May 9, 1944. S. J. DUHAIME 2,348,196

BAG MANUFACTURING MACHINE

Filed May 6, 1938 2 Sheets-Sheet 1

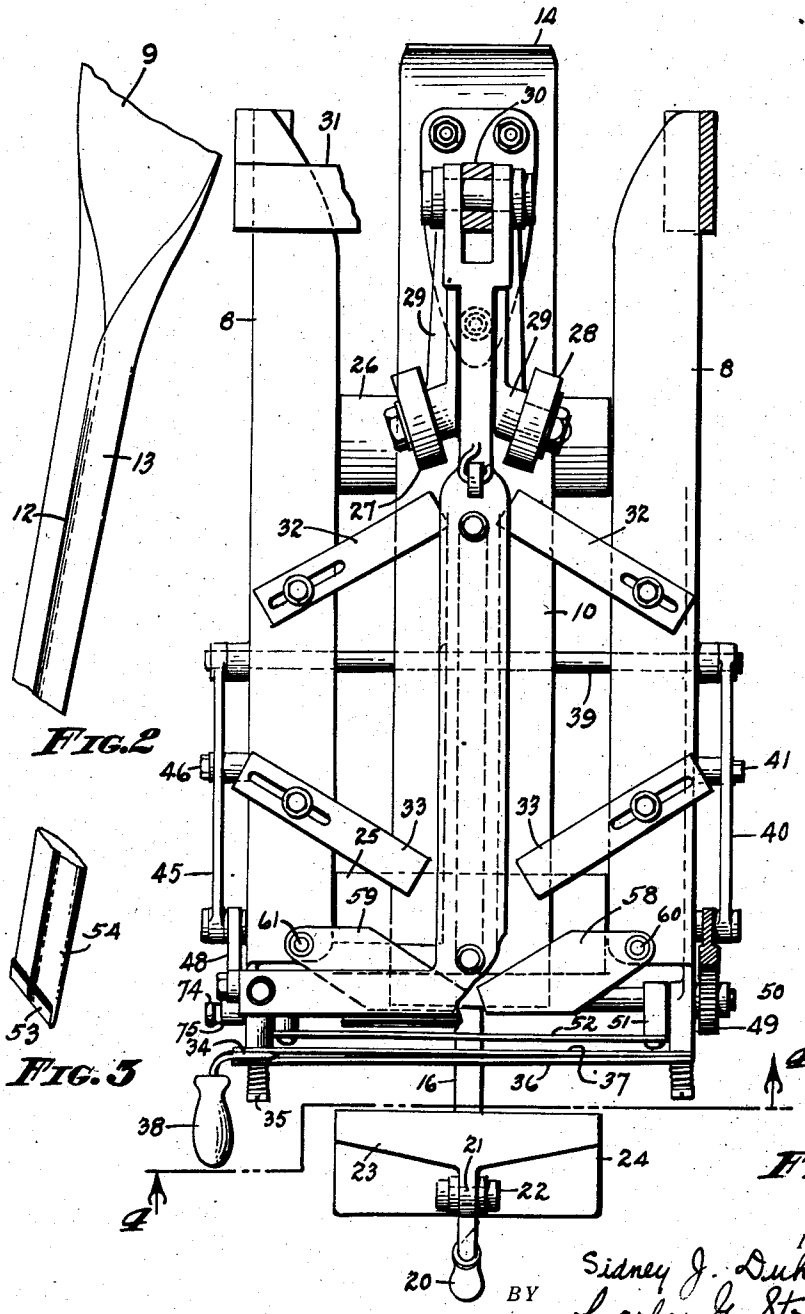

FIG. 2

FIG. 3

FIG. 1

INVENTOR
Sidney J. Duhaime

BY Carlos G. Stratton
ATTORNEY

May 9, 1944. S. J. DUHAIME 2,348,196

BAG MANUFACTURING MACHINE

Filed May 6, 1938 2 Sheets-Sheet 2

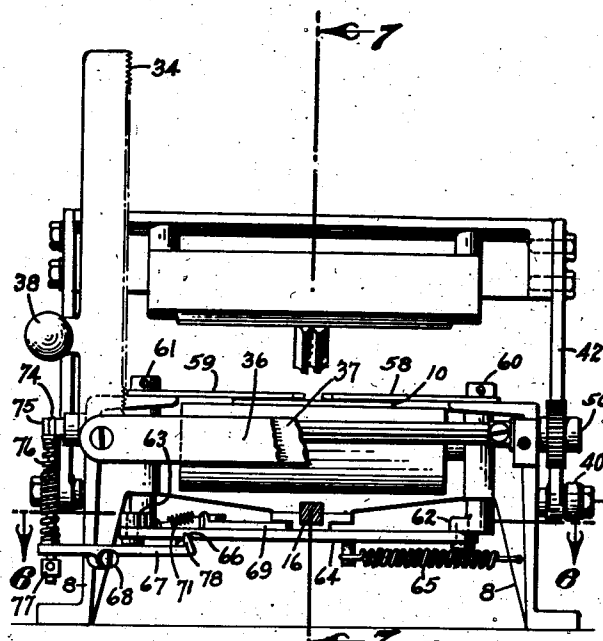

FIG. 4

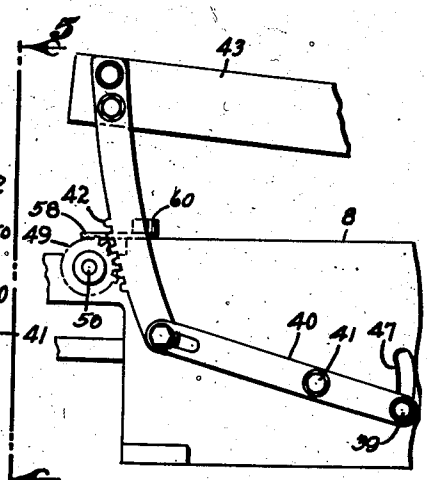

FIG. 5

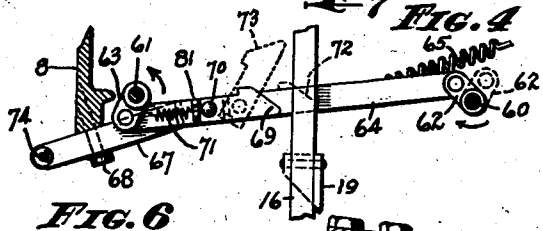

FIG. 6

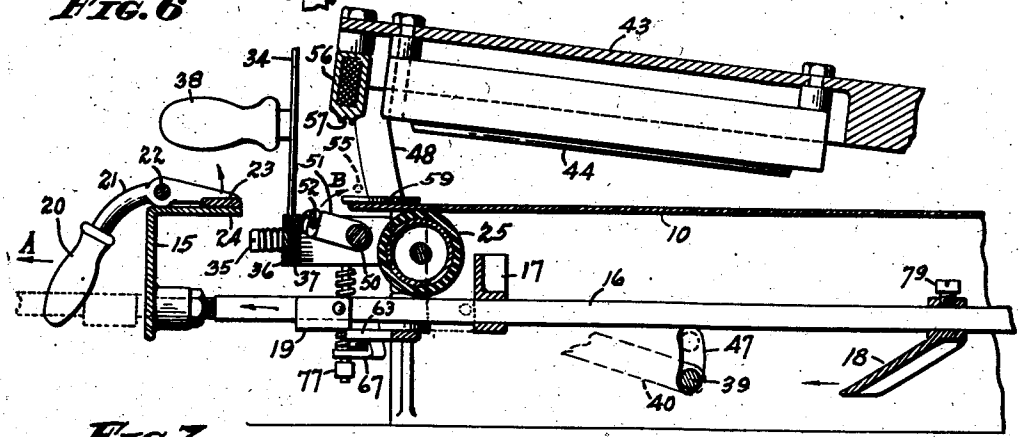

FIG. 7

INVENTOR
Sidney J. Duhaime
BY Carlos G. Stratton
ATTORNEY

Patented May 9, 1944 2,348,196

UNITED STATES PATENT OFFICE

2,348,196

BAG MANUFACTURING MACHINE

Sidney J. Duhaime, Los Angeles, Calif.

Application May 6, 1938, Serial No. 206,347

23 Claims. (Cl. 93—18)

My invention relates to a bag manufacturing machine and more particularly to a machine adapted for the manufacture of bags of fusible material.

An object of my invention is to provide means in such a machine for folding, cutting and sealing bags of fusible material.

Another object is to provide means for automatically measuring, folding and sealing the edges of such a bag.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description.

In the drawings, like reference characters designate similar parts in the several views.

Figure 1 is a plan view, partly broken away, of an embodiment of my invention.

Figure 2 is a perspective view of material being folded to provide the sides of the bag.

Figure 3 is a perspective view of a finished bag.

Figure 4 is a section taken on the line 4—4 of Figure 1.

Figure 5 is a side elevation looking in the direction of the arrows 5—5 of Figure 4.

Figure 6 is a detailed view of operating mechanism comprised in the invention, taken on the line 6—6 of Figure 4.

Figure 7 is a longitudinal section of said embodiment taken on the line 7—7 of Figure 4.

Referring more in detail to the drawings, the frame of my machine is generally designated by the number 8. The material 9 from which the bags are made is preferably provided in the form of a roll (not shown). This material is preferably a transparent, glossy, sheet-like rubber composition, known in the trade as "Pliofilm" and capable of fusing to itself upon the application of heat.

A former or folding plate 10 extends longitudinally of the frame 8. The bag material 9 is folded entirely around the plate 10 with the edges of the material overlapping, as suggested at 12 in Figure 2. The material is, therefore, in tubular form 13 embracing the plate 10. The feed end 14 of the plate 10 is bent upwardly.

In the views showing my machine, the material for the bags has been omitted, to avoid confusion, but it is to be understood that in the operation of the machine, the bag is folded around the plate 10 in the manner described.

A carriage 15 is mounted upon a rod 16 which in turn is slidable in a bracket 17 on the frame. The rod 16 carries a cam 18 and an abutment 19, the function of which will be explained more fully hereinafter.

A handle 20 is mounted at one end of a lever 21, which is pivoted on the carriage at 22. The opposite end of the lever 21 carries a head 23 that contacts a flange 24 of the carriage 15. The face of the head 23 which contacts the flange 24 may be knurled or otherwise roughened or may carry non-slip material.

An end of the tube 13 projecting beyond the plate 10 is gripped between the head 23 and flange 24. Then by drawing the handle 20 in the direction of the arrow A of Figure 7, the tubular material is drawn out the desired length of the bag.

Rollers 25 and 26 mounted on the frame 8 beneath the plate 10 rotate in close proximity to the plate. The rollers preferably have friction material thereon, such as a rubber surface. These rollers maintain the bottom stretch of the tubular material 13 in close contact with the underside of the plate 10.

Rollers 27 and 28 are rotatably supported on arms 29 on a bracket 30 depending from a cross bar 31 on the frame 8. These rollers 27 and 28 toe-in and draw the edges of the material 9 together, to form the tubular shape. Adjustable guides 32 and 33 on the frame 8 maintain the material in its tubular form 13.

A serrated knife 34 pivoted on the pin 35 shears the bag at the desired length by wiping between plates 36 and 37. A handle 38 on the knife is provided for its manipulation.

Thereafter, continued withdrawal of the carriage 15 in the direction of the arrow A causes a transverse rod 39 to ride upward on the cam 18. The rod 39 is connected to one end of levers 40 and 45 which are pivoted at 41 and 46 respectively.

A rack 42 connects the opposite end of the lever 40 with a support 43 for a longitudinal heating element 44, and a link 48 connects the opposite end of the lever 45 with the support 43. The rod 39 oscillates vertically in slots 47 in the side walls of the frame 8.

A pinion 49 meshes with the rack 42. The pinion is mounted on a shaft 50 transverse of the frame 8. Arms 51 adjacent opposite ends of the shaft 50 support a wire 52 therebetween. The wire 52 is arranged to swing upwardly in the direction of the arrow B of Figure 7 when the rack 42 descends by reason of the cam 18 engaging the rod 39. This upward movement of the wire 52 causes the projecting end of the tube 13, between the knife 34 and the end of the plate 10, to be folded upwardly over the end of the plate 10, to form the bottom 53 of the finished bag 54. The broken line 55 indicates the upward position of the wire 52, whereby the end 53 of the bag is folded upon itself.

A cross heating element 56 is also mounted on the support 43 ahead of the longitudinal heating element 44. The heating element 44 has a bifurcated nose 57 which fits over the wire 52 when the heating elements come into contact with

the tube 13. It is believed clear without further illustration that the heating elements 44 and 56 are connected in an electric circuit (not shown).

To maintain the tube 13 in its folded condition until it is ready to be fused together, I provide reciprocating fingers 58 and 59 mounted respectively on vertical shafts 60 and 61. Cranks 62 and 63 respectively on the lower ends of the shafts 60 and 61 are connected by a bar 64 for synchronous movement. A spring 65 tends to draw the bar 64 to the right in Figures 4 and 6, which movement of the bar 64 tends to rotate the shafts 60 and 61 in the directions of the arrows shown in Figure 6 and tends to move the crank 62 to the broken line position, also shown in Figure 6. The crank 63 is also moved to a new position, which, however, has not been indicated for the sake of clarity.

The bar 64 has a notch 66 on its lower face, which notch is engaged by the point of a rocker arm 67, pivoted on the frame 8 at 68.

On the upper face of the bar 64 is a trip 69 pivoted on the bar at 70. A coil spring 71 tends to maintain the trip 69 longitudinal of the bar 64. The position 72 of the trip 69 indicates the position thereof when the spring 65 draws the bar 64 to the right in Figure 6. The position 73 of the trip 69 is its position when moved aside by reason of the return movement of the abutment 19.

A pin 74 passes through an end of a rocker 67 and is connected with an eccentric 75 on an end of the shaft 50. A helical spring 76 on the pin 74 tends to maintain a pointed end 78 on the rocker 67 in engagement with the recess 66. However, as the eccentric 75 approaches its upward limit, a stop 77 on the pin 74 rocks the arm 67 and thereby removes its point 78 from the recess 66, thus permitting movement of the bar 64 to the right by reason of the spring 65.

A set screw 79 on the cam 18 is employed to maintain the cam in adjusted positions along the bar 16, to adjust the mechanism for different lengths of bags to be manufactured by the machine.

In the operation of my machine, material 9 is folded about the plate 10 in tubular form by means of the rollers 27 and 28, the rollers 25 and 26 and the guides 32 and 33. The ends of the tubular form 13 extends approximately to the knife 34, and the folding wire 52 and the heating elements at the beginning of the cycle of operation are substantially in the position shown in Figure 7.

In these positions, the reciprocating fingers 58 and 59 extend over the upper edges of the tubular material, to maintain the material in position until the end of the tube is folded thereover and the seams ready to be sealed.

The previously formed and cut bag is gripped between the head 23 and the flange 24 and is drawn outward by means of the handle 20. Thereupon when the cam 18 engages the cross rod 39, the rack 42 is lowered, thus rotating the shaft 50 in the direction of the arrow B, which effects folding of the end of the tube 13 by means of the wire 52. The heating elements then contact the material. The longitudinal heating element 44 seals the overlapping edges 12 and the heating element 56 seals the bottom 53 in the position shown.

Just prior to the engagement of the bag by the heating element 56, the eccentric 75 effects rocking motion of the arm 67, thus releasing the bar 64, whereby the spring 65 moves the bar to the right in Figure 6 and thereby rotates the shafts 60 and 61 in the directions of the arrows shown in Figure 6. This rotation of the shafts causes the reciprocating fingers 58 and 59 to move rearwardly out of the path of the heating element 56.

After the sealing step, the abutment 19 strikes the trip 69 when the latter is in its position 72, which causes the bar to move to the left in Figure 6 against the action of the spring 65 and permits the pointed end 78 to again engage the recess 66 and hold the bar 64 in position shown in Figure 4. When the pointed end 78 engages the recess 66, the fingers 58 and 59 are in the position shown in Figure 1.

When the carriage 15 has moved to its outward limit, reversal of the direction of movement of the handle 20 will raise the head 23, releasing and dropping the bag previously formed. In the return movement of the bar 16, the abutment 19 slides past the pivoted trip 69, whereby the trip assumes the broken line position 73. A stop 81 prevents clockwise swinging movement of the trip 69 when the abutment 19 first strikes the trip.

The carriage 15 is moved in until the flange 24 slides under the plate 10 and the head 23 is disposed above the plate 10. Then by drawing the handle 20 in the direction of the arrow A, the sealed end of the tube 13 is clamped between the head 23 and the flange 24. By continued movement of the carriage 15 in the direction of the arrow A, the bag is drawn out the desired length past the knife 34. The knife is then manually moved to its shearing position. Continued movement of the carriage 15 in the direction of the arrow A will cause the wire 52 to again fold the end of the tube 13 and go through the aforedescribed cycle of operation.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications which may fall within the scope of the appended claims.

One change that would be within the scope of the hereunto appended claims would be sealing an end of the bag without folding it over. This change is suggested only for the sake of example and is certainly not the only change that can be made in the details of construction without departing from the scope of the invention.

It is to be understood that "fusible material," "material capable of being fused to itself," and the like, in the hereunto appended claims, are to be interpreted to include not only material whose body is so fusible, but also material whose surface is so fusible, whether the interior is so fusible or not.

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

1. A bag making machine comprising means to support sheet-like, fusible material in tubular form, a rod connected to fold and maintain an end of the tubular shaped material upon itself, and heating means straddling said rod as the rod maintains the folded end in position, whereby to fuse the folded end at either side of the rod.

2. A bag making machine comprising a plate, means to engage and draw along and around, the plate sheet-like, fusible material in tubular form

with overlapping edges, movable finger means to hold the material in tubular form with overlapping edges, means to fold an end of the tubular arranged material over the movable finger means, movable heating means to fuse the overlapping edges and the folded end upon the material itself, and mechanism controlled by said material drawing means to move the finger means out of the path of the heating means and to move the heating means into engagement with the material.

3. A bag making machine comprising a plate, means to fold sheet-like, fusible material around the plate in tubular form, retractile means to hold the material in tubular form, latch means to hold the retractile means in said position, means to fold an end of the tubular arranged material over the retractile means, movable heating means to fuse the folded end upon the material itself, mechanism to trip the latch means upon movement of the heating means toward engagement with the material, spring means to retract the retractile means upon tripping of the latch means, and mechanism to move the heating means into engagement with the material to fuse the end in a closed position.

4. A bag making machine comprising a plate, means to fold sheet-like, fusible material around the plate in tubular form, means to fold over and fuse closed an end of the tubular material, a carriage having gripping means arranged to grip the closed end of the tubular material, the carriage being mounted to move, whereby to draw out the tubular material a desired amount, and shearing means to cut off a bag of desired length.

5. A bag making machine comprising a plate, means to fold sheet-like, fusible material around the plate in tubular form, means to fold over and fuse closed an end of the tubular material, a carriage having gripping means arranged to grip the closed end of the tubular material, the carriage being mounted to move, whereby to draw out the tubular material a desired amount, manual means for moving the carriage and controlling the gripping means, the manual means being arranged to cause the gripping means to grip said closed end when the carriage is withdrawing the material and being arranged to release the material when the manual means moves the carriage in the opposite direction.

6. A bag making machine comprising a plate, means to fold sheet-like, fusible material around the plate in tubular form, means to fold an end of the tubular shaped material over upon itself, heating means to fuse the folded end to the body of the material, a carriage having gripping means arranged to grip the closed end of the tubular material, the carriage being mounted to move, whereby to draw out the tubular material a desired amount, and mechanism operable by movement of the carriage connected to effect the folding of the end.

7. A bag making machine comprising a plate, means to fold sheet-like, fusible material around the plate in tubular form, means to fold an end of the tubular shaped material over upon itself, movable heating means to fuse the folded end upon the material itself, a carriage having gripping means arranged to grip the closed end of the tubular material, the carriage being mounted to move, whereby to draw out the tubular material a desired amount, shearing means to cut off a bag of desired length, and mechanism operable by movement of the carriage to fold the severed end and move the heating means into engagement with the material to fuse the end in a closed position for the next withdrawal of the material.

8. A bag making machine comprising means to support sheet-like, fusible material with its edges overlapping and arranged in tubular form, means to fold an end of the tubular shaped material, means to fuse the overlapping edges and the folded end, means to withdraw a definite amount of the tubular shaped material having the sealed end and side, and shearing means to cut the sealed end into a bag of desired length.

9. In a bag making machine, a mandrel having a front edge substantially fitting within a bag to be made, means for advancing material over the mandrel from the rear to form a sleeve embracing the mandrel and having thicknesses on opposite sides of the mandrel, with a small portion unobstructedly projecting beyond the front edge of the mandrel, means for folding the projecting portion to overlie one of the thicknesses of the sleeve and heated means for bonding the folded portion and the said thickness, with the front end of the mandrel interposed between the two thicknesses.

10. In a bag forming machine, a heating means for a bag having a transverse bottom seam and and a longitudinal seam, comprising a supporting bracket, a heater arranged transversely thereon for sealing the bottom seam and a second heater mounted longitudinally thereon for sealing the longitudinal seam, the second heater being spaced from the first heater.

11. In a bag making machine, a fixed former along which sheet-like fusible material may be moved from a roll thereof, means cooperating with the former to fold said material therearound in the course of its movement and with its longitudinal edges in overlapping relation to form a tubular web, heating means shiftable into contact with the end portion of said web on the former for sealing the said overlapping edges and also sealing the web transversely thereof for a closed bag end, a movable web shifting device including means engageable with the closed end of the web whereby a sealed bag forming length of the web may be withdrawn from the former beyond the sealing means, and means for severing the withdrawn, sealed portion of the web.

12. In a bag making machine, a fixed former along which sheet-like fusible material may be moved from a roll thereof, means cooperating with the former to fold said material therearound in the course of its movement and with its longitudinal edges in overlapping relation to form a tubular web, heating means shiftable into contact with the end portion of said web on the former for sealing the said overlapping edges and also sealing the web transversely thereof for a closed bag end, a web shifting device, including means engageable with the closed end of the web whereby the web may be drawn along the former and a sealed bag-forming length thereof extended beyond the sealing means, means for severing the extended and sealed portion of the web, and means operated by movement of the web shifting device for actuating the sealing means.

13. In a bag making machine, a former along which sheet-like material of a fusible nature is movable from a roll thereof, means cooperating with the former to fold said material around the former in the course of its movement and with its longitudinal edges in overlapping relation on the former to form a tubular web, a device including means engageable with the free end of

the tubular web at one end of the former, for drawing a bag length of the web along, and beyond the former, means for severing the extended bag length from the web, and heating means operated by movement of said device and shiftable thereby into, and out of, contact with the web on the former, for sealing the said overlapping edges and also sealing the material transversely thereof adjacent to its free end for a closed bag end.

14. A bag making machine comprising reciprocal means engaging and drawing sheet-like, fusible material from a roll, mechanism to fold edges of the material in overlapping relation and to arrange same in tubular form, means to fuse the overlapping edges and the advancing end of the tubular form, said first-mentioned means being arranged to withdraw the fused length of the tubular material, and shearing means to sever the withdrawn fused length from the remaining material.

15. A bag making machine comprising means to engage sheet-like, fusible material whereby it may be drawn from a roll, a former disposed to shape material from the roll in the course of its movement in tubular form, idler rollers that toe-in being arranged to direct edges of the material in overlapping relation on the former, means arranged to fuse the overlapping edges and the end of the tubular form, said first-mentioned means being arranged to withdraw material over the former past the fusing means, and shearing means to sever withdrawn bag lengths from the remaining tubular material.

16. A bag making machine comprising means to grip sheet-like, fusible material whereby it may be drawn from a roll, mechanism to fold edges of a single sheet of the material in overlapping relation upon itself and to arrange the single sheet in tubular form, means operable to fuse the overlapping edges and the end of the tubular form, said first-mentioned means being operable to advance the material through the machine and beyond the fusing means, a shearing knife mounted to shear a bag length from the advanced material, and connections actuated by said first-mentioned means during movement thereof, for operating the fusing means.

17. A bag making machine comprising gripping means for engaging and drawing sheet-like, fusible material from a roll, mechanism to fold edges of a single sheet of the material in overlapping relation, one edge overlapping the other, and to arrange same in tubular form, said first-mentioned means advancing the material through the machine upon movement thereof in one direction, heating means, mechanism actuated by the gripping means to move the heating means into contact with one of the overlapping edges, to seal same to the other edge and to seal the material transversely for a closed bag end, said folding means including means arranged to separate the sides of the tubular form during the heating of the overlapping edges, and shearing means to sever fused bag lengths from the remaining material.

18. In a bag making machine comprising a support for a roll of bag-making material capable of being fused to itself, the combination of a former, material gripping means operable to draw material on to one end of the former from the roll and from the opposite end of the former, means coacting with the former to fold the material around the former in overlapping relation to itself, reciprocating heating means arranged to seal one edge to the other edge of the same piece of material and to seal the material transversely for a closed bag-end, the heating means being movable into and out of contact with the material on the former, whereby the former thus prevents one side of the bag from fusing to the opposite side, and shearing means to sever bag lengths from the material drawn beyond the sealing means.

19. In a bag making machine comprising a support for a roll of bag-making material capable of being fused to itself, the combination of a former along which material may be drawn from the roll, means cooperating with the former to fold the material around the former in overlapping relation to itself during its movement on the former, means operable to fuse the overlapping edges of the one piece of material and the end of the tubular form, the fusing means being movable into and out of contact with the material on the former, means to grip the material for drawing the same through the machine and advancing its sealed portion beyond the sealing means, shearing means to sever individual bags from the advanced, sealed portion of the material, and connections between the said gripping means and the sealing means to operate the latter by movement of the former.

20. In a bag making machine, gripping means to engage and draw sheet-like material from a roll during advancing movement of said means, the material being at rest during return movement of the gripping means, means to fold edges of said sheet, during its movement, in overlapping relation with regard to each other and in tubular form, the gripping means by its advance withdrawing a bag-forming lengthwise portion of the tubular material beyond the folding means, shearing means to sever each withdrawn bag-forming portion from the remaining material, mechanism to fuse the overlapping edges of a remaining portion of the tubular form to each other and to fuse the tubular form crosswise, and connections for operating said fusing mechanism actuated by the gripping means.

21. In a bag making machine comprising a support for a roll of bag-making material capable of being fused to itself, the combination of a fixed former along and beyond which the material may be drawn from the roll, means cooperating with the former to fold the material around the former with its longitudinal edges in overlapping relation as it moves along the former, heating means arranged to seal said overlapping edges to each other and to seal the material transversely for a closed bag-end, the heating means being movable into and out of contact with the material on the former, means for gripping the sealed end of the material whereby the sealed portion may be drawn from the former beyond the sealing means, and the material from the roll advanced along the former, the former preventing one side of the bag from fusing to the opposite side, shearing means to sever bags of the desired length from the remaining material on the former, and means actuated by the gripping means during movement thereof for operating the sealing means.

22. A bag making machine comprising means for gripping sheet-like, fusible material whereby to draw the same from a roll, mechanism to fold edges of a single sheet of such material, during its movement, in overlapping relation, one edge overlapping the other, and to arrange same in tubular form, said first-mentioned means being

movable to advance the material through the machine and withdraw a portion thereof beyond the folding mechanism, heating means to heat one of the overlapping edges, to seal same to the other edge, the folding mechanism including means arranged to separate the sides of the tubular form during the heating of the overlapping edges, heating means to seal the material transversely for closed bag-ends, shearing means to sever bags of desired length from the withdrawn portions of the material, and connections actuated by movement of the said material gripping means for simultaneously operating the two heating means against the end portion of the remaining folded material.

23. In a bag making machine, a support to receive movably on, and around the same, fusible material in tubular form, means to fuse closed an end of the said material at a fusing station adjacent to the forward end of the support, means engageable with the fused end of the material at the fusing station and movable forwardly therefrom for withdrawing a fused bag length of the material and at the same time advancing another bag length of the material to the fusing station, means for severing from the material a withdrawn, fused bag length, and means controlled by movement of said withdrawing means, for actuating the fusing means to fuse closed the advanced bag length on the support.

SIDNEY J. DUHAIME.