

Jan. 21, 1941.

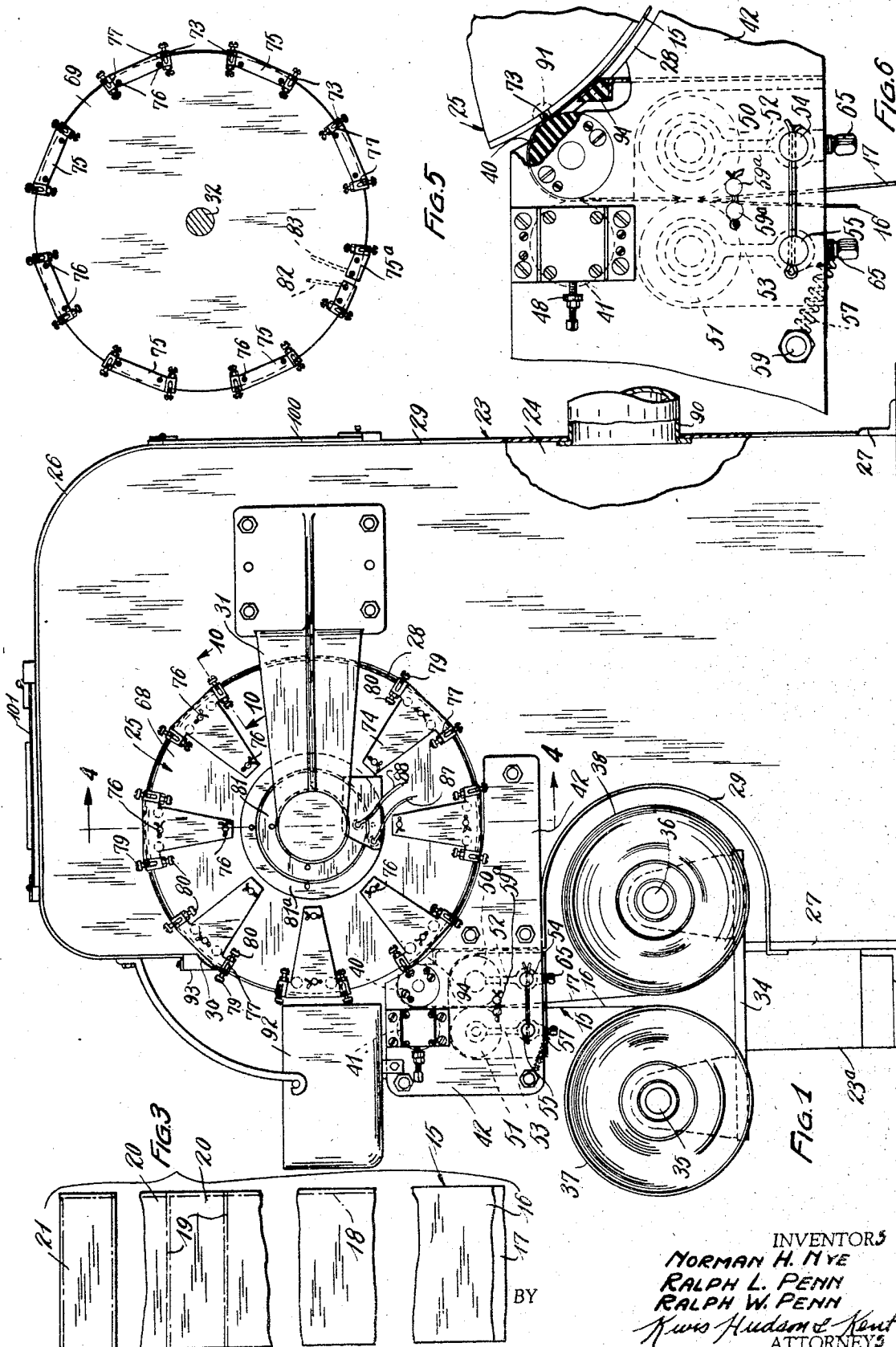
N. H. NYE ET AL

2,229,121

METHOD AND APPARATUS FOR OPERATING ON SHEET MATERIAL

Filed April 27, 1938

3 Sheets-Sheet 1



INVENTORS
NORMAN H. NYE
RALPH L. PENN
RALPH W. PENN
BY *Kewis Hudson & Kent*
ATTORNEYS

Jan. 21, 1941.

N. H. NYE ET AL

2,229,121

METHOD AND APPARATUS FOR OPERATING ON SHEET MATERIAL

Filed April 27, 1938

3 Sheets-Sheet 2

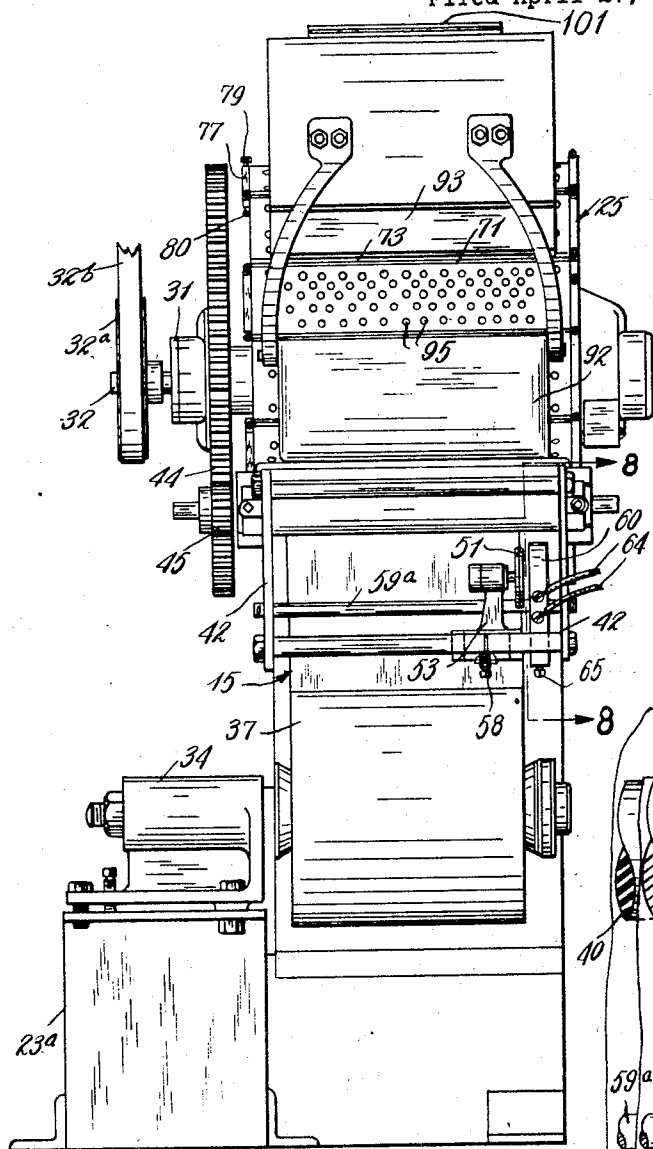


FIG. 2

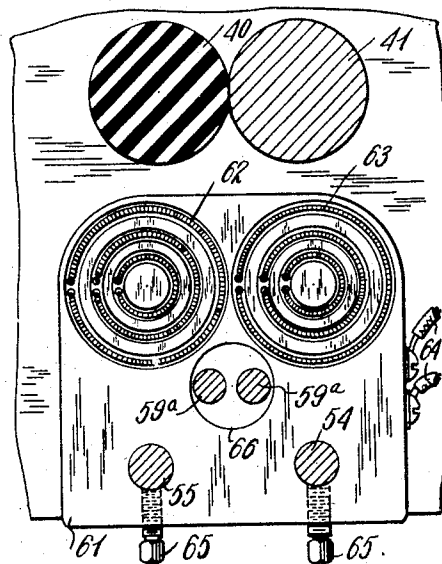


FIG. 8

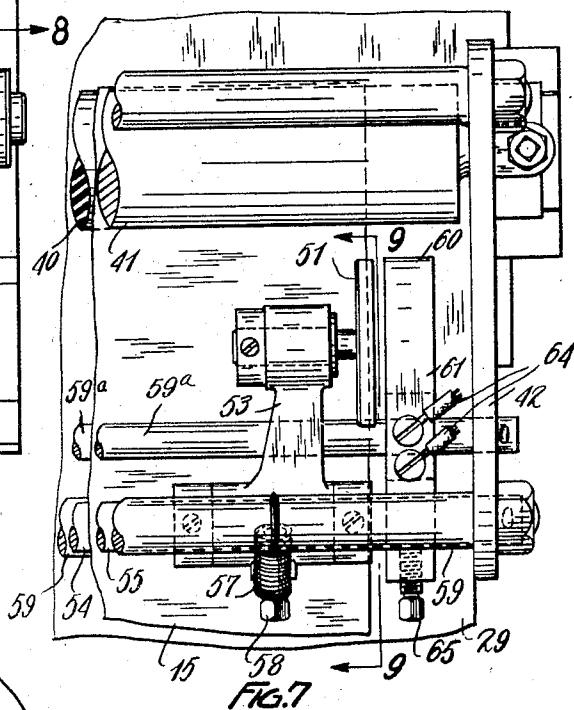


FIG. 7

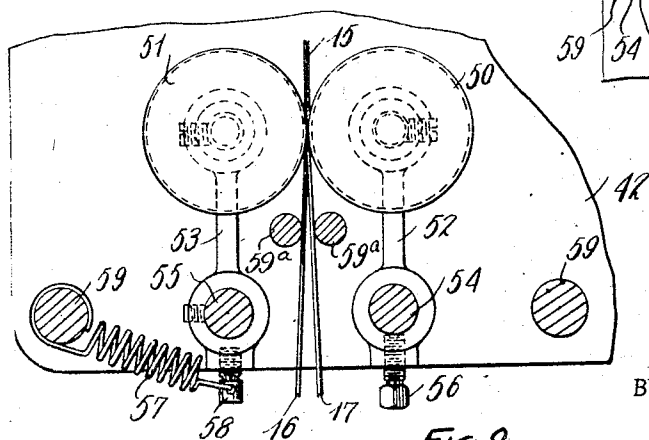


FIG. 9

INVENTORS
NORMAN H. NYE
RALPH L. PENN
RALPH W. PENN
Kwis Hudson & Kent
ATTORNEYS

BY

Jan. 21, 1941.

N. H. NYE ET AL

2,229,121

METHOD AND APPARATUS FOR OPERATING ON SHEET MATERIAL

Filed April 27, 1938

3 Sheets-Sheet 3

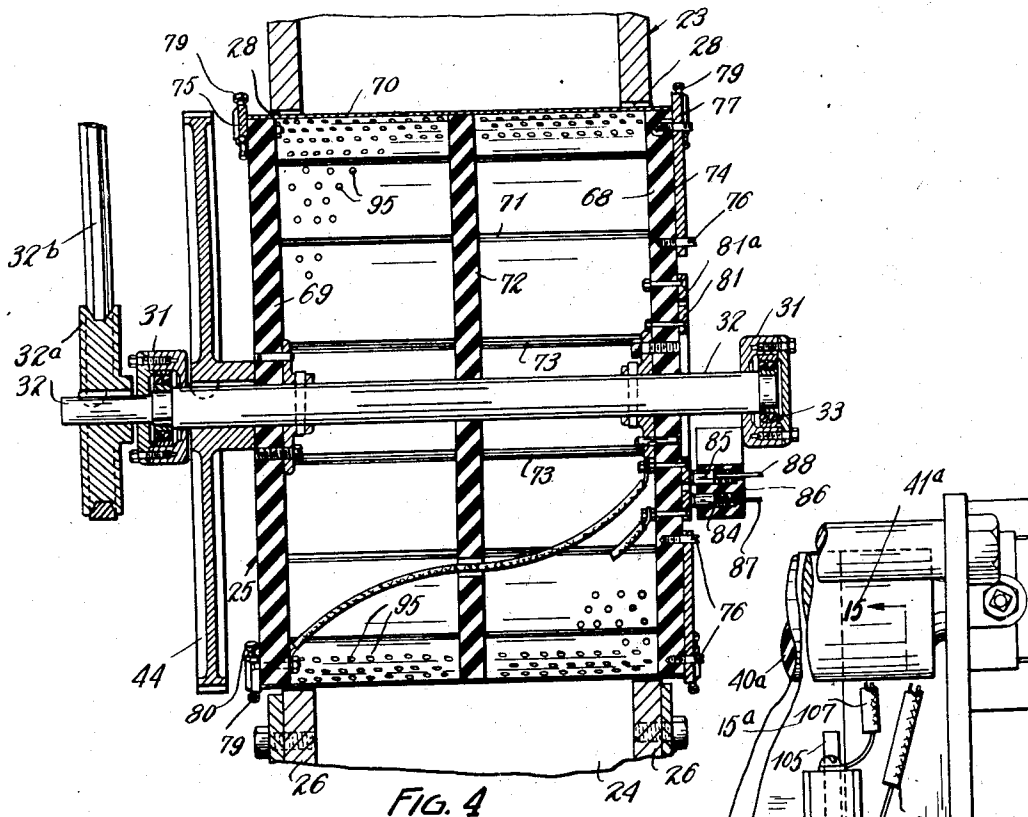


FIG. 4

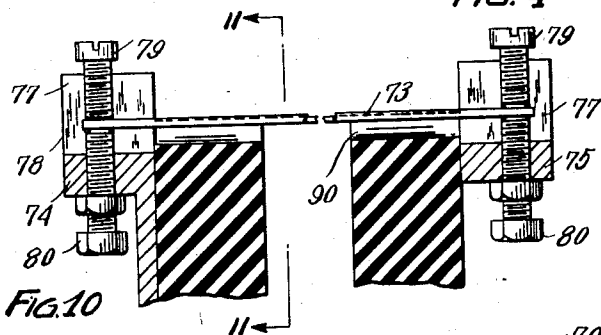


FIG. 10

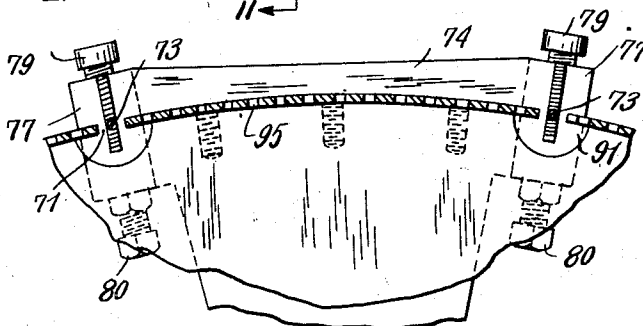


FIG. 11



FIG. 12

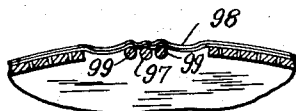


FIG. 13

BY

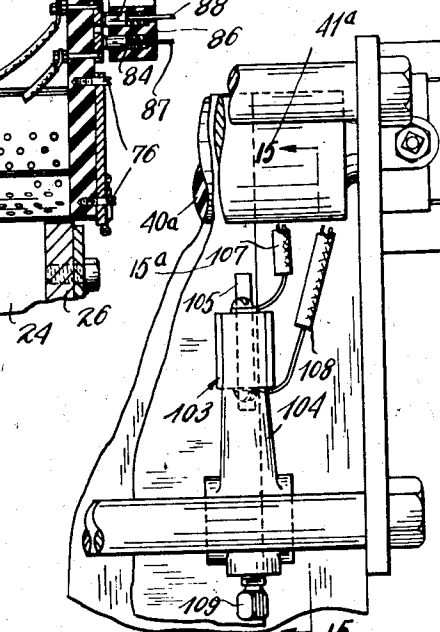


FIG. 14

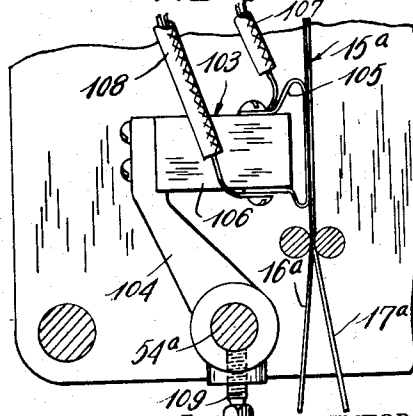


FIG. 15

INVENTORS
NORMAN H. NYE
RALPH L. PENN
RALPH W. PENN
Kwis Hudson & Nye
ATTORNEYS

UNITED STATES PATENT OFFICE

2,229,121

METHOD AND APPARATUS FOR OPERATING
ON SHEET MATERIAL

Norman H. Nye and Ralph L. Penn, Cuyahoga
Falls, and Ralph W. Penn, Akron, Ohio, assign-
ors of one-fourth to Edwin J. McIlvried, Stow,
Ohio

Application April 27, 1938, Serial No. 204,623

14 Claims. (Cl. 93—19)

This invention relates to a method and appa-
ratus for operating on sheet material for the pro-
duction of bags or envelopes and other articles of
this character. Our method and apparatus are
especially suitable for carrying out operations on
thin thermoplastic or heat-sensitive sheet ma-
terial, that is, sheet material which is subject to
softening and severance by the application of heat
and pressure thereto, such as cellulose sheeting
or the rubber sheeting known commercially as
"Pliofilm." The mention of specific forms of such
sheet material is only by way of example how-
ever, and it should be understood that our method
and apparatus are capable of successful operation
on various other kinds of sheet material.

An object of our invention is to provide an im-
proved method for the rapid and economical pro-
duction of bags or the like, in which heat and
pressure are applied along one edge of a strip of
superimposed layers of sheet material to unite
such layers therealong, and in which heat and
pressure are then applied to the strip along longi-
tudinally spaced transverse lines for severing the
strip into sections and at the same time sealing
the adjacent severed edges to form bags.

Another object of our invention is to provide an
improved method for operating on sheet material,
in which the material passes over a rotatable
member having heating elements and in which a
fluid pressure differential between opposite sides
of the material acts to press the same against the
heating elements.

Still another object of our invention is to pro-
vide an improved method of the character just
mentioned, in which the fluid pressure differential
produces a resultant force tending to press the
sheet material against the heating elements dur-
ing a portion of the travel of the rotary member
and, during another portion of the travel of the
rotary member, produces a resultant force tend-
ing to dislodge the material therefrom.

A further object of our invention is to provide
an improvement in the production of bags, or the
like, in which a strip comprising superimposed
layers of sheet material is subjected to heat and
pressure along an edge thereof to unite the layers
herealong and is then passed over a rotary mem-
ber having spaced heating and severing elements
adapted to sever the strip into sections and to seal
the adjacent severed edges to form bags, and in
which a fluid pressure differential acts during a
portion of the travel of the rotary member to press
the material against the heating and severing ele-
ments and acts during another portion of the

travel of the rotary member to dislodge the bags
therefrom.

Another object of our invention is to provide
improved apparatus with which our method of
operating on sheet material can be rapidly and
economically carried out.

Still another object of our invention is to pro-
vide improved means for applying heat and pres-
sure to sheet material being advanced.

Yet another object of our invention is to pro-
vide improved apparatus, of this character, em-
bodying a rotary member having spaced elements
thereon to be engaged by sheet material overlying
such member and in which means is provided for
creating a fluid pressure differential on opposite
sides of the material for pressing the same against
said elements.

It is also an object of our invention to provide
improved apparatus, of the type referred to, in
which means is provided for electrically heating
the elements of the rotary member.

Other objects and advantages of our invention
will be apparent from the following description
when taken in conjunction with the accompany-
ing sheets of drawings in which,

Fig. 1 is a side elevation of a machine con-
structed according to our invention and which
may be used in carrying out our method;

Fig. 2 is a front elevation of the machine;

Fig. 3 is a plan view, somewhat diagrammatic in
form, illustrating the progressive treatment of the
sheet material being acted upon;

Fig. 4 is a partial vertical sectional view taken
through the machine as indicated by line 4—4 of
Fig. 1, and illustrating the construction of the
rotary drum;

Fig. 5 is a detached end view of the drum;

Fig. 6 is a side elevation showing a portion of the
apparatus of Fig. 1 on a larger scale;

Fig. 7 is a front elevation showing a portion of
the machine on a larger scale than in Fig. 2;

Fig. 8 is a partial vertical sectional view taken
as indicated by line 8—8 of Fig. 2;

Fig. 9 is a partial vertical sectional view taken
as indicated by line 9—9 of Fig. 7;

Fig. 10 is a partial longitudinal sectional view
taken through the drum as indicated by line
10—10 of Fig. 1 and illustrating constructional
details thereof;

Fig. 11 is a partial transverse sectional view
taken through the drum as indicated by line 11—11
of Fig. 10;

Fig. 12 is a partial transverse sectional view
taken through another drum and illustrating a
modified construction.

Fig. 13 is a partial transverse sectional view similar to that of Fig. 11, but illustrating another modified construction.

Fig. 14 is a partial front elevation similar to that of Fig. 7 but showing a modified arrangement; and

Fig. 15 is a partial vertical sectional view taken on line 15-15 of the modified arrangement of Fig. 14.

More detailed reference will now be made to the accompanying drawings in which we have illustrated our improved method and apparatus for operating on sheet material, but before proceeding with the detailed description it should be understood that although the machine illustrated in the drawings represents what we now regard to be the preferred form of our apparatus, the invention may be embodied in various other machines and our method may be carried out in various other ways and on various other kinds of apparatus than herein specifically described.

Our method and apparatus for operating on sheet material is well suited to the production of bags from the thin thermoplastic sheet material commercially known as "Pliofilm," and, therefore, are hereinafter described in connection with this material and the production of bags therefrom. It should be understood, however, that the specific reference to this material and to the particular articles mentioned, is made without intent to limit the invention because our method and apparatus are capable of operation on other materials and are adaptable to the production of various other articles.

In general, our method contemplates the advancing or feeding of the sheet material, preferably in the form of a strip 15 comprising overlying or superimposed layers 16 and 17. Heat and pressure are applied to the strip along a longitudinal line thereof as it is being advanced to thereby render the material soft and tacky and unite the layers 16 and 17 along such line. The line along which the heat and pressure are applied is preferably, though not necessarily, adjacent an edge of the strip such as the line 18 indicated in Fig. 3. The strip then passes over a rotatable member or drum in overlying relation to heating and severing elements and is pressed against such elements to cause heating and softening of the material along lines or areas 19 extending transversely of the strip as shown in Fig. 3 and which areas are spaced longitudinally of the strip a distance corresponding with the circumferential spacing of the elements. The pressure of the material against the elements, combined with the softening or fusing of the material caused by the heating thereof, results in a severing of the strip transversely along each of the areas or lines 19 to thereby cut the strip into a plurality of similar sections 20. During the severing of the strip into the sections 20, the pressure applied to the heat-softened material causes the adjacent severed edges of the sections to be fused together to thereby seal the layers of the sheet material along the longitudinal edges of the sections to form the bags or envelopes 21. As will be readily seen from Fig. 3 the bags or envelopes thus formed have the overlying sheets or walls thereof sealed together along the two side edges and one end thereof, but are unconnected at the other end to permit material to be inserted into the bag or envelope.

In Figs. 1 and 2 we show a machine for carrying out our method and which operates very satisfactorily. As shown in the drawings, this machine may comprise an upright frame 23 and a rotatable

member or drum 25 operably mounted thereon and to which the strip material 15 is supplied. The frame 23 may be of hollow construction to provide a chamber 24 adapted to contain fluid pressure and into which at least a portion of the drum extends. This frame may comprise a pair of upright plates 26 spaced laterally to provide the space or chamber 24 therebetween and having aligned openings 28 in which end portions of the drum 25 operate. Sheet material 29 conforming to the outline of the frame members 26 is connected to the edges thereof to provide a connection between these members and to enclose the space therebetween to complete the chamber 24.

As shown in Figs. 1 and 4, the openings 28 preferably extend across the front edges of the frame members 26 so that a segment of the drum 25 will project from the chamber 24. At this point the sheet material 29 is omitted to define a laterally extending opening 30 which leads into the chamber and through which successive portions of the drum surface are exposed to atmosphere as the drum is rotated. The drum may be mounted on the frame in any suitable manner, such as by providing a pair of brackets 31 on the frame members 26 and in which the shaft 32 of the drum is supported by the bearings 33. The drum is constructed of a length to accommodate a strip 15 of the desired maximum width and such that its ends project through and substantially close the openings 28 of the frame members 26. Driving means of any suitable form may be provided for the drum such as the pulley 32^a on the shaft 32 and a belt 32^b connecting the same with an electric motor or other power device.

At a point adjacent the drum 25 the frame 23 is provided with suitable means for supporting a stock of the "Pliofilm" or other sheet material which is to be supplied to the drum. This stock supporting means may comprise a lateral frame projection 23^a and a bracket-like member 34 mounted thereon and having a pair of laterally extending substantially parallel spindles 35 and 36 upon which rolls 37 and 38 of the sheet material are supported respectively for unwinding of the layers 16 and 17.

The strip 15 may be drawn from the rolls 37 and 38 by a pair of cooperating feed rolls 40 and 41 between which the strip passes. The roll 40 may be suitably mounted in a pair of brackets 42 which are carried by the frame members 26 and rotates about an axis substantially parallel with the axis of rotation of the drum 25. This roll transfers or lays the strip 15 onto the drum and is preferably located adjacent the lower edge of the opening 30 so that the maximum amount of wrap for the strip can be had. The roll 40 may be driven by any suitable means for advancing the strip 15 at the desired rate and is preferably driven at a speed proportional to the speed of rotation of the drum 25. As shown in Fig. 2, this roll may be driven from the drum shaft 32 as by means of gears 44 and 45 which are connected, respectively with the drum shaft and roll.

The feed roll 41 cooperates with the driven roll 40 for pressing the strip 15 thereagainst. The roll 41 is mounted on the brackets 42 in a manner to provide for adjustable movement toward and from the roll 40 and may be retained at the adjustment which provides the desired pressure on the strip.

The heat and pressure applied to the strip 15 for connecting the layers 16 and 17 along the longitudinal line 18 may be applied at a point between the rolls of stock and the feed rolls 40 and 41. For this purpose we provide a pair of

cooperating disk-like rolls 50 and 51 between which the strip 15 passes. The rolls 50 and 51 are mounted respectively in brackets 52 and 53 which are adjustable laterally of the machine, that is, transversely of the strip, preferably by being slidably mounted on a pair of bars 54 and 55 carried by the brackets 42. The lateral adjustment thus provided for the brackets 52 and 53 permits shifting of the rolls 50 and 51 to the desired point of operation on the strip 15. In this instance the rolls 50 and 51 are arranged to act on the strip 15 adjacent one end thereof as shown in Figs. 2 and 7.

The bracket 52 may be held against swinging on its bar 54 by the clamping action of a set screw 56 so that the roll 50 may act as an anvil or backing roll against which the strip 15 is pressed by the roll 51. The bracket 53 is preferably arranged to swing on the bar 55 so that the roll 51 may be swung toward or away from the backing roll 50. The bracket 53 may be normally biased to press the roll 51 against the roll 50 as by means of a tension spring 57 having one end thereof connected to a stud or extension 58 and its other end anchored on the transversely extending tie rod 59.

Ahead of the rolls 50 and 51, and at a point adjacent thereto, we may provide strip-guiding means such as a pair of laterally extending stationary bars 59^a mounted in the brackets 42 and between which the strip passes. These bars serve to guide the strip and also assist in maintaining the strip in a smooth and flat condition.

The rolls 50 and 51 apply both heat and pressure to the strip 15 for the purpose explained above, and as a source of heat for these rolls we provide an electric heating device 60 which may be mounted on the bars 54 and 55 in adjacently spaced relation to the rolls. This heating device 60 may comprise a body 61, formed of insulating material, and having electric heating units 62 and 63 mounted thereon. These heating units may correspond generally as to size and shape with the rolls 50 and 51 and are mounted on the insulating body 61 so as to be disposed substantially opposite, and in adjacent relation to, the respective rolls. Electric current for heating the units 62 and 63 may be supplied thereto by the conductors 64.

The cooperating rolls 50 and 51 are preferably formed of material having good heat-conducting characteristics, such as copper or brass, and by forming these rolls with large disk-like faces, it will be seen that they can be readily heated by radiant heat from the units 62 and 63. In this way the desired heating of the rolls 50 and 51 can be obtained without encountering the difficulty of establishing electrical connections for rotatable members. As shown in Fig. 8, the insulating body 61 is slidable along the bars 54 and 55 so that the heating device 60 will be adjustable therealong as well as the roll-carrying brackets 52 and 53. By adjusting the device 60 relative to the brackets the desired heating effect of the units 62 and 63 on the rolls 50 and 51 may be obtained and the heating device can then be clamped in the desired position of adjustment by the set screws 65.

The insulating body 61 of the heating device 60 may have a clearance opening 66 therein through which the guide bars 59^a extend.

Reverting now to the drum 25 to which the strip 15 passes from the feed roll 40, it will be seen from Fig. 1 that when this drum is rotated in a counterclockwise direction the strip will ex-

tend around the outer surface of the drum and the sections or bags 21, which are severed from the strip, will be carried by the drum to the opening 30 and discharged therethrough. The drum may be of any construction suitable for the accomplishment of the desired purpose, such as the construction which we have illustrated in the drawings. As shown in Fig. 4, the drum may comprise axially spaced end plates or heads 68 and 69 which are formed of suitable electrically insulating material such as "Transite" and which may be pinned or otherwise secured to the shaft 32. A cylindrical facing 70, formed of insulating sheet material and having circumferentially spaced axially extending slots 71 therein, is secured to the heads 68 and 69. The facing 70 may be formed as a continuous sheet of such material wrapped around the heads and having the slots 71 formed therein, or, if desired, it may be formed by mounting arcuate sections of the insulating sheet material on the heads with the edges of the adjacent sections spaced apart to form the slots 71. For reinforcing the drum and providing additional support for the facing 70, we may mount an intermediate head 72 on the shaft 32 at a point substantially midway between the heads 68 and 69.

The slots 71 of the drum facing 70 are located thereon at distances spaced to correspond with the width desired for the bags 21 to be formed and heating and severing elements 73 disposed in or adjacent these slots act on the strip 15 during the rotation of the drum to soften the sheet material and sever the same transversely along the lines or areas 13. These heating elements may be of any appropriate form, for example, they may be wires or bars which are heated by the passage of electric current therethrough. For mounting these wires on the drum we may provide a circumferential series of plates 74 on the head 68 and another circumferential series of plates 75 on the opposite head 69, the plates of the latter series being in offset or staggered relation to the plates of the head 68. The plates 74 and 75 may be secured to the respective heads 68 and 69 of the drum by means of suitable studs or screws 76. Each of the plates 74 and 75 carries a pair of clamping devices 77 which are spaced apart the same arcuate distance as the slots 71 of the drum face. The plates 74 and 75 are mounted on the drum heads 68 and 69 with the clamping device 77 in axial alignment with the slots 71 so that the ends of the heating elements 73 may be gripped and held by these devices.

As shown in Figs. 10 and 11, each of the clamping devices 77 may comprise a slotted part 78 which may be an integral extension of the plate 74 (or plate 75) and a pair of aligned screws 79 and 80 extending into the slot with their ends in opposed relation. The ends of the heating element 73 extend into the slots of extension parts 77 and are gripped by the opposed ends of the screws 79 and 80. The radial position of the elements 73 with respect to the drum surface can be varied or adjusted by adjustment of the cooperating screws 79 and 80. It will also be seen that when replacement of the heating elements 73 is necessary or desirable, the old elements can be easily removed by loosening the screws 79 and 80 and new elements can be quickly substituted and clamped in place by tightening of these screws.

The plates 74 at one end of the drum 25 can all be of similar or identical construction. The plates 75 at the other end of the drum can also be

of similar construction, but one of the latter plates, such as the plate 75^a, is formed of spaced sections so that a desired electrical circuit can be maintained through the heating elements 73. It will be seen from the staggered arrangement of the plates 75 with respect to the plates 74, that each of the elements 73 has one end thereof connected with one of the plates 75 and its opposite end connected with one of the plates 74. By reason of this arrangement the elements 73 are electrically connected in series with each other and the two sections of the plate 75^a form the terminals of this series circuit.

For establishing electrical connection with the elements 73, we may provide one of the drum heads, for example, the head 68, with a pair of collector rings 81 and 81^a which are connected respectively with the sections of the plate 75^a by means of the conductors 82 and 83. Electric contact may be made with the collector rings 81 and 81^a during rotation of the drum 25 by means of suitable brushes 84 and 85 which are carried by a brush holder 86 and bear against these rings. A pair of conductors 87 and 88 leading from a suitable source of current are connected with the brushes 84 and 85.

For pressing the strip 15 against the face of the drum 25 and against the heating elements 73, we create a fluid pressure differential between opposite sides of the strip. This pressure differential is obtained by creating a pressure in the chamber 24 of the frame 23 such as by forcing air into this chamber through the conduit 90. The air pressure in the chamber 24 presses the strip against the drum surface so that when the drum is driven by the pulley 32^a it will carry the strip along with it and thus advance the material toward the opening 30. The air pressure in this chamber also presses the strip against the heating elements 73, and upon softening of the thermoplastic material, the pressure on the strip causes the same to be severed by the elements. The severing of the strip at these points permits the severed edges of the sections 20 to be deflected towards the inside of the drum by a flow of air from the chamber 24 into the drum through the slots 71. Interference between these inwardly deflected edges and the drum structure may be prevented by providing the drum heads 68, 69 and 72 with clearance recesses 91 adjacent the heating elements 73. This flow of air through the slots serves to cool and harden the severed edges of the material and, in addition, it will be seen that the inwardly deflected edges will assist in holding the newly formed bags in place on the drum until they arrive at the opening 30.

The flow of air into the drum from the chamber 24 creates a pressure in the drum which may be lower than the pressure in the chamber but which is higher than the outside or atmospheric pressure. The air pressure in the drum, being higher than atmospheric pressure, creates a pressure differential on opposite sides of the portion of the drum which is exposed through the opening 30. This pressure differential causes the bags 20 to be dislodged from the drum surface in succession as they become exposed at this opening. The bags delivered at the opening 30 may be collected by any suitable means such as by providing a container 92 at this point to catch the bags as they are discharged from the drum.

To avoid sparking or short-circuiting at the heating element 73, we may construct the feed roll 40 of suitable insulating material and may also provide laterally extending insulating strips

93 and 94 on the frame 23 at the upper and lower edges of the opening 30.

In addition to the slots 71 of the drum facing 70 we may also provide relatively numerous perforations 95 in the drum facing to enable the pressure in the chamber 24 to more firmly press the strip 15 against the drum surface. In some conditions of operation these perforations may not be needed and can be omitted.

Instead of forming the heating elements 73 of the drum as individual round wires we may employ other specific forms of heating elements such as bars 96 of substantially triangular cross-section, as shown in Fig. 12, or we may employ heating elements consisting of a group of wires as 15 shown in Fig. 13. When the heating element consists of a group of wires, as shown in this instance, the center wire 97 is heated to a temperature high enough to sever the sheet material 98, and the wires 99 may be heated to a temperature only high enough to soften or fuse the sheet material.

In constructing the frame 23 of the machine it may be desirable to provide for ready access to the chamber 24 and to the drum 25 and for this purpose we may provide hinged or removable doors 100 and 101 in the rear and top walls of the chamber. One or both of these doors may be provided with windows for observing the operation of the drum during a production run.

Instead of using the above-mentioned pair of cooperating pressure and sealing members 50 and 51 for joining the layers 16 and 17 of the strip 15, we may provide sealing means of the form shown in Figs. 14 and 15. In this latter arrangement we provide a sealing and joining member 103 past which the strip 15^a, comprising overlying layers 16^a and 17^a, is pulled by the feed rolls 40^a and 41^a.

The sealing member 103 may comprise an arm 104 and a heating element in the form of a shoe 105 against which the strip 15^a is pressed by reason of the tension therein. The shoe 105 may be formed of resistance ribbon bent to the desired shape and mounted on an insulating block 106 which is carried by the arm 104. Electric conductors 107 and 108 may be connected with the shoe for supplying heating current thereto. The arm 104 may be mounted on the laterally extending bar 54^a so as to provide for both lateral and pivotal adjustment and may be clamped in the desired adjustment by means of the set screw 109.

From the foregoing description and accompanying drawings it will now be readily seen that we have provided an improved method and apparatus for rapidly and economically producing bags or envelopes and like articles from "Pliofilm" or other sheet material. It will also be seen that we have provided a novel method of operating on sheet material in which a pressure differential is utilized for pressing the material against elements of a rotary member and in which a pressure differential may also be used for dislodging the articles.

While we have illustrated and described the method and apparatus of our invention in a somewhat detailed manner it should be understood, however, that we do not wish to be limited to the precise steps of procedure and forms of apparatus herein disclosed, but regard our invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claims.

Having thus described our invention, we claim:

1. In a method of operating on thin thermo-

plastic sheet material on the order of Pliofilm, the steps of bringing successive portions of superimposed strips of such material and a machine element into contact with each other by traveling movement, and creating a fluid pressure differential between opposite sides of the material for pressing the material against the machine element.

2. In a method of operating on thin sheet material, the steps of bringing such material and a machine element into contact with each other, and creating a fluid pressure differential between opposite sides of the material first with a resultant force acting to press the material against said element and then with a resultant force acting to move the material away from the element.

3. In a method of making bags by severing thin thermoplastic sheet material or the like and sealing the severed edges, the steps of bringing superimposed layers of such material and a heating and severing element into contact with each other, and creating a fluid pressure differential between opposite sides of the material for pressing the material against the element.

4. In a continuous method of making bags from thin thermoplastic sheet material or the like comprising, leading superimposed layers of such material in strip form over a rotary member having spaced heating and severing elements thereon, and creating a fluid pressure differential between opposite sides of the material for pressing successive portions thereof against said elements as the strip is advanced.

5. In a continuous method of making bags from thin thermoplastic sheet material or the like comprising, leading superimposed layers of such material in strip form over a rotary member having spaced heating and severing elements thereon, and creating a pressure differential between opposite sides of the material first with a resultant force acting to press successive portions against said member and elements as the strip is advanced and then with a resultant force acting to dislodge severed sections of the strip from said rotary member.

6. In apparatus of the character described, the combination of a rotary member having spaced heating elements and adapted to be driven for advancing strip material in overlying relation to said heating elements, and means providing for the flow of air under pressure toward said member during one portion of its travel and away from said member during another portion of its travel whereby the material is pressed against said elements during said one portion of the travel of the rotary member and the severed sections are dislodged from the rotary member during said other portion of its travel.

7. In apparatus of the character described, the combination of a rotary member having spaced heating elements and adapted to be driven for advancing strip material in overlying relation to said heating elements, a housing at least partially surrounding said rotary member, and means for supplying air under pressure to said housing for pressing the material against said elements.

8. In apparatus of the character described the combination of a housing forming a pressure chamber having an opening therein, a hollow rotary member having peripheral openings and spaced heating and severing elements, said member being arranged to operate in said opening with strip material to be severed overlying said ele-

ments, and means for supplying air for pressing the material toward that portion of the rotary member which extends into the chamber and for dislodging severed sections from the portion which is exposed by the chamber opening.

9. In a machine for the continuous production of bags from thin thermoplastic sheet material or the like, a hollow frame providing a pressure chamber with an opening to atmosphere, a drum having circumferentially spaced openings and heating elements in or adjacent such openings, means mounting said drum for rotation in said chamber opening for advancing superimposed layers of such material in overlaying relation to said elements, and means for creating a super-atmospheric pressure in said chamber and drum for pressing the material against said elements and for dislodging the bags from the drum.

10. In apparatus for operating on thin sheet material, a rotary member, means for causing the sheet material and said rotary member to be brought adjacent each other, a plurality of heating elements spaced around the periphery of said rotary member for operating on the sheet material, and means mounting said elements on the rotary member and providing for adjustment of the elements as to their distance from a common rotation axis.

11. In apparatus of the character described, a rotatable drum having peripherally spaced elements for operating on thin sheet material, means for supporting a roll of such sheet material adjacent said drum, a hollow structure at least partially surrounding said drum, means for supplying fluid pressure to said hollow structure for pressing the sheet material against said drum and elements, and means for driving the drum to unwind the sheet material from said roll.

12. In apparatus of the character described, a rotatable drum having peripherally spaced elements for operating on thin sheet material, means for supporting a roll of such sheet material adjacent said drum, a hollow structure at least partially surrounding said drum, means for supplying fluid pressure to said hollow structure for pressing the sheet material against said drum and elements, means for driving the drum to unwind the sheet material from said roll, and means adapted to act on the sheet material at a point between said supporting means and drum comprising cooperating members for applying heat and pressure to the sheet material.

13. In apparatus for operating on sheet material, the combination of a rotary member having spaced elements adapted to be brought into contact with the sheet material and heated sufficiently to sever the same, means for heating said elements, and means for causing fluid pressure to act on the material for pressing the same against said elements.

14. In apparatus of the character described the combination of a rotary member having spaced heating elements and adapted to be driven for advancing strip material in overlying relation to said heating elements, means for driving said rotary member, means for electrically heating said elements sufficiently to sever said material, and means for causing fluid pressure to act on the material for pressing the same against said elements.

NORMAN H. NYE,
RALPH L. PENN.
RALPH W. PENN.