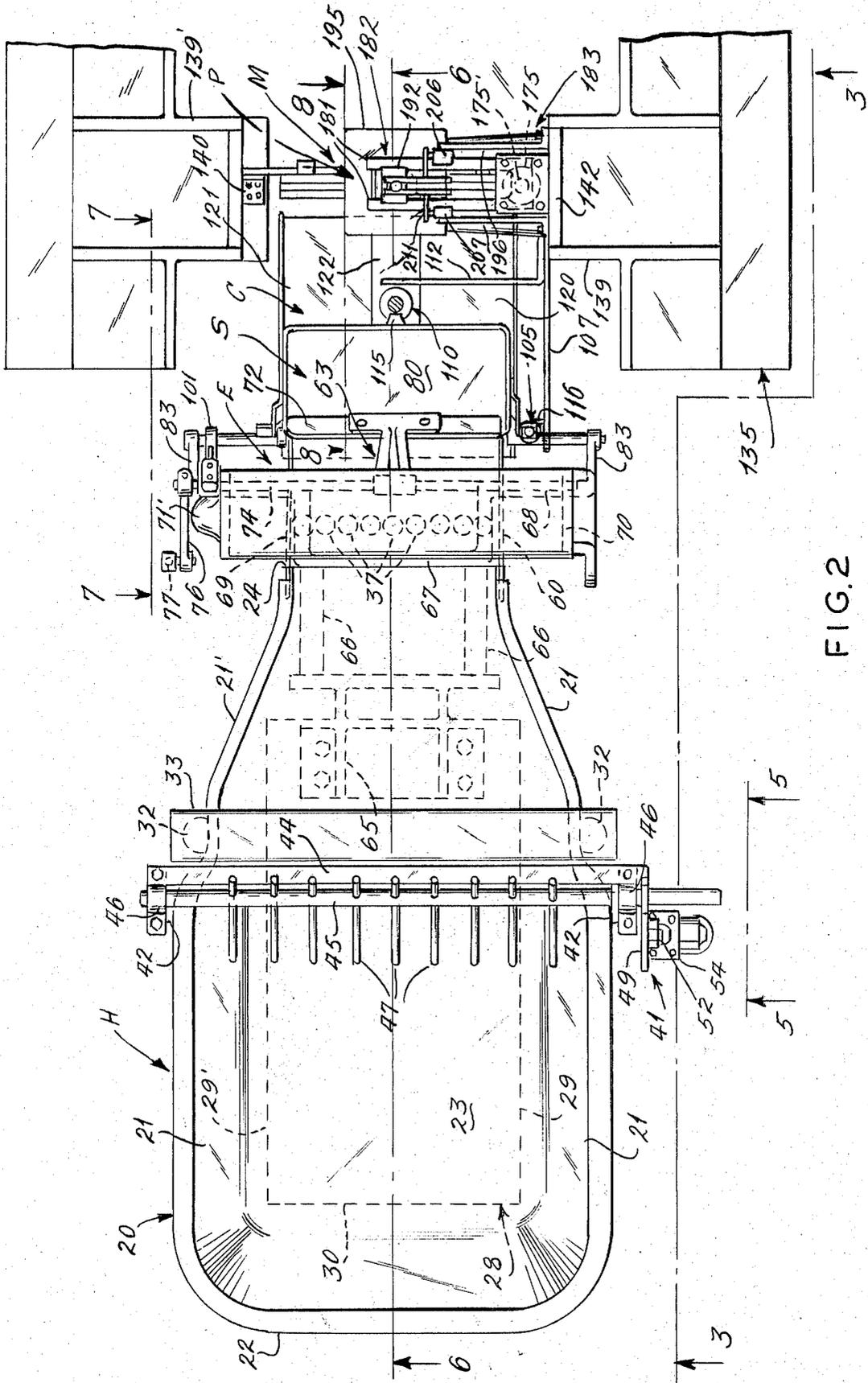
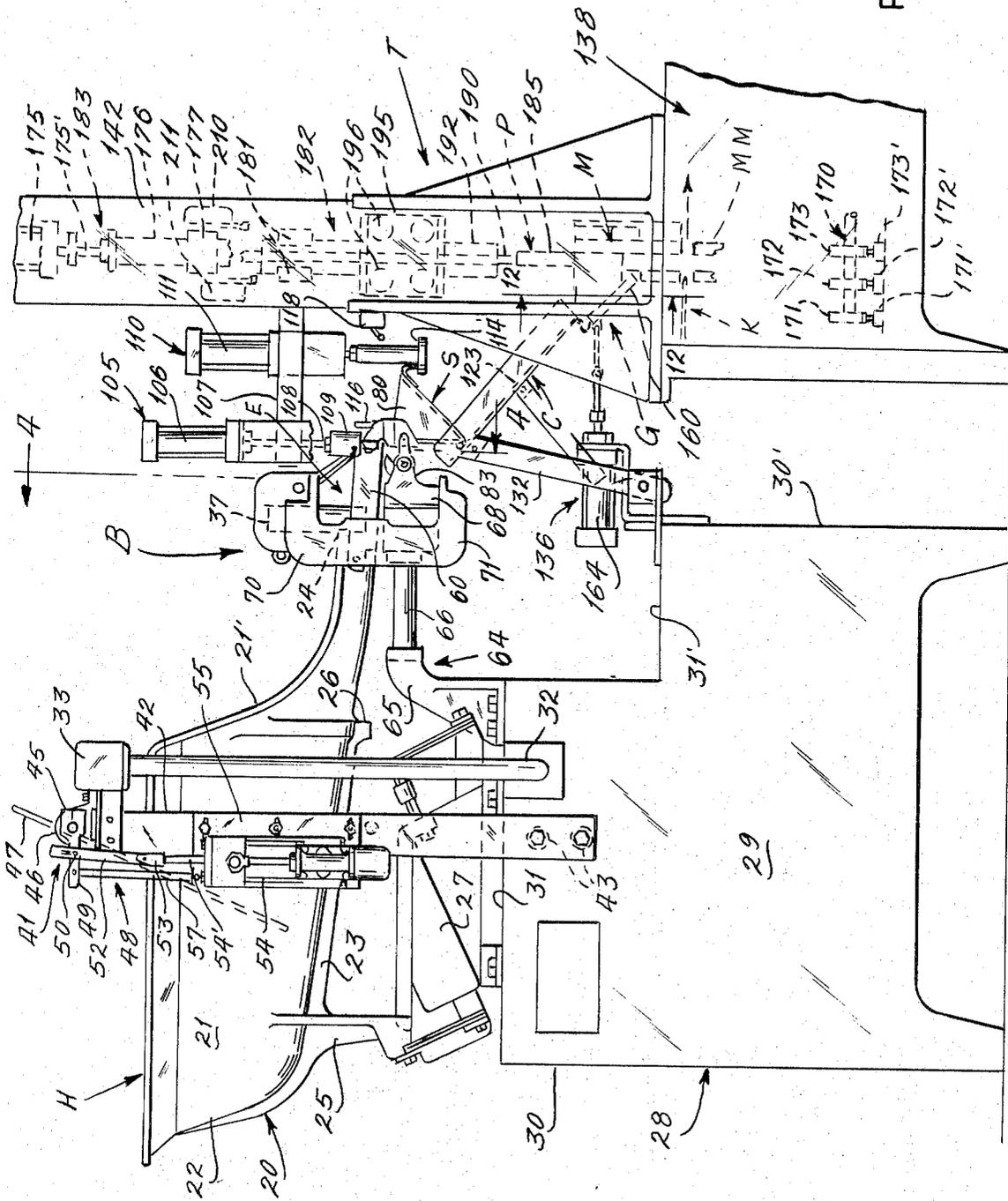


FIG. 2

FIG. 3



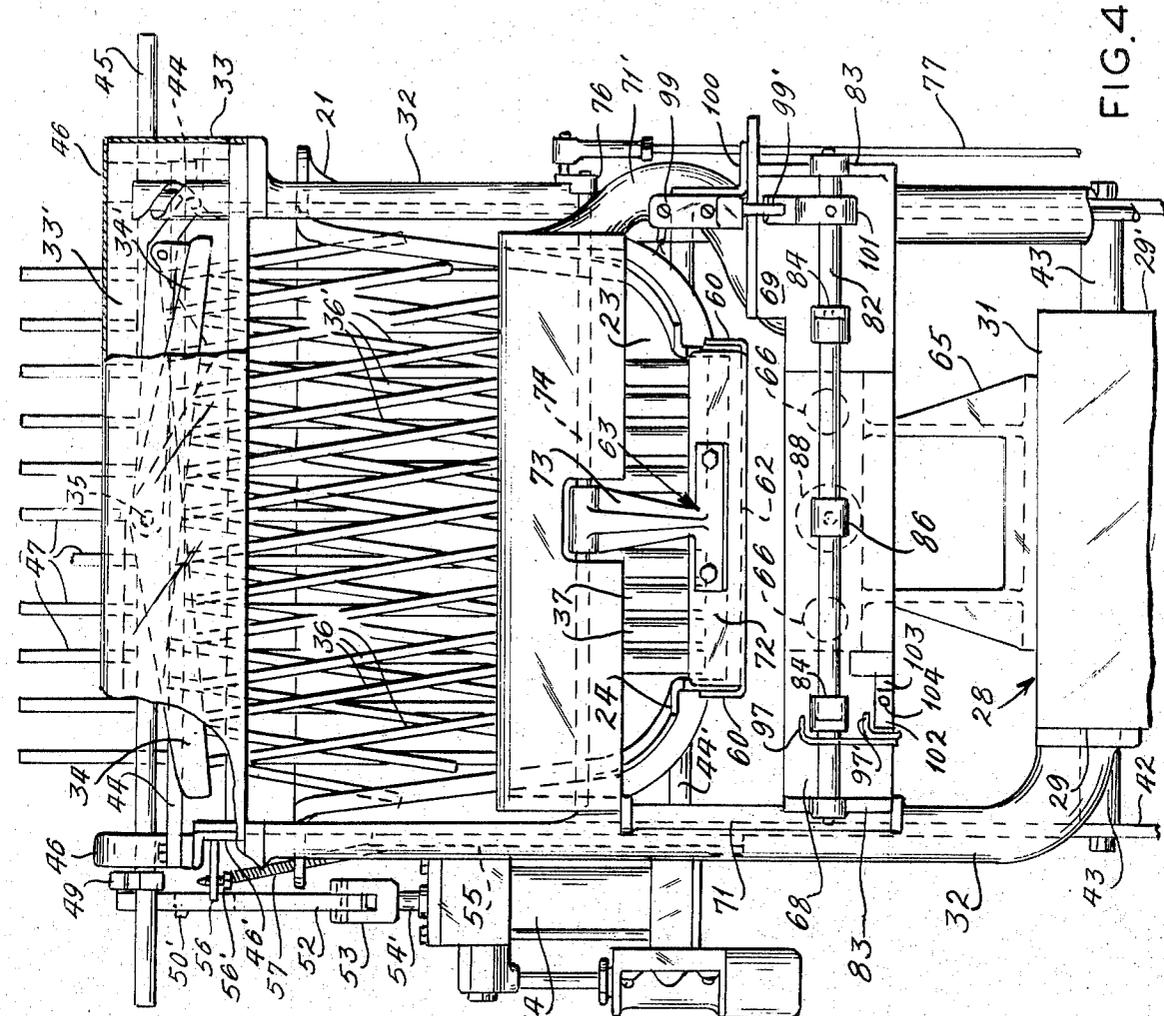


FIG. 4

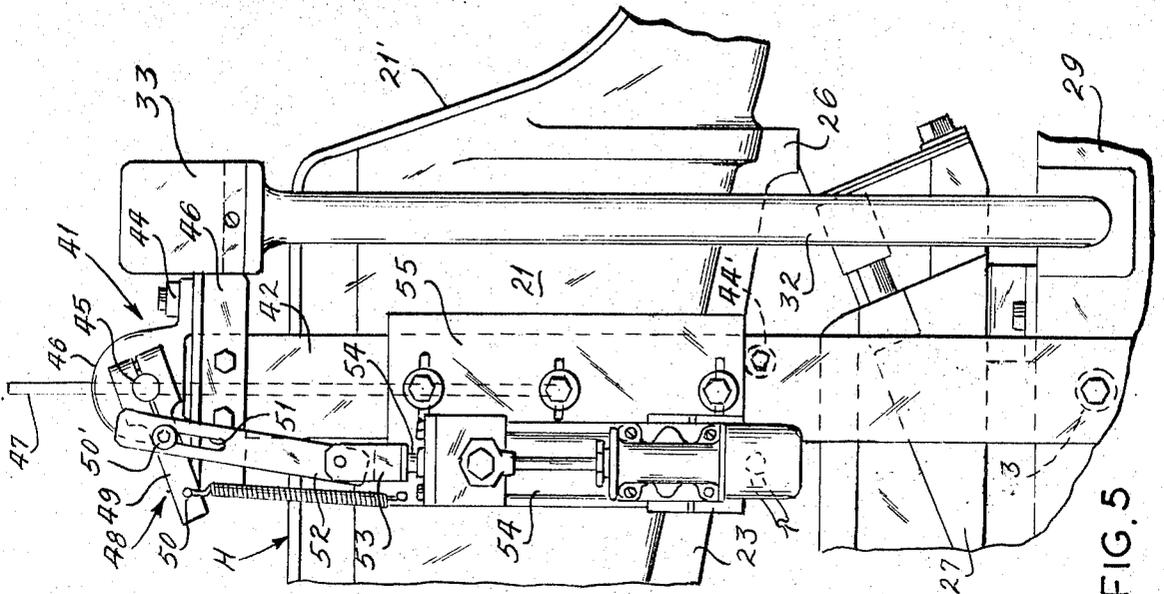


FIG. 5

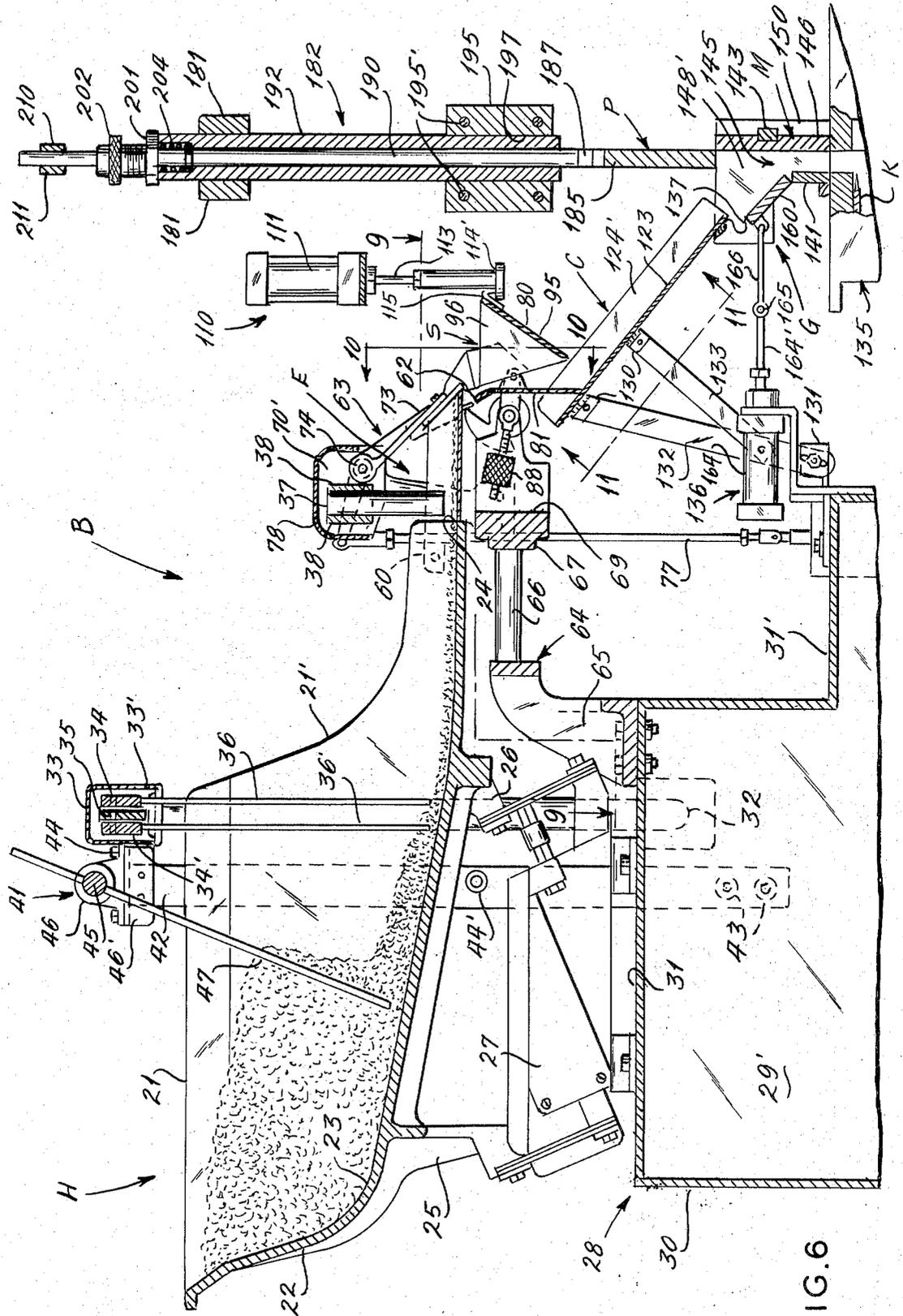


FIG. 6

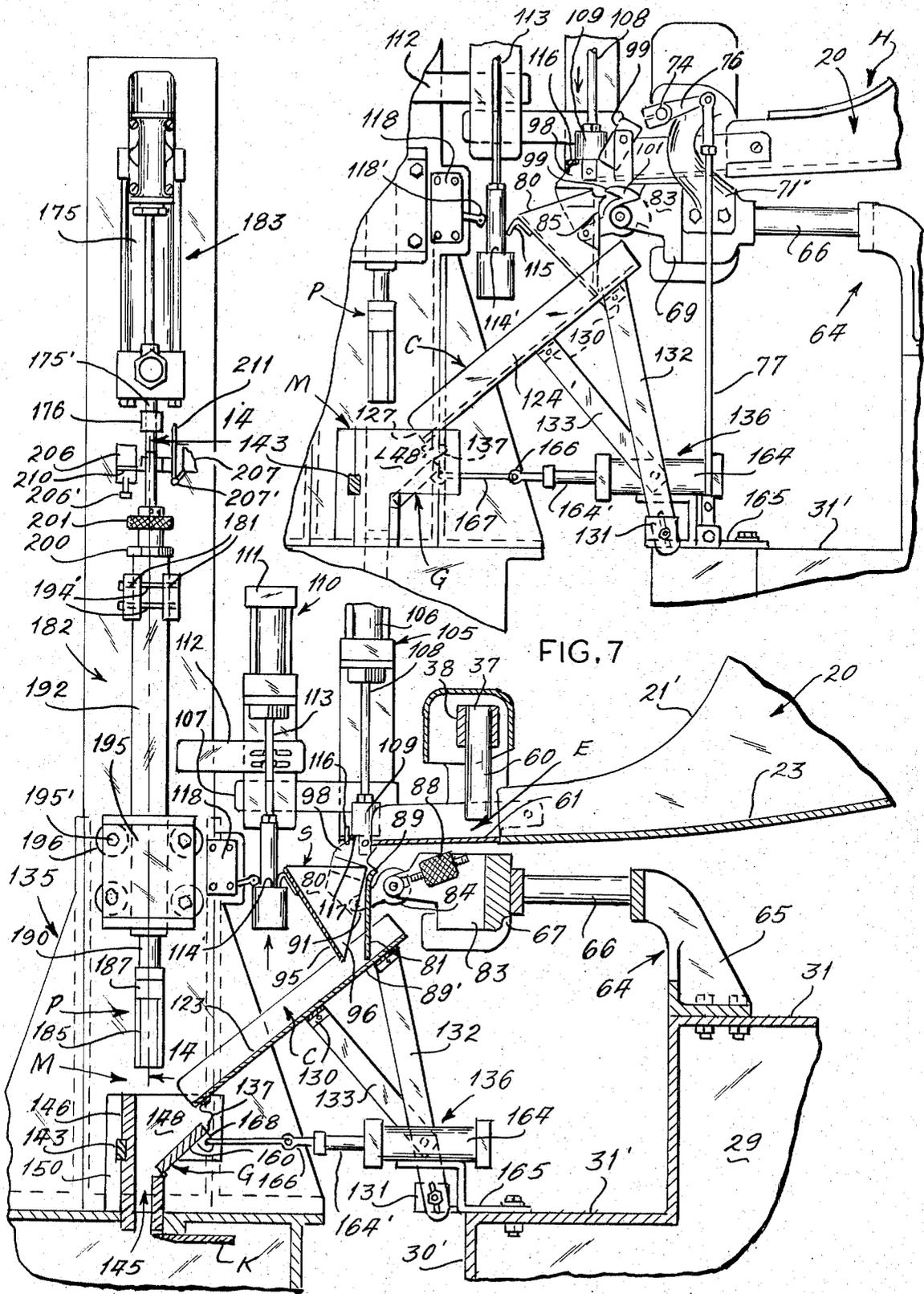


FIG. 7

FIG. 8

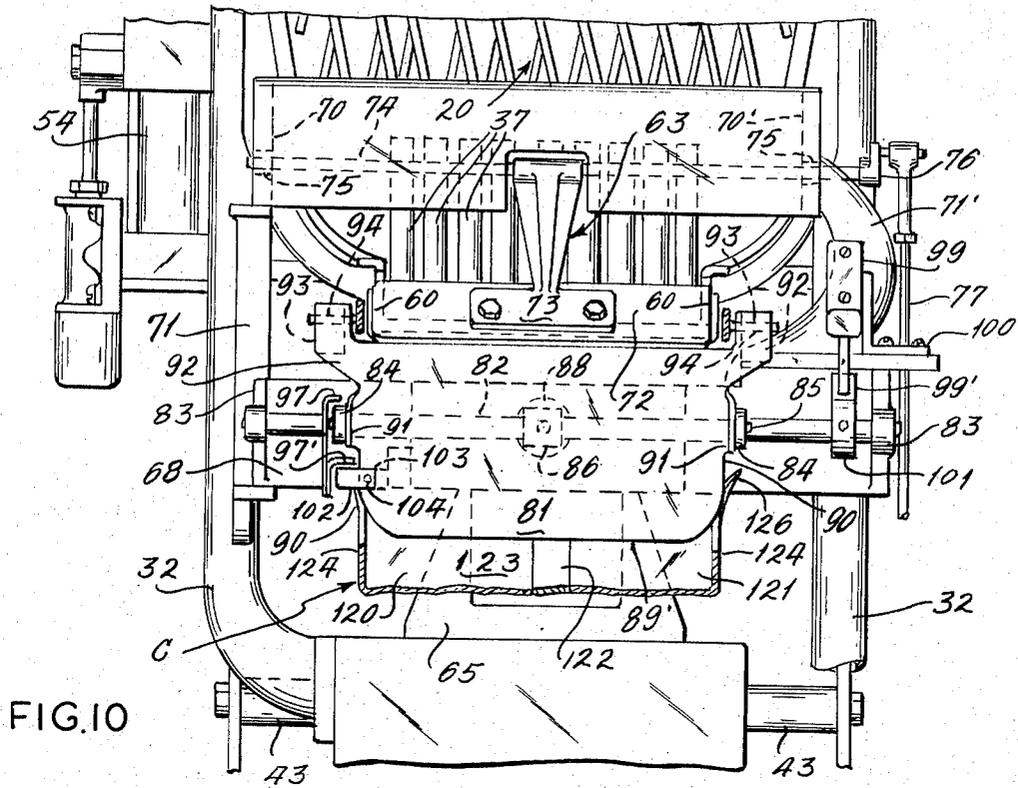


FIG. 10

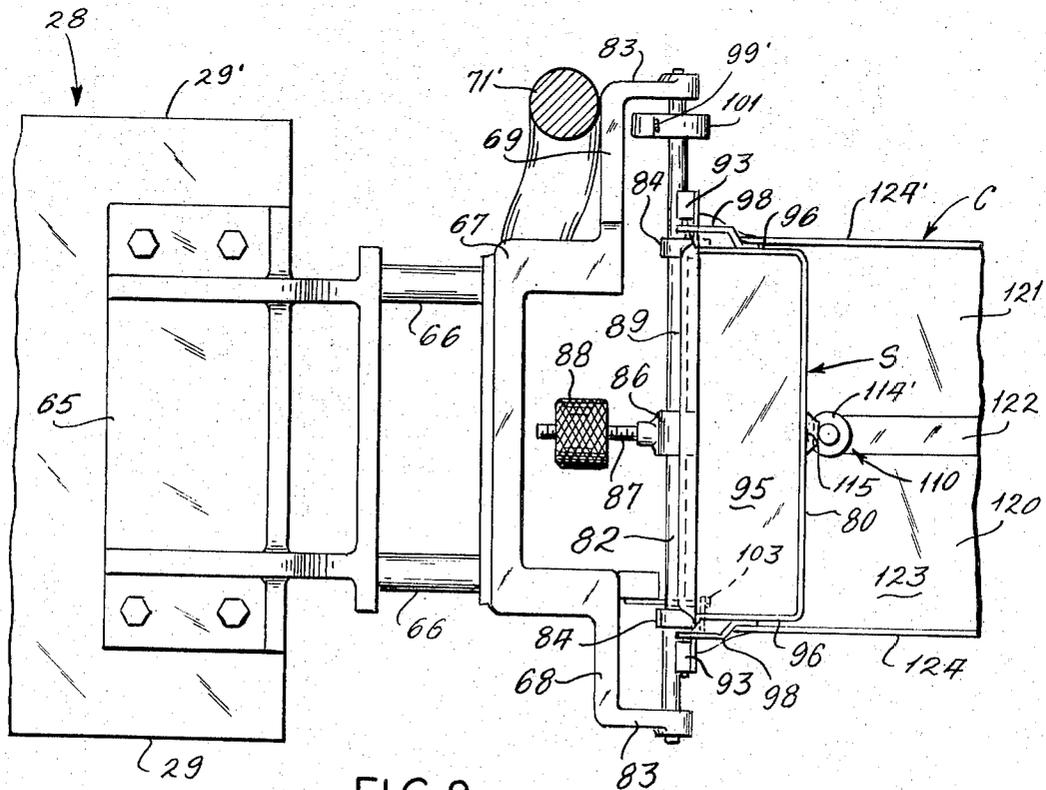


FIG. 9

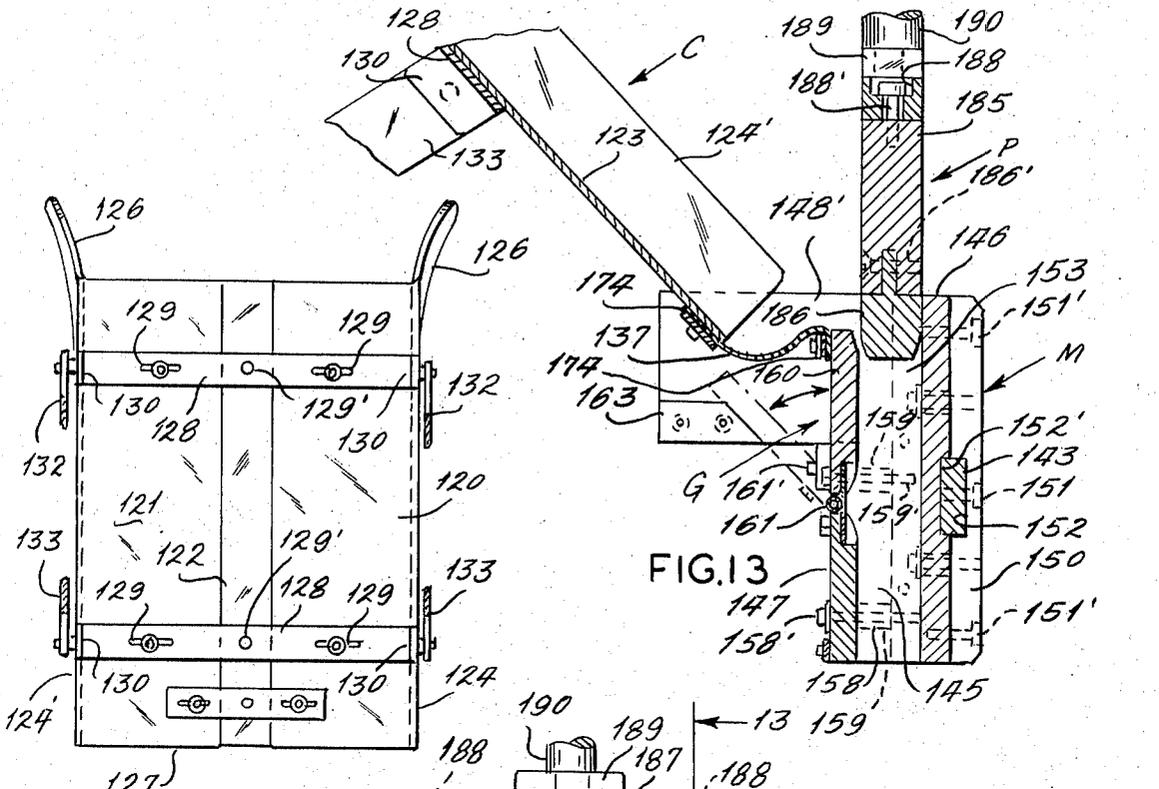


FIG. II

FIG. 13

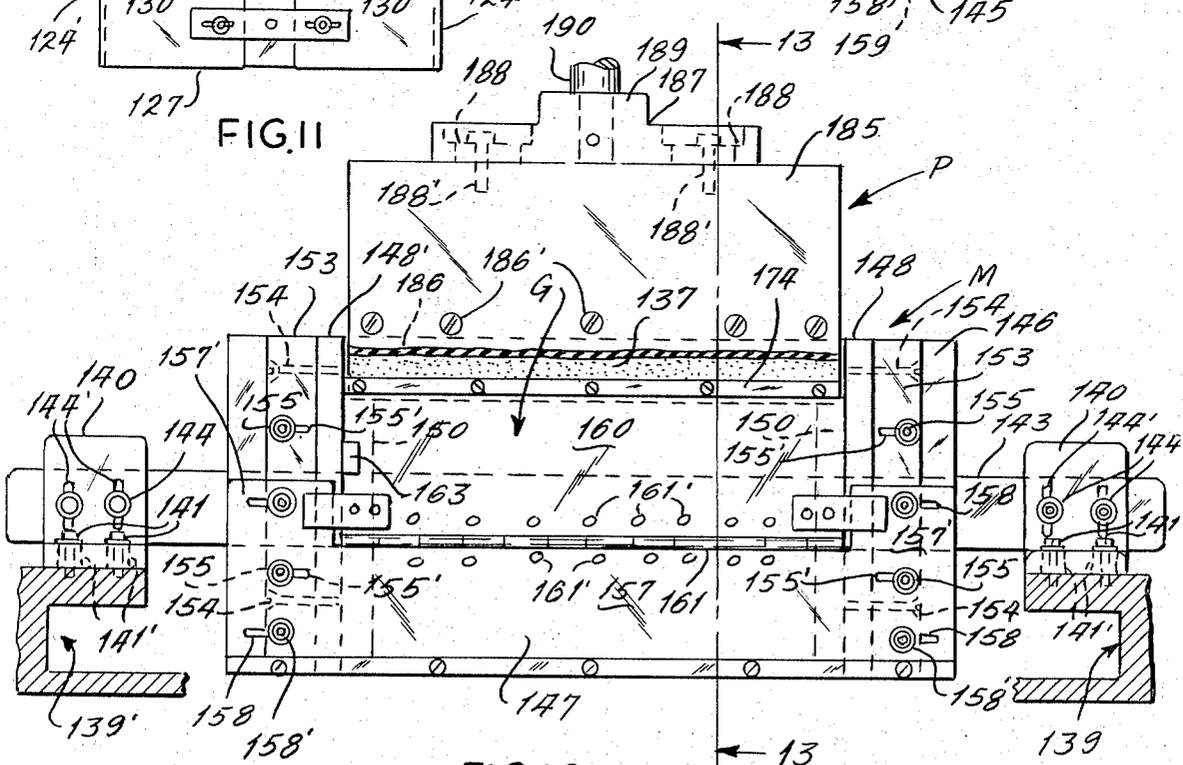
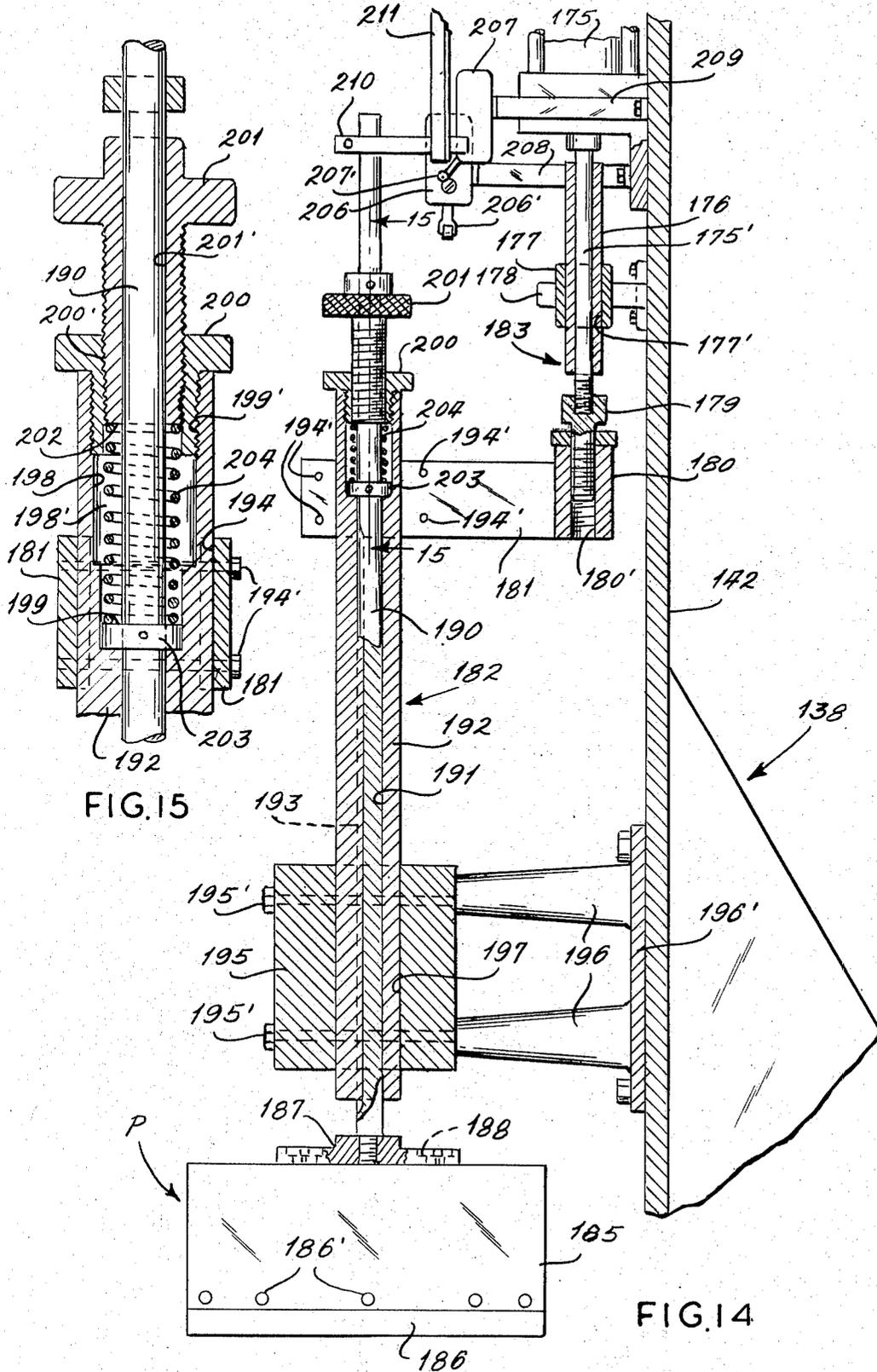


FIG. 12



SHORT FILLER CIGAR MACHINE**BACKGROUND OF THE INVENTION**

The invention relates generally to cigar machines, and more particularly to short filler bunch forming apparatus therefor.

Heretofore, many mechanisms and devices have been proposed for automatically or semi-automatically producing cigars having a uniform length and desired shape, using filler material forming the cigar bunches, inner binders formed of reconstituted or natural leaf tobacco, outer wrappers generally formed from natural tobacco leaf, and the cigars being molded to a uniform shape in the case of so-called "American" cigars or natural and somewhat irregular shapes in the case of so-called "Toscani" cigars (which are formed without a binder). Traditionally, both American and Toscani cigars were hand rolled using a bunch or filler of long strands or strips of tobacco, and the bunch was then rolled into a wrapper of fine grade tobacco.

Many advances have been made in the machine art for mechanically making cigars and a great amount of sophistication has been achieved in automatically performing certain stages in the overall cigar making operation. In more recent years, many attempts have been made to produce cigars having fillers formed of short (chopped or shredded) lengths of tobacco, referred to as "short filler", because of certain economies that can be realized by utilizing extra tobacco leaf portions cut away from wrappers, binders, or trimmed from the cigars in the finishing stages. Such short filler cigar machines are now being widely used throughout the industry in the manufacture of both American and Toscani cigars. However, prior to the present invention certain problems existed in the handling of short filler material, primarily in the inability of the apparatus to evenly distribute and smoothly deliver predetermined amounts of the filler material into the bunch forming mechanism for successively forming uniform bunches to be transferred to the subsequent binding, molding, wrapping and trimming stages of the machines. The short filler handling apparatus heretofore has not only transferred the material unevenly and irregularly, but has scattered the material out of the prior art transfer mechanisms onto the machine thereby requiring downtime for cleaning and onto the floor thereby causing waste and increasing tobacco costs. In addition, mechanical control parts, such as cams and the like, are expensive to manufacture, difficult to replace, and previous cigar machines have required exceptionally long downtime for adjustments and other servicing.

An additional problem in the manufacture of Toscani or stogie-type cigars is that such cigars are formed of tobacco filler material having a high residual or natural moisture content up to about 40 to 45 percent as compared with the tobacco filler for American cigars, in which the moisture content is in the range of 20 to 25 percent. Inasmuch as the aroma and taste of a cigar depends upon the tobacco or blend of different tobaccos used and the fermentation processes producing various characteristics of these different tobaccos, including moisture content, it is important that a cigar machine be adapted to handle such moist tobacco for long periods of time without becoming gummed up and inoperative, and without packing or compressing the tobacco into agglomerated lumps or a solid mass. In addition, by

reason of the rolling operation of Toscani cigar machines (to form a "double" cigar tapering toward both ends, which are then trimmed and later the cigar is cut in half), it has been the practice to form an extra-long bunch with the result that waste occurs when the ends are trimmed since reclamation of such tobacco scraps is limited.

SUMMARY AND OBJECTS OF THE INVENTION

Briefly, the invention comprises a short filler bunch forming apparatus for a cigar machine having a hopper reservoir containing a supply of short filler material, hopper extension means extending from the reservoir, means for intermittently discharging short filler material from the reservoir and spreading it substantially evenly in lateral and longitudinal directions onto the hopper extension, weighing means for receiving a predetermined amount of filler material from the hopper extension, means responsive upon demand to discharge the filler material from the weighing means, a bunch forming magazine receiving the filler material from the weighing means, and interrelated means for the positive control of the operations of the hopper reservoir, weighing means and bunch forming means.

The principal object of the present invention is to provide an improved short filler bunch forming apparatus for a cigar machine which obviates the disadvantages of prior art machines and provides positive control of the flow of filler material for forming uniform bunches of tobacco regardless of moisture content.

Another object of the invention is to provide a bunch forming apparatus that will rapidly and efficiently measure and transfer short filler tobacco in order to afford increased speed in the manufacture of cigars.

Another object is to provide short filler bunch forming apparatus which operates automatically at variable speeds to produce uniform cigar bunches at all production speeds.

Another object of the invention is to provide short filler measuring and transfer devices having interrelated, positive controls for measuring the smooth flow of material without scattering or waste.

A further object of the invention is to provide a short filler apparatus that is essentially trouble free from a maintenance standpoint, and eliminates major mechanical drive mechanisms which are costly to install and replace and result in substantial machine downtime.

A still further object of the invention is to provide a bunch forming charge having a minimum length requiring little trimming and thereby having little waste and effecting substantial tobacco economies.

Still another object is to provide a simple, positive acting, easily adjusted control system for a short filler cigar apparatus that is trouble free and maintains a substantially continuous operation of the machine for extended periods of time.

These and still other objects and advantages of the invention will become more apparent hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

For purposes of illustration and disclosure, the invention is embodied in the parts and in the arrangements and combinations of parts hereinafter described and claimed. In the accompanying drawings which form a part of the specification and wherein like numerals refer to like parts wherever they occur:

FIG. 1 is a diagrammatic flow chart illustrating the stages of operation of a short filler bunch forming apparatus embodying the invention,

FIG. 2 is a top plan view of the bunch forming apparatus embodying the invention,

FIG. 3 is a side elevational view, taken along line 3—3 of FIG. 2, of the bunch forming apparatus,

FIG. 4 is an enlarged end elevational view, partially fragmentary, taken substantially along sectional line 4—4 of FIG. 3,

FIG. 5 is an enlarged elevational view taken along line 5—5 of FIG. 2, but showing the actuated position of the back rake device,

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 2,

FIG. 7 is an enlarged fragmentary side elevational view taken along line 7—7 of FIG. 2,

FIG. 8 is an enlarged cross-sectional view taken along line 8—8 of FIG. 2,

FIG. 9 is an enlarged partial plan view taken substantially along line 9—9 of FIG. 6,

FIG. 10 is an enlarged end elevational view taken substantially along line 10—10 of FIG. 6,

FIG. 11 is an elevational view taken along line 11—11 of FIG. 6,

FIG. 12 is an enlarged front elevational view of the magazine taken substantially along line 12—12 of FIG. 3,

FIG. 13 is a cross-sectional view taken along line 13—13 of FIG. 12,

FIG. 14 is an enlarged cross-sectional view taken substantially along line 14—14 of FIG. 8, and

FIG. 15 is a greatly enlarged cross-sectional view taken along line 15—15 of FIG. 14.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, the present invention pertains to improvements in short filler bunch forming apparatus, shown generally by the letter B, having several sub-parts that are interrelated and cooperative to carry out the proper flow of short filler tobacco material from which successive uniform bunches can be formed. These sub-parts include a hopper reservoir H, a hopper extension E, a weighing or measuring scale S, a delivery chute C, and a bunch forming magazine M having a movable gate G and a vertically movable compaction plunger P. The magazine also includes a lower magazine measuring chamber MM in which the bunch is formed by actuation of a horizontal knife K and which then transfers the bunch for making the cigar. It will be understood that the other functions of both American and Toscani cigar machines to which the invention is applicable form no part of this invention, but the flow diagram of FIG. 1 illustrates the major units of a Toscani machine T including a rolling table R on which the cigar bunch is deposited in a loop formed in a flexible apron, a wrapper forming station W at which an outer wrapper is cut from a tobacco leaf and transferred to the rolling table R, an adhesive applying unit A which deposits adhesive on the wrapper when positioned on the rolling table apron and, after the apron is tightened to close the loop, the bunch is rolled in the wrapper and the ends are trimmed at a finishing station F.

Referring now to the remaining drawings wherein a preferred embodiment is shown in detail, and particularly to FIGS. 2—6, the hopper H comprises a rigid cast

curvilinear reservoir 20 having opposed side walls 21 and a rear wall 22 curving downwardly into a bottom wall 23 that slopes angularly forwardly toward an open discharge end 24 defined, in part, by arcuate front margins 21' of the side walls 21. The hopper reservoir 20 has rear legs 25 and front bosses 26 formed integral therewith, which are securely fastened to a vibrator unit 27 supported on a base frame 28 housing the main electrical, hydraulic and mechanical drive components of the bunch forming apparatus B. The base frame 28 has outer side panels 29, 29', a rear panel 30, a front panel 30', and top wall which is offset from an upper rear deck 31 mounting the vibrator 27 to the hopper reservoir 20 to a lower front deck 31'. A pair of vertical stanchions 32 are securely mounted to the opposed side walls 29, 29', the stanchions extending above the reservoir adjacent to the open discharge end 24 and being bridged across by a rigid frame member 33 defining an open channel 33' extending laterally of the reservoir 20 and housing a pair of rocker arms 34, 34' pivotally mounted, at 35, in the channel 33' and carrying a plurality of vertically extending spaced rods or lateral rakes 36, 36', respectively. It will be recognized that the apparatus as thus far described is substantially conventional, and that the vibrator 27 is actuated intermittently to move filler material from the reservoir 20 forwardly and downwardly along the bottom wall 23 toward the open front end 24 while the reversely acting rocker arms 34, 34' are rocked in opposite directions by conventional drive means (not shown) to laterally move the rakes 36, 36' so as to even out the filler material between the side walls 21 of the reservoir 20 and sift or feed it outwardly to the hopper extension E. Another conventional feature is the provision of a row of vertical magnets 37 disposed with their lower ends in juxtaposition to the upper level of filler material for the purpose of removing any small metallic fragments, such as baling wire clippings or the like, that may inadvertently be left in the tobacco leaves prior to shredding to form the short filler material. However, the magnets 37 according to the present invention, are adjustably carried by a frame 38 rigidly secured to the base frame 28 and are disposed over the hopper extension E whereby their efficacy is substantially improved, as will be described.

An important feature of the short filler hopper H comprises a back rake device 41 for the dual purpose of aerating or loosening the filler material in the reservoir trough 20 to prevent packing thereof, particularly in the case of Toscani filler having a high moisture content, and also leveling and feeding only a predetermined amount of the filler material in the generally longitudinal direction of movement toward the lateral rakes 36, 36' whereby the filler material will be more evenly spread for subsequent measuring and transfer to the bunch forming magazine M, as will appear. The back rake device 41 comprises vertical stanchions 42 secured in spaced relation to the side walls 29, 29' of the base frame 28 by spacer members 43 and extending above the reservoir 20. The stanchions 42 may be stabilized against relative lateral movement by cross tie bars 44, 44' and a spindle 45 is mounted for oscillating movement in bearing blocks 46 secured by brackets 46' or the like to the upper ends of the stanchions 42. The back rake 41 also includes a plurality of laterally spaced, vertically adjustable rods 47 having lower ends spaced substantially uniformly above the bottom wall

23 of the reservoir 20 to meter the flow of filler material therepast.

Referring particularly to FIGS. 3, 4 and 5, the back rake 41 is operated by a drive mechanism 48 comprising a drive arm 49 connected at one end to the spindle 45 and, intermediate to its free end 50, a pin 50' is received in a lost-motion connection in an elongated slot 51 adjacent to the upper end of a lever 52 extending substantially perpendicular to the drive arm 49. The other end of the lever 52 is connected to a clevis 53 carried by the upper end of piston rod 54' of an air cylinder 54 mounted in fixed relation by a bracket 55 adjustably secured to one stanchion 42. The lost-motion connection between the drive arm 49 of lever 52 controls the degree of sweeping action of the back rake 41 and is limited by an adjustable stop member 56 secured to the stanchion 42 and extending outwardly below the free end 50 of the drive arm 49, the member 56 having a vertically adjustable set screw 56' or the like for abutment by the drive arm 49. A tension spring 57 extends from the free end 50 to a fixed connection on the bracket 55 and biases the pin 50' toward the lower end of the slot 51 in lever 52. In the "at rest" position of the back rake 41 between short filler feeding operations, the cylinder rod 54' is extended upwardly so that the lever 52 and drive arm 49 are in raised positions and the spring 57 biasing the pin 50' downwardly against the lower end of the slot 51. In this position the rods 47 of the back rake 41 are in a normally rearward position in the reservoir 20 to hold the mass of short filler material in the rear of the hopper H and away from the lateral rakes 36, 36' (FIGS. 3 and 6).

The hopper extension E is rigidly secured to the hopper H and has opposed side walls 60 and a bottom wall 61 forming continuations of the reservoir trough 20 defined by the side walls 21 and bottom walls 23 thereof and, due to the corrosive nature of moist tobacco, it is preferred to line the hopper walls 21, 23 and extension walls 60, 61 with Teflon (a DuPont product) or like material, which also facilitates the smooth flow of filler material under vibratory agitation. The magnets 37 are positioned immediately adjacent to the discharge end 62 of the hopper extension E, which is also provided with a pivotally mounted tobacco discharge control or dam member 63 to close off the discharge end 62 between the intermittent feeding operations. The magnets 37, the dam member 63 and the scale S are independent of the hopper H and are mounted to the base frame 28 by a rigid support structure, shown generally at 64, including a cast base member 65 having horizontally projecting, spaced tubular members 66 supporting a U-shaped central cross frame member 67 having laterally and forwardly extending end frame members 68 and 69 integrally formed therewith (on the left and right as viewed in FIGS. 4, 9 and 10). The magnets 37 are adjustably mounted between cross side frames 38 extending laterally across the extension E and being secured at each end between end brackets 70, 70' rigidly secured to the frame members 68 and 69, respectively. As shown in FIGS. 3, 9 and 10, the end frame member 68 carries a C-shaped end portion 71 with which the end bracket 70 may be integrally formed, and the end bracket 70' (FIGS. 4 and 7) may be carried by an arcuate arm 71' secured to the end frame member 69. Obviously, other mounting arrangements may be provided.

The dam member 63 comprises a pad member 72 having a complementary configuration to the discharge end 62 of the extension E, and being carried by a T-shaped lever 73 secured to a cross-bar 74 journalled at each end 75 in the end brackets 70, 70' in front of the magnets 37. Referring to FIGS. 6, 7 and 10, one end of the cross-bar 74 has an arm 76 pivoted to a vertical drive rod 77 for actuation by typical drive means (not shown) between a closed position across the discharge end 62 of the extension E and an elevated open position during vibratory action for discharging filler material into the measuring scale S upon demand. A cover member 78 is provided over the magnets 37 and cross-bar 74 for dam member 63.

When the measuring scale S is empty and in a closed condition (as will be described), the dam member 63 is raised and the vibrator 27 is actuated to vibrate both the hopper reservoir 20 and hopper extension E so that the filler material is caused to move forwardly along the bottom walls 23 and 61 toward the discharge end 62. The lateral rakes 36, 36' are operated relatively slowly concurrently with the vibrator operation to sift or meter the material between the rods 36, 36' therebetween and to level the filler tobacco along the bottom walls as it passes into the hopper extension E. The air cylinder 54 is also actuated to slowly retract the piston rod 54' and lower the lever 52 with the spring 57 tending to maintain the pin 50' of the drive arm 49 downwardly in the slot 51 acting through the lost-motion connection until the stop member 56, 56' is engaged by the drive arm 49 with the lever arm 52 completing its retraction stroke so that the back rake 41 is rotated counter-clockwise in FIG. 3 with the rods 47 moving slowly forwardly to the FIG. 5 position thereby assisting in the short filler feeding action while holding the bulk of tobacco rearwardly in the reservoir 20. At the end of the forward sweep, the air cylinder 54 is reversed to more rapidly extend the piston rod 54' in an upward action. This causes the lost-motion connection (50', 51) to provide a brief dwell time of the back rake in its forward position, and the pin 50' then engages the lower end of slot 51 with the lever 52 then actuating the drive arm 49 upwardly to move the rods 47 rearwardly at a rapid rate to loosen and level the filler material and still retaining the bulk thereof rearwardly in the hopper H. It will be apparent that upon termination of the vibratory and leveling action, a level bed of filler tobacco will be retained along the bottom wall 61 to the discharge end 62 of the hopper extension E and the dam member 63 closes the discharge end 62 of the extension E to prevent loose filler tobacco from falling into the scale S.

The measuring scale S is also hingedly mounted on the frame support structure 64 independently of the hopper H and extension E, and comprises a front V-shaped trough or bucket member 80 and a rear closure plate 81. A cross-rod or pivot shaft 82 has its ends journalled in bearings carried by the support structure 64. The L-shaped end frames 68 and 69 have forwardly projecting flanges 83 for the bearings. A pair of rocker arm members 84 are fastened to the cross-rod 82 in laterally spaced position adjacent the frame flanges 83 and project forwardly and having aligned opposed pivot pins 85 in their free ends for swingably supporting the scale S, as will appear. Intermediate of the arms 84, a central collar 86 is secured to the cross-rod 82 and a rearwardly extending threaded rod 87 adjustably car-

ries a knurled counterweight **83** (accommodated by the U-shaped frame) for adjustably determining the weight of filler tobacco to be measured by the scale **S**. The rear closure plate **81** (FIGS. **8** and **10**) is essentially planar and has a rearwardly flared upper margin **89** and a lower margin **89'** and vertical lateral margins **90**. An apertured lug **91** is connected to the closure plate **81** at each vertical margin **90** intermediate to the upper and lower margins **89, 89'** for hinged mounting the closure plate on the opposed pins **85** carried by the pivot arms **84** on the cross-rod **82**; substantially at the weight center of the scale **S**. The closure plate **81** also has upstanding ears **92** at each upper corner mounting block members **93** having aligned, opposed pins **94** for hinged mounting the front bucket member **80**. Referring to FIGS. **6** and **8**, the front member **80** is substantially V-shaped and has a front wall **95** and opposed, rearwardly formed V-shaped end walls **96**, the rear margins of which normally abut against the closure plate **81** inside the pivot lugs **91** to maintain a closed condition of the scale **S** to receive and hold a charge of filler tobacco. The front member **80** is hinged on the opposed pins **94** of the closure plate **81** by bracket members **98** connected to each end wall **96** and having upstanding, offset flanged ends hingedly received on the pins **94**.

It will thus be apparent that the front bucket portion **80** is freely swingable on the rear closure portion **81**, and it in turn is freely swingably on the rocker arms **84** with rotate with the cross-shaft **82** in the frame bearings. It will also be apparent that the open top of the scale **S** is disposed immediately below the discharge end **62** of the hopper extension **E** and, when empty, is pivoted upwardly by the counterweight **88** with the upper margin **89** in juxtaposition with the extension **E**. An upper stop member **97** may be provided to limit the upper unloaded position of the scale **S** by engagement with one rocker arm **84** on shaft **82**. Similarly, when the scale **S** has been filled with a predetermined amount of filler tobacco due to the vibratory feeding action of the hopper **H** and extension **E**, the counterweight **88** will be overbalanced and the scale **S** will move downwardly toward the discharge chute **C** with the pivot arms **84** rotating the shaft **82**. A lower stop member **97'** may also be provided for abutment by the rocker arm **84** to limit the downward loaded position of the scale **S**. Vibratory action of the hopper **H** and extension **E** is terminated by a micro-switch **99** adjustably mounted on the frame flange **83'** by a bracket **100** and has its actuating or trip arm **99'** positioned in juxtaposition to the cross-shaft **82**. A cam member **101** is mounted on the shaft **82** and has its cam arm **101'** positioned to engage the micro-switch actuating arm **99'** when the scale **S** is filled with the predetermined charge of filler tobacco. The micro-switch **99** also actuates a scale hold-down device **105**, now to be described.

By reason of the relative freely swinging hinged connections of the front bucket **80** and closure plate **81** on the rocker arms **84** (which are in fixed rotatable relation with the counterweight **88** on the cross-shaft **82**), the opening of the scale **S** to discharge a filler tobacco charge has, in the past, immediately caused the scale to swing upwardly during such discharge with the result that tobacco has been scattered in undesirable and uncontrollable patterns onto the machine and floor. Accordingly, an important feature of the invention is a positive control for the scale **S** to effect smooth to-

bacco discharge without adverse mechanical agitation. The scale hold-down device **105** comprises a vertically disposed air cylinder **106** adjustably mounted on a bracket **107** carried by a machine frame to be described, and the piston rod **108** of the cylinder **106** has a pressure foot **109** adapted for engagement with one of the blocks **93** on an upper ear **92** of the closure plate **81**. The rod **108** and pressure foot **109** are normally retracted and in spaced relation above the closure plate **81** but, upon actuation of the micro-switch **99** when the scale **S** has received a tobacco charge, the air cylinder **106** is actuated to extend the piston rod **108** to lower the pressure foot **109** firmly, but gently, into abutment with the closure plate block **93** thereby maintaining the rocker arm **84** against the lower stop **97'** and the closure plate in an immobile position during the scale dumping operation. Referring again to FIGS. **4** and **10**, a U-shaped saddle **102** is secured below the upper and lower stops **97, 97'** and defines a vertical channel in which the margin **90** of the closure member **81** is disposed. Each opposed lug **103** of the saddle **102** has an adjustable stop **104** to limit the horizontal movement of the closure plate **81** during its vertical translation between unloaded and loaded conditions. In addition, an L-shaped bracket **116** is vertically adjustable on the bracket **107** below the pressure foot **109** and carries a stop member **117** to delimit the downward stroke of the hold-down device **105** as determined by the firm abutment of the closure plate **81** with one of the stop members **104** and engagement of the rocker arm **84** with its lower stop **97'**.

The discharge of a tobacco load from the scale **S** is controlled by a scale opening device **110** comprising another vertically disposed air cylinder **111** adjustably mounted on a bracket **112** carried by the machine frame to be described. The piston rod **113** of the air cylinder **111** is normally extended and has a lifting member **114** in the form of a stepped cylinder having a horizontal annular shoulder **114'** disposed in front of the front wall **95** of the bucket **80** and adapted for actuation from a lowered position of the scale **S**. The front wall **95** has a lifting tab **115** centrally disposed between the end walls **96** at its upper edge, the tab curving outwardly and being adjacent to the annular shoulder **114'** when the scale **S** is in its lowered loaded position. The air cylinder **111** is actuated upon demand from the bunch forming magazine **M**, as will be described, to retract the piston rod **113** and raise the lifting member **114** and lifting tab **115** so that the front bucket member **80** is provided on the pins **94** of the rear member **81** to open the scale **S** and discharge a tobacco charge into the discharge chute **C**. During this time the hold-down device **105** is operative to prevent relative movement of the closure plate **81** thereby assuring a smooth flow of filler tobacco from the scale **S**. FIG. **7** illustrates the hold-down device **105** being operative to prevent movement of the back plate **81** when the scale **S** is loaded, and FIG. **8** illustrates the opening of the trough portion **80** to discharge the filler charge to the magazine **M**. As illustrated in FIGS. **7** and **8**, a micro-switch **113** is also controlled by the scale opening device **110**, the switch **118** having its rocker element **118'** bearing against and activated by the lifting member **114**. When the scale **S** is opened and the air cylinder **111** is reversed to extend the piston rod **113** and lifting member **114** to the normally lowered position, the micro-switch **118** is closed to complete a circuit reversing the scale

hold-down air cylinder 106 so that its piston rod 108 and pressure foot 109 are retracted. Accordingly, the empty scale S is swung upwardly by the counterbalance 88 rotating rod 82 and the rocker arms 84 so that the cam 101 releases the micro-switch 99 thereby activating the vibrator 27 and concurrently raising the dam member 63 to permit another charge of filler material to be delivered into and measured by the scale S.

Referring to FIGS. 3, 6-8 and 11, the delivery chute C is rigidly attached to the main frame 28 independently of the hopper H, extension E and scale S and of the bunch forming magazine M and subsequent stages of operation mounted on the separate machine frame. In addition to other objects or features of the present invention, an objective is to provide a short filler bunch forming apparatus that is readily adaptable to making different length cigars. It is well known that American cigars are made in different lengths and shapes and, similarly, Toscani cigars are made in different lengths. For instance, double Toscanis are made in lengths between about 6½ inches to about 8¼ inches (after trimming and before curing and being cut in half). Therefore, adjustability of the delivery chute C and magazine M are important improvements since machines embodying this invention can be quickly converted to different dimensions with a minimum of downtime.

The delivery chute C is preferably made in three sections, including main outer sections 120, 121 and a removable or replaceable center section 122. The sections 120, 121, 122 together define a common, continuous bottom wall or chute surface 123, and the outer sections are provided with side walls 124, 124' which, at the upper end 125 underlying the scale S, are outwardly flared, at 126, to assure the transfer of tobacco from the scale S to the chute C. The lower end 127 of the chute C is disposed over the gate G for transfer of the tobacco to the magazine M, as will appear. The chute sections 120, 121, 122 are assembled together by a pair of laterally extending straps 128 having spaced elongated slots 129 adjustably fastened to the outer sections 120, 121 and having a central connection 129' for the central section 122. Other assembly straps 128' may also be provided. The lateral or cross straps 128 have end flanges 130 for mounting the chute C on the main frame 28. The main frame 28 has mounting brackets 131 to which main supporting bars 132 are adjustably secured and are pinned to the flanges 130 of the upper strap 128. Second bars 133 are pinned between the main bars 132 and the flanges 130 of the lower cross strap 128. Thus the angularity of the delivery chute C relative to the scale S and magazine M can be adjusted by merely resetting the connection of the main bars 132 on the frame 28.

The width of the delivery chute C is adjusted by loosening the section fasteners in the slots 129 and the central connection and removing or replacing the central section 122. It will be apparent that the outer sections 120, 121 may be moved together or laterally spaced to accommodate variable width sections 122, and that the bars 132, 133 have sufficient lateral give to permit such adjustments. The bottom wall 123 of the sections 120, 121, 122 may be covered with Teflon to facilitate smooth flow and minimize cleaning problems.

The magazine M, including the gate G and plunger P, and all subsequent units of the cigar machine T are mounted on a separate machine frame 135, except for the gate control 136 and the connection of a flexible

anti-spill chute extension 137 to the chute C. Reference may be had to other cigar machine patents disclosing various American cigar mechanisms, and Petri et al. Pat. Nos. 3,105,497; 3,199,514 and 3,298,375 pertaining to Toscani machines. Of particular interest will be Clausen et al. Pat. No. 3,033,210, which discloses a machine frame and Toscani cigar mechanisms from the bunch forming magazine through the wrapper, adhesive, rolling and finishing stages similar to those which may be utilized in carrying out the present invention.

Referring to FIGS. 2, 3, 6, 8 and 12-15, the magazine M is carried on the frame 135 which houses the mechanical, hydraulic and electrical components for operation of the main cigar machine functions through the finishing unit F. The frame 135 includes a base frame unit 138 having laterally spaced apart sections 139, 139' to which angle mounting brackets 140 are adjustably secured by bolts 141 received in elongated slots 141'. The main frame 135 also includes a frame tower or vertical frame plate 142 to which the mounting brackets 107, 112 are secured and which also secures the plunger P for vertical actuation relative to the magazine M. As shown best in FIGS. 12 and 13, the upper magazine M is mounted on the brackets 140 by a horizontal cross-bar or tie-rod 143 vertically adjustably secured by bolts 144 in elongated slots 144' in the vertical flanges of the brackets 140. The magazine M comprises a vertical upper magazine reservoir 145 defined by a back plate 146, front plate 147, laterally spaced and adjustable end plates 148, 148' and the gate G. A pair of vertical, laterally spaced, mounting straps 150 are bolted, at 151, to the cross-bar 143 and have notches 152 in opposed relation with notches 152' in the back plate 146 to receive the cross-bar 143 in order to maintain these pieces in aligned position. The mounting straps 150 are bolted, at 151', to the back plate 146.

The end plates 148, 148' are each rigidly secured to a vertical mounting bar 153 by plural bolts 154 and the mounting bars 153 abut the back plate 146 and are laterally adjustably secured thereto by bolts 155 received through elongated slots 155'. It will be readily apparent that by loosening the bolts 155, the end plates 148 may be moved relatively toward or away from each other to adjust the length of the magazine reservoir or chamber 145. The front plate 147 has a low center portion 157 with upstanding end portions 157', which have pairs of elongated slots 158 formed therein. The front panel 147 is secured in spaced relation on the mounting bars 153 by spacers 159 secured by bolts 158' extending through the slots 158 and spacers 159 into the mounting bars 153. It will thus be apparent that when the length of the reservoir 145 is changed, the bolts 158' are loosened (along with the bolts 155) to permit lateral movement of the end plates 148, 148' relative to the rear and front plates 146 and 147. The gate G comprises a plate 160 connected by a strap hinge 161 and bolts 161' to the center portion 157 of the front wall 147 between the end portions 157' and the end plates 148, 148'.

The gate G is movable from an open delivery position (shown in FIGS. 6 and 8 and the broken line position of FIG. 13) for receiving a tobacco charge from the scale S through the chute C to a closed position (shown in FIG. 12) for closing the magazine chamber 145 for compaction of the charge by the plunger P. The open

position of the gate G is delimited by a stop member 163 secured to one end plate 148', and the gate is operated in each cigar forming cycle of the Toscani machine T by the gate control 136. The gate control 136 comprises an air cylinder 164 centrally mounted by a bracket 165 on the lower frame level 31' between side plates 29, 29', and having its piston rod 164' connected through a universal joint 166 to a connecting link 167 hinged to a saddle 168 secured to the gate plate 160. As indicated in phantom in FIG. 3, the main cam drive shaft 170 of the Toscani machine T carries cams 171, 172, 173 acting on micro-switches 171', 172', 173' to control the operation of the gate control 136, filler cut-off knife K and plunger P, respectively. The cam 171 actuates the micro-switch 171' to control the air cylinder 164 and extend the piston rod 164' to close the gate G and define the closed magazine chamber 145 prior to actuation of the plunger P by the cam 173, as will be described. The knife K is then actuated by the cam 172 to cut off a predetermined bunch or filler charge in the measuring reservoir MM (as described more fully in the Clausen Pat. No. 3,033,210) and, during the transfer of the bunch to the rolling table R and return of the measuring reservoir MM, the gate G, plunger P and knife K are maintained in the actuated position by the dwell time of the cams 171, 172, 173. The plunger P is then raised, the knife K retracted and the gate G opened for a subsequent cigar measuring cycle. It will be readily apparent that the gate G extends the chute C into the open magazine chamber 145 to deliver filler material from the scale S, and that the flexible chute extension 137 (preferably formed of FAIROPRENE, a DuPont product) prevents scattering or loss of tobacco onto the machine or floor. The flexible extension 137 may be removably secured to the chute discharge end 127 and the gate G by removable furring strips 174.

Still referring to FIGS. 2, 3, 6, 8 and 12-15, the plunger P is mounted for vertical movement relative to the frame tower 142 and is carried by a plunger column 182 laterally offset from and actuated by an actuation column 183. The actuation column 183 includes an air cylinder 175 secured to the tower plate 142 and the piston rod 175' of the air cylinder 175 may be provided with an outer guide member 176 of square cross-section and being rigidly secured thereto. The guide member 176 is vertically slidable in a complementary opening 177' of a guide block 177 rigidly secured to the frame plate 142 by a bracket 178 so that rectilinear vertical movement of the piston rod 175' and guide member 176 is effected. The lower end of the piston rod 175' is threadedly received in a bushing 179 which, in turn, is threaded into the bore 180' of a block member 180 that is non-rotatably carried between laterally extending, spaced bracket plates 181 for mounting the vertical plunger column 182 in laterally offset relation from the air cylinder 175 and its actuation column 183. It will be apparent that the threaded connections between the piston rod 175', bushing 179 and block 180 permit vertical adjustment in order to regulate the plunger actuation or compaction stroke in the magazine reservoir 145.

The plunger P is carried on the lower end of the plunger column 182 and comprises a substantially rectangular, elongated block 185 complementary to the rectangular configuration of the magazine reservoir 145 and preferably being provided with a bottom edging strip 186 of Teflon or the like secured by recessed

bolts 186' (FIGS. 12-14). The plunger block 185 is removably secured to a winged mounting plate 187 having recessed elongated slots 188 in each wing to receive bolts 188' threaded into the block 185. The central boss 189 of the mounting plate 187 is bored to threadedly receive a vertical drive rod 190 slidable in the bore 191 of another guide member 192 of square cross-section and being keyed, at 193, for rectilinear vertical movement. The bracket straps 181 are recessed or notched, at 194, to receive the guide member 192, and are secured together by pairs of bolts 194' to rigidly secure the plunger guide member 192 to the actuation column 183. The plunger column 182 is further maintained in vertical and aligned position relative to the magazine chamber 145 by a guide block 195 rigidly secured by bolts 195' to frame bosses 196 carried by a frame plate 196' secured to the frame tower 142 (FIG. 14). The guide member 192 is slidably received in a complementary opening 197 formed in the guide block 195.

The drive rod 190 and guide member 192 are assembled together for relative axial or yieldable movement. As shown best in FIG. 15, the upper end of the guide member 192 is provided with a stepped counterbore 198 forming a chamber 198' having a lower abutment shoulder 199 and upper threaded wall 199'. A bushing 200 is fitted in the upper end 199' and has a tapped bore 200' in which a second bushing 201 is threadedly received for relative adjustment therebetween. The inner bushing 201 has a smooth bore 201' in which the drive rod 190 is slidably positioned, and the lower end 202 of the bushing 201 forms an upper abutment shoulder in the chamber 198'. The drive rod 190 has a collar 203 secured thereto within the chamber 198' and a spring member 204 extends between the abutment end 202 of the inner bushing 201 and the collar 203 to normally bias the drive rod 190 downwardly relative to the guide member 192 with the collar 203 abutting the shoulder 199. The spring 204 determines the degree of compaction or compaction force effected by the plunger P upon a charge of tobacco in the magazine M.

As previously described, the plunger P is actuated by the cam 173 on the main drive shaft 170 (FIG. 3) to close the micro-switch 173' in each cycle of machine operation. The micro-switch 173' actuates the air cylinder 175 to extend the piston rod 175' and guide member 176 downwardly so that this actuation column 183 acts through the lateral brackets 181 to lower the guide member 192 and drive rod 190 and move the plunger 185 into the magazine reservoir 145 after the gate G is closed. At this time, the transfer magazine MM is aligned below the magazine chamber 145 to form a continuation thereof (FIG. 3), and the plunger P then pushes filler material in the chamber 145 downwardly into the transfer magazine MM. Near the end of the actuation stroke, the plunger P acts through the drive rod 190 and spring 204 to compress the tobacco a predetermined amount (which is determined by adjusting the bushing 201 to select the desired spring pressure) and, while the tobacco is under compression, the knife K is actuated angularly between the magazine chamber 145 and transfer magazine MM to cut off the measured filler charge for one cigar. This arrangement and the subsequent steps of cigar manufacture will be understood more fully by reference to the Clausen et al. patent previously cited.

It is not essential that the scale S deliver a load of filler tobacco to the reservoir 145 in each cycle of operation although the gate G is opened each time and conditioned for such delivery. However, operation of the scale S is controlled by the plunger column 182 so that filler material will be delivered as required. The air cylinder 111 for opening the scale bucket 81 is controlled by two micro-switches 206 and 207 mounted by brackets 208, 209, respectively, on the tower frame 142. Micro-switch 206 has its switch element 206' positioned below a sensor cam 210 carried by the upper end of the drive rod 190. When the plunger P is actuated in a compaction stroke and the amount of tobacco in the magazine M is low and needs to be replenished from the scale S, the cam 210 contacts the switch 206 to close a normally open, stepping or self-holding relay in the electrical circuit (not shown) to the scale opening air cylinder 111 to condition this circuit for operation. The micro-switch 207 has its switch element 207' positioned to be in contact with another vertically elongated, sensor cam 211 carried by the plunger drive shaft 190 throughout the reciprocation of the plunger P and to hold the switch 207 open except when the plunger P is fully retracted. During the upward retraction stroke of the plunger P, the empty measuring reservoir MM is returned to its aligned position below the chamber 145 after the previously measured charge is deposited on the rolling table apron R, the knife K is retracted by actuation of the cam 172 and the cam 171 actuates the air cylinder 164 to retract its piston rod 164' and open the gate G. At the upward position of the plunger P, the sensor 211 releases the switch 207 to complete the circuit to the scale opening air cylinder 111 to discharge filler tobacco from the scale S into the opened magazine chamber 145.

During the dwelltime of the plunger P in its upward position, as determined by the cam 173 acting on micro-switch 173', and the discharge of filler material into the magazine chamber 145, the switch 207 also holds the stepping relay to the solenoid for air cylinder 111 to keep the scale bucket 80 open and also holds the solenoid for the cylinder 164 to keep the gate G open. When the plunger P is actuated downwardly to begin its compaction stroke, the sensor 211 contacts the micro-switch 207 to release the stepping relay and the air cylinder 164 immediately closes the gate G and the air cylinder 111 reverses to lower the lifting member 114 to close the bucket 80. The lifting member 114 then contacts the micro-switch 118 to release air cylinder 106 so that the pressure foot 109 is raised and the scale S swings free to release the micro-switch 99 and initiate action of the vibrator 27 and the lateral and longitudinal tobacco raking members 36, 36' and 47, as previously described.

In adjusting the length of the magazine chamber 145 to accommodate the manufacture of different length cigars, it is necessary to replace the plunger block 185. The elongated slots 188 permit easy alignment of the bolts 188' for securing a replacement plunger block.

It is believed that the operation of the short filler cigar machine will be readily apparent from the foregoing, and that the cooperation and interaction of mechanisms and controls for producing improved tobacco flow patterns has also been fully disclosed. The invention encompasses all changes and modifications in the disclosed embodiment that will be apparent to those skilled in the art.

What is claimed is:

1. In combination, a short filler bunch forming apparatus for a cigar machine, comprising a hopper reservoir containing a supply of short filler tobacco material and having a downwardly sloping bottom wall with a discharge end, vibratory means for effecting intermittent forward movement of the filler material along said bottom wall for discharging said filler material from the discharge end thereof, said means for discharging filler material also including rake means for spreading said filler material substantially evenly in lateral and longitudinal directions across said bottom wall, said rake means comprising a pair of adjacent first rake members each having a plurality of laterally aligned rods and being actuated in opposite transverse oscillating movement during operation of said vibratory means, and a second rake member having a plurality of laterally aligned, vertically disposed rods mounted on a spindle extending across said hopper reservoir in advance of said first rake members, means for actuating said second rake member longitudinally toward and away from said first rake members during operation of said vibratory means comprising lost-motion drive means for rotating said spindle to move said rods forwardly at a relatively slow rate to release and level short filler tobacco during said vibratory forward movement toward said first rake members and to return said rods rearwardly at a relatively rapid rate to loosen and hold the bulk of the filler material in said hopper reservoir away from said first rake members, weighing means disposed below the discharge end of said hopper reservoir for receiving a predetermined amount of filler material therefrom, bunch means adapted to receive said filler material from said weighing means including means for compaction of said filler material and formation of a cigar charge, and interrelated means for the positive control of each of said hopper reservoir, weighing means and bunch forming means.

2. The bunch forming apparatus according to claim 1, in which said hopper reservoir includes hopper extension means of substantial length extending beyond said first rake members to the discharge end of said bottom wall.

3. The bunch forming apparatus according to claim 2, in which said rods of said second rake member are positioned a substantial distance rearwardly of the first rake members in said hopper reservoir and in advance of said hopper extension means, and said rods are adjustably mounted adjacent to the upper ends thereof on said spindle the lower ends of said rods normally being maintained in a rearward, retracted position to maintain the bulk of short filler tobacco material away from said first rake members.

4. The bunch forming apparatus according to claim 1, in which said first and second rake members are actuated concurrently with said vibratory means in response to first switch means signalling an empty scale condition.

5. In combination, a short filler bunch forming apparatus for a cigar machine, comprising a hopper reservoir containing a supply of short filler tobacco material and having a downwardly sloping bottom wall with a discharge end, vibratory means for effecting intermittent forward movement of the filler material along said bottom wall for discharging said filler material from the discharge end thereof, said means for discharging filler material also including rake means for spreading said

filler material substantially evenly in lateral and longitudinal directions across said bottom wall, weighing means disposed below the discharge end of said hopper reservoir for receiving a predetermined amount of filler material therefrom, said weighing means comprising a scale device having front and rear bucket forming members swingably connected together and being relatively movable upon horizontal axes between upper unloaded and lower loaded positions, and first switch means responsive to the upper position of said weighing means for actuating said vibratory means for discharging filler material and also being responsive to the lower position of the weighing means for deactivating said vibratory means, said rear bucket forming member being swingably connected on spaced rocker arms mounted on a rotatable cross-bar, upper and lower stop means delimiting the relative movement of said scale device, said first switch means being operated by cam means mounted on said cross-bar, and vertically movable pressure means operable in response to said first switch means for engaging one of said front and rear bucket forming members of said weighing means to maintain it firmly against said lower stop means and against movement relative to the other of said bucket forming members in the lower loaded position of said scale device, bunch forming means adapted to receive said filler material from said weighing means including means for compaction of said filler material and formation of a cigar charge, and interrelated means for the positive control of each of said hopper reservoir, weighing means and bunch forming means.

6. The bunch forming apparatus according to claim 5, in which scale opening means are provided for actuating said other of said bucket forming members to effectuate an open condition of said scale device, and other switch means signalling a low tobacco condition in said bunch forming means to actuate said scale opening means.

7. The bunch forming apparatus according to claim 5, in which said bunch forming means comprises a first magazine reservoir including gate means movable between an open magazine position for receiving said filler material from said weighing means and a closed position to accommodate the compaction of said filler material, a measuring reservoir movable between an aligned position below said first reservoir and a cigar bunch transfer position, plunger means vertically movable between an upper remote position to a lower compaction position in said magazine reservoir to compact a cigar charge of filler material from said first magazine reservoir into said measuring reservoir, said plunger means including a plunger column having a plunger head removably secured to a vertical plunger shaft, and first and second sensor means carried by said shaft for controlling said other switch means for operating said weighing means, said other switch means comprising a second switch contacted by the first sensor means to condition said scale opening means for operation in response to a low tobacco condition in said magazine res-

ervoirs during the compaction thereof, and a third switch contacted by said second sensor means during the compaction and retraction movement of said plunger means to prevent said scale opening means from operating, and fourth switch means responsive to said scale opening means and operable during the open condition of said scale means to maintain said pressure means in contact with said one of said bucket forming members, and knife means movable from a retracted position during compaction to an actuated position to sever the cigar charge in said measuring reservoir.

8. The bunch forming apparatus according to claim 7, in which said second sensor means releases said third switch means in the upper retracted position of said plunger means to actuate said scale opening means to its retracted position, and said scale opening means thus being operable for releasing said fourth switch means to retract said pressure means whereby said scale means swings freely to its upper unloaded position to release said first switch means and initiate operation of said vibratory means and said first and second rake members.

9. The bunch forming apparatus according to claim 7, including chute means positioned at a fixed predetermined angle below said weighing means and having a delivery end position above the open magazine position of said gate means, and a flexible chute extension connecting said chute and gate means to provide delivery of substantially all filler material from said weighing means into said bunch forming magazine.

10. The bunch forming apparatus according to claim 9, in which said chute means is laterally adjustable to accommodate the manufacture of different length cigars, said chute means comprising outer sections having opposed side walls and a removable and replaceable central section forming a common bottom wall with said outer sections.

11. The bunch forming apparatus according to claim 7, in which said first magazine reservoir is expansible to accommodate the manufacture of different length cigars, said reservoir having a rear plate, opposed end plates laterally adjustably secured to said rear plate and a centrally recessed front plate engaged by said end plates, said gate means being hingedly connected to said front plate within the central recess thereof, and said rear, end and front plates with said gate means defining the first magazine reservoir.

12. The bunch forming apparatus according to claim 7, in which said plunger column is mounted for vertical movement laterally of an actuation column secured to a main frame, said actuation column including means for adjusting the vertical compaction stroke of said plunger column, and said plunger column including yieldable means mounting said plunger shaft to said actuation column for preselecting the amount of compaction force exerted by the plunger head upon filler tobacco in the magazine reservoir.

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