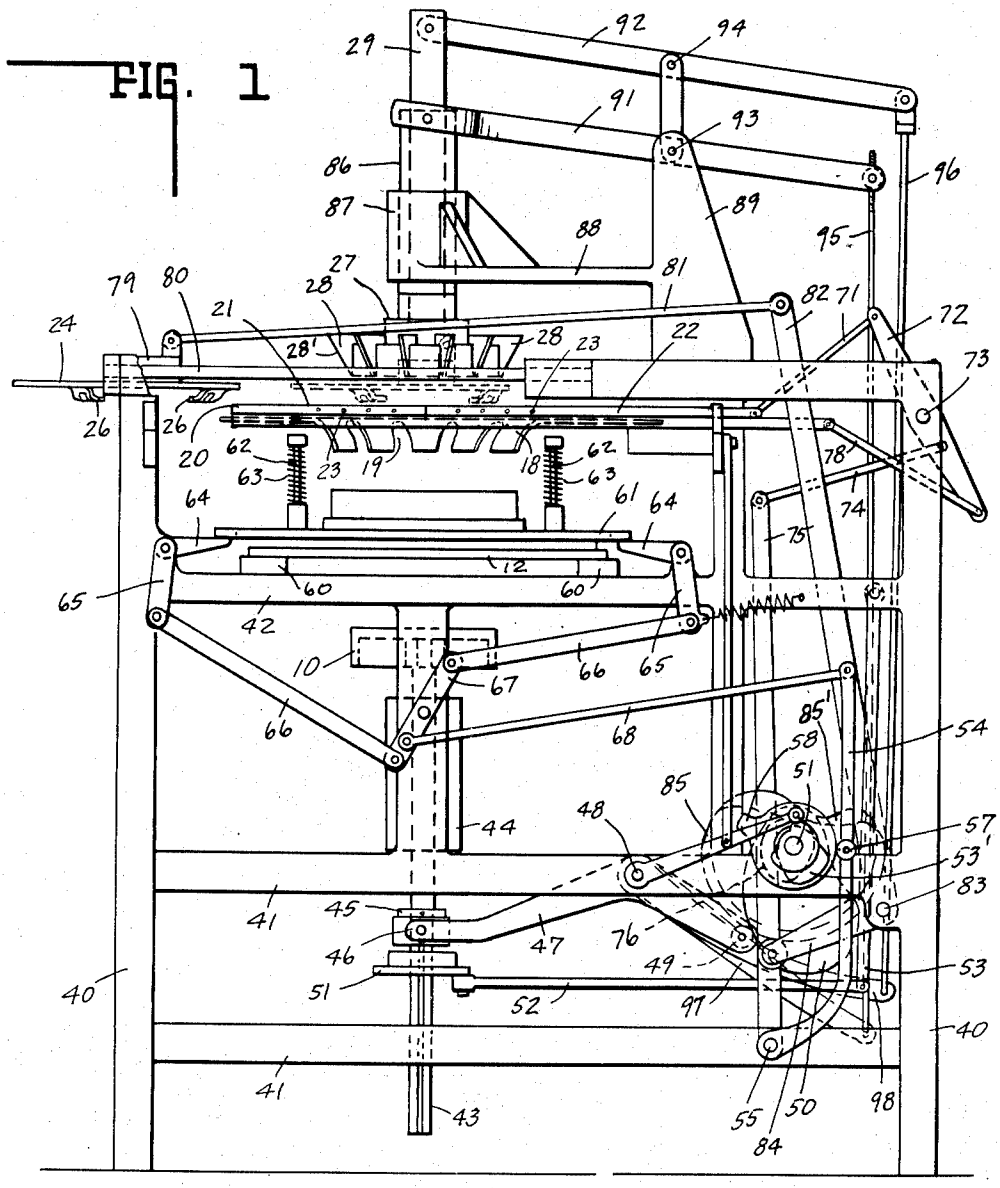
Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

Filed Dec. 26, 1950 7 Sheets-Sheet 1

FIG. 1



INVENTOR.
JOHN BUECHEK.

BY
Lockwood, Hahn, Galt & Woodard,
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

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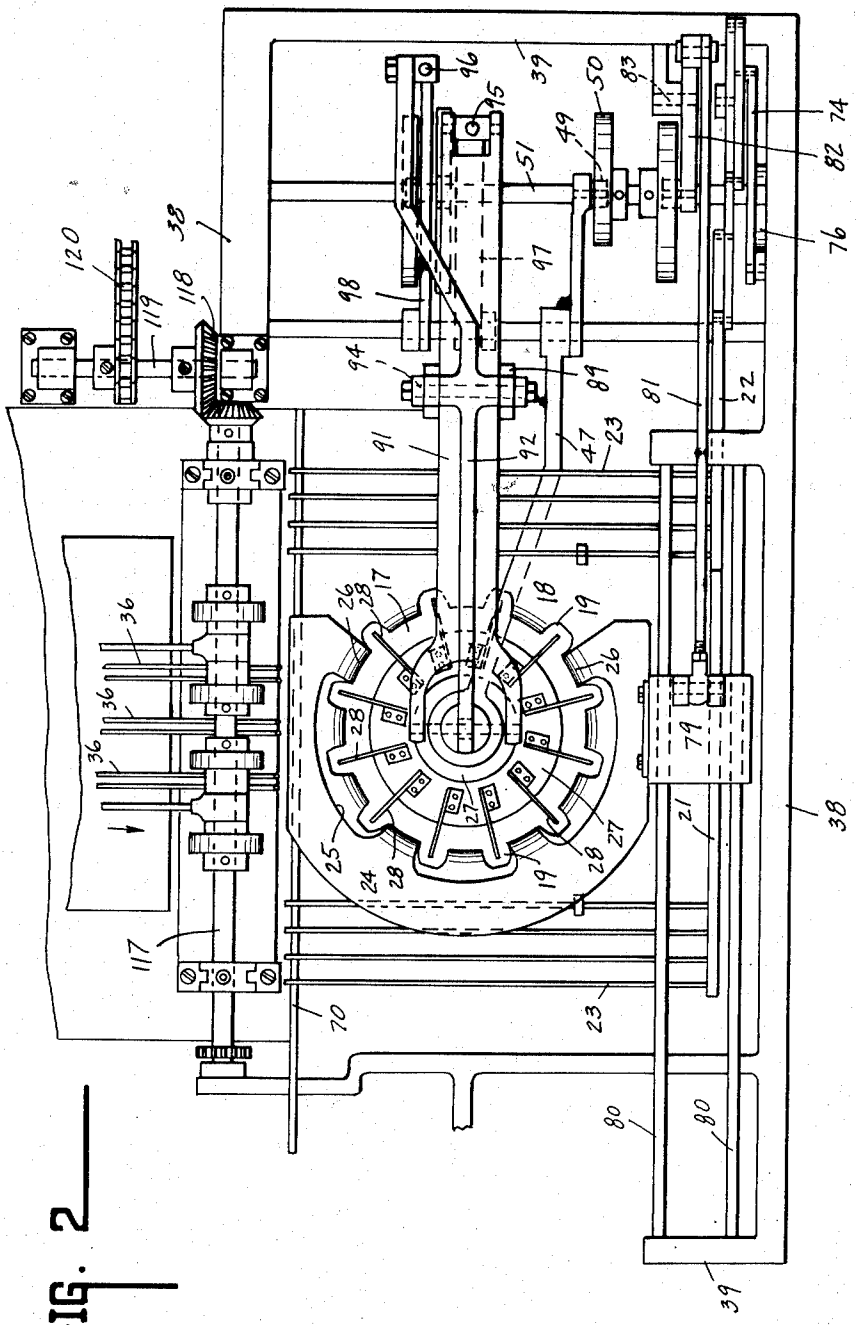


FIG. 2

INVENTOR.
JOHN BUECHEK.

BY
Lockwood, Dahn, Galt & Woodard,
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

Filed Dec. 26, 1950 7 Sheets-Sheet 3

FIG. 3

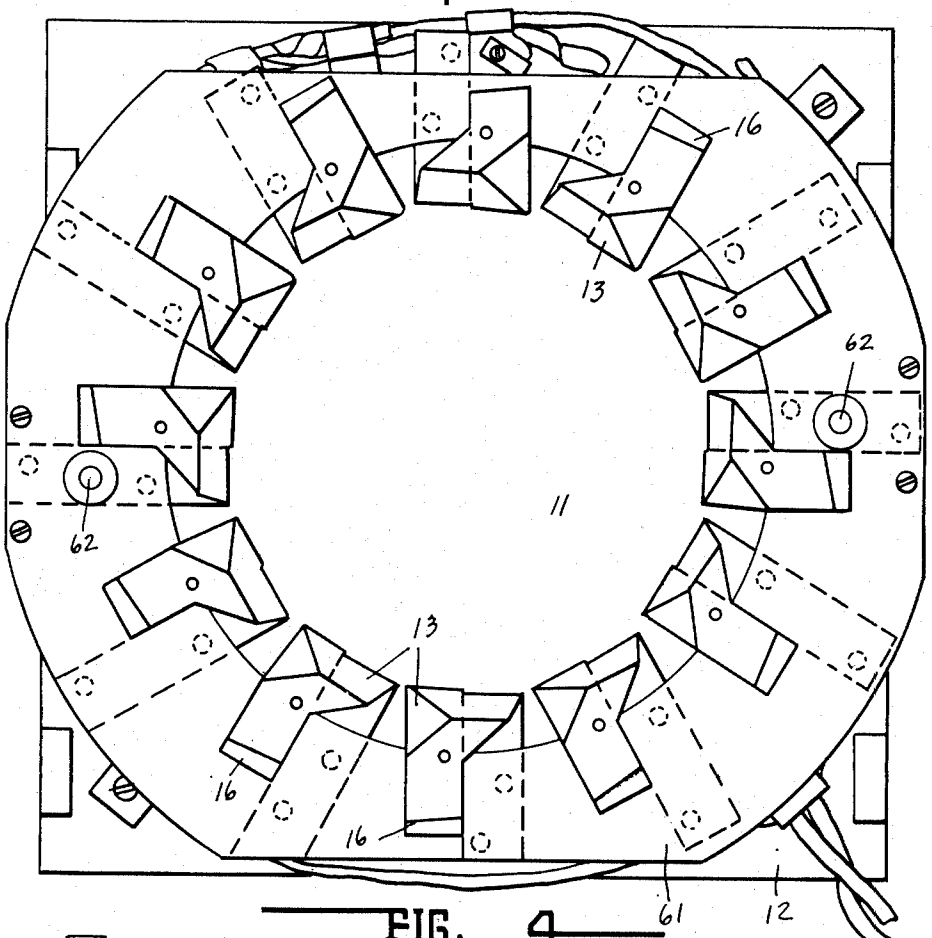
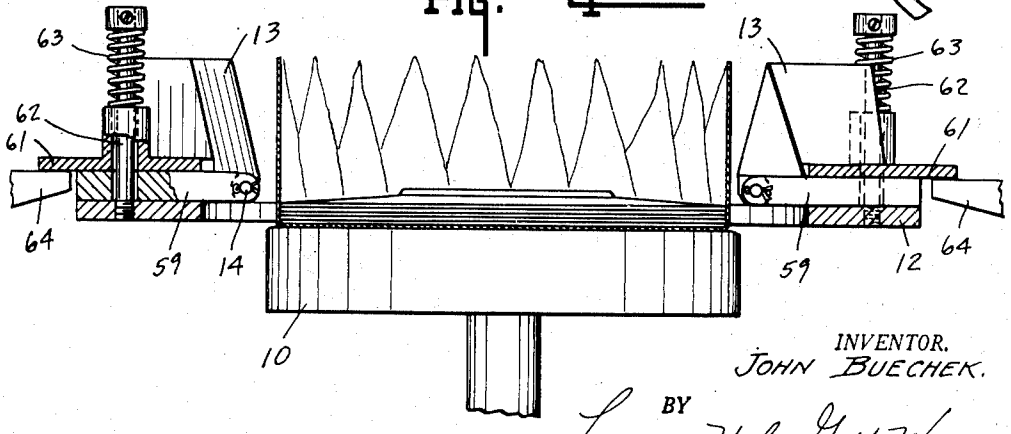


FIG. 4



INVENTOR.
JOHN BUECHEK.

BY
Lockwood, Hahn, Galt & Woodard,
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

Filed Dec. 26, 1950 7 Sheets-Sheet 4

FIG. 5

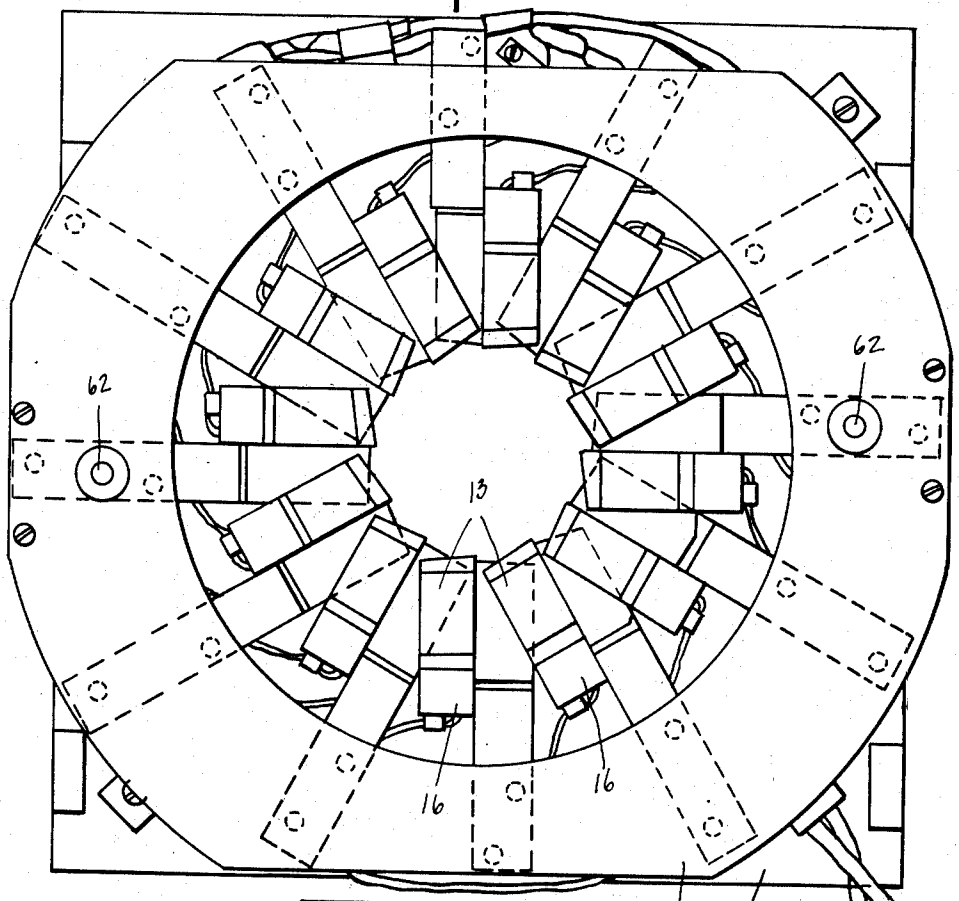
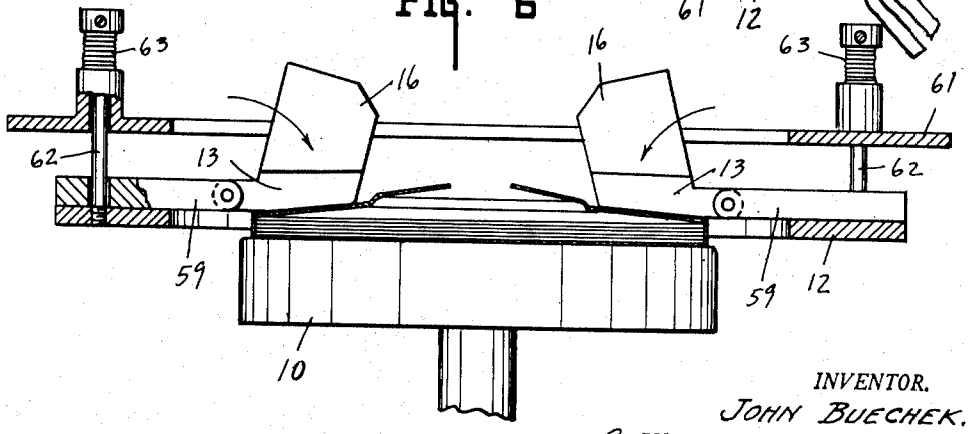


FIG. 6



INVENTOR.
JOHN BUECHEK.

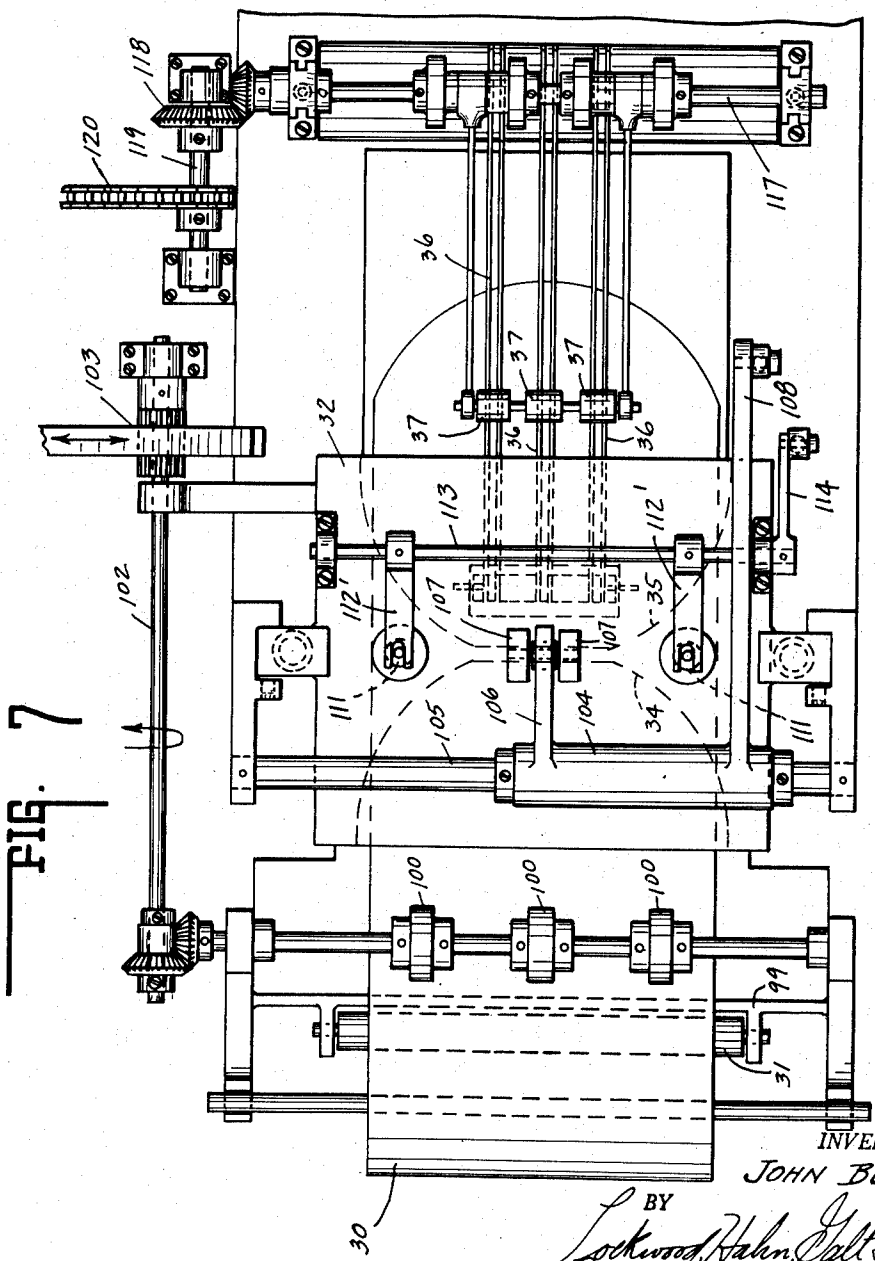
BY
Lockwood, Hahn, Galt & Woodard,
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

Filed Dec. 26, 1950 7 Sheets-Sheet 5

FIG. 7



INVENTOR.
JOHN BUECHEK.
BY
Lockwood, Dahn, Galt & Woodard.
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

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FIG. 8

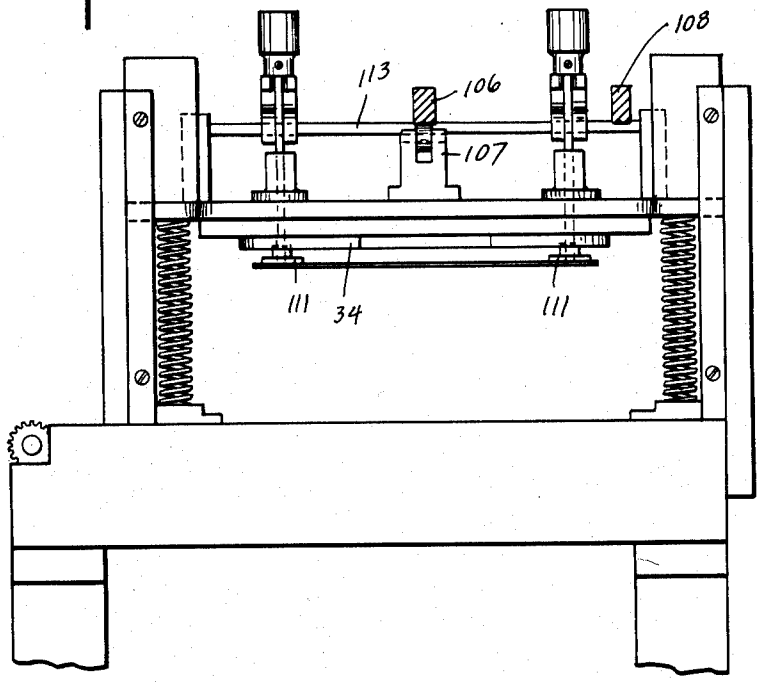


FIG. 10

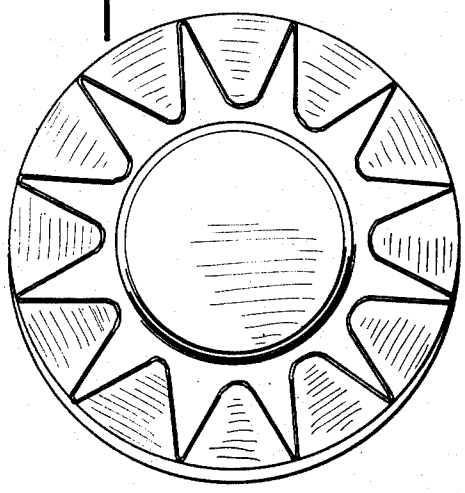
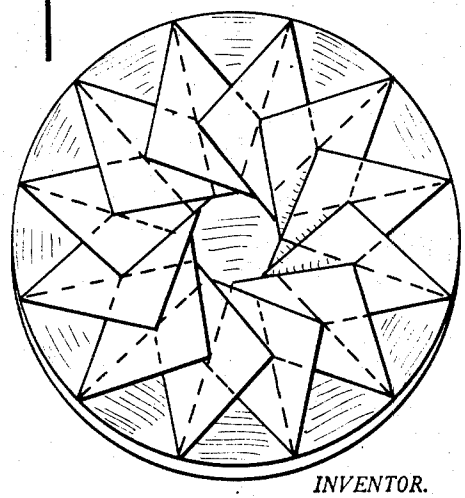


FIG. 11



INVENTOR.
JOHN BUECHEK.

BY
Lockwood, Hahn, Galt & Woodard
ATTORNEYS.

Oct. 27, 1953 J. BUECHEK 2,656,659

BULK PAPER PLATE WRAPPING MACHINE

Filed Dec. 26, 1950 7 Sheets-Sheet 7

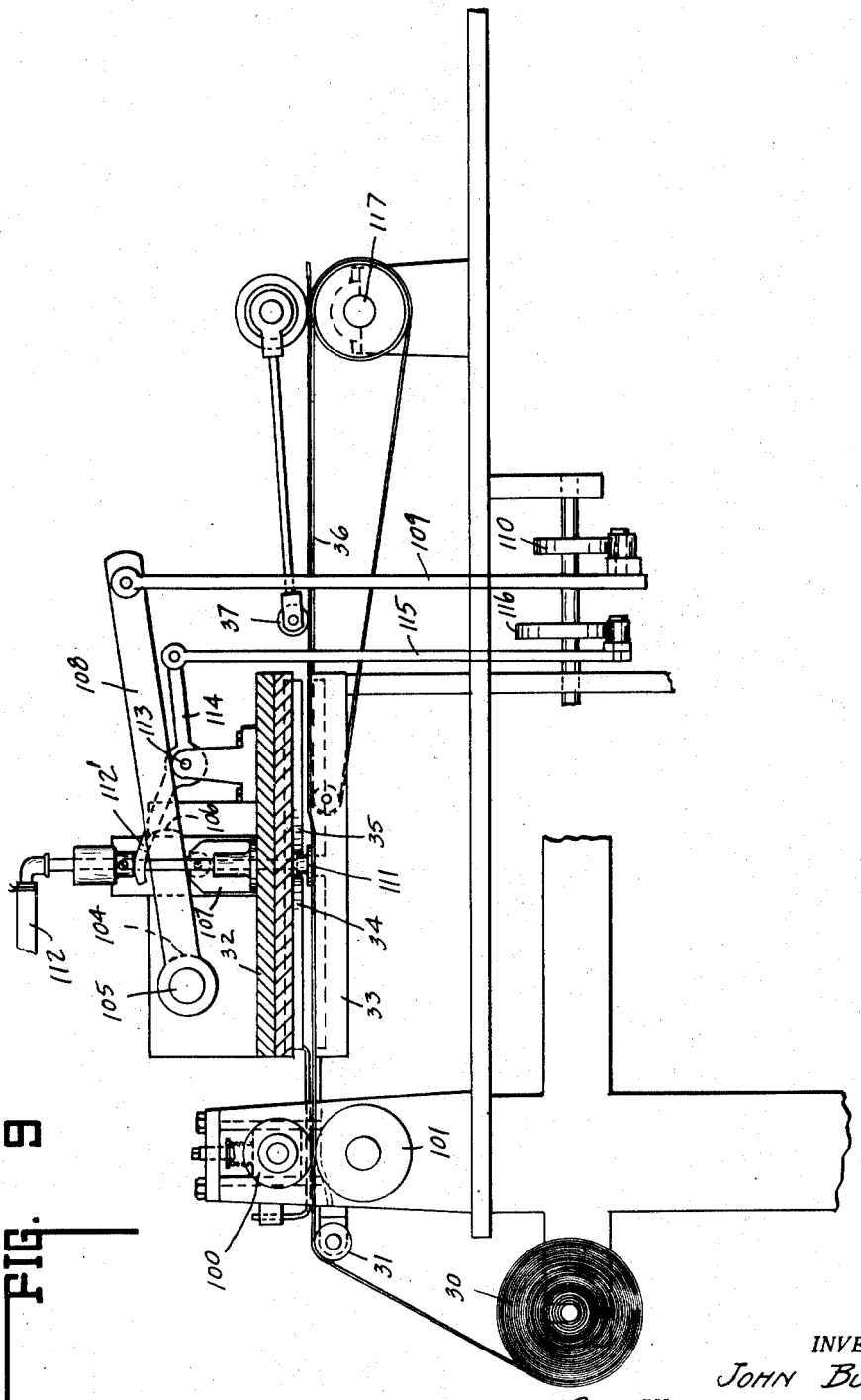


FIG. 9

INVENTOR.
JOHN BUECHEK.
BY
Lockwood, Hahn, Galt & Woodard,
ATTORNEYS.

Patented Oct. 27, 1953

2,656,659

UNITED STATES PATENT OFFICE

2,656,659

BULK PAPER PLATE WRAPPING MACHINE

John Buechek, Indianapolis, Ind., assignor to Paper Art Company, Inc., Indianapolis, Ind., a corporation

Application December 26, 1950, Serial No. 202,790

7 Claims. (Cl. 53—122)

1

The present invention relates to improvement in packaging machines and has for one of its objects that of wrapping an article or an assemblage of articles, folding the wrapping about the article and sealing the same.

Another object of the invention is to provide a fully automatic machine which will receive the article to be wrapped or packaged, position the same in a wrapping position, receive from a roll of wrapping material and form a wrapping sheet from said roll and deliver the same in a position to receive the articles to be wrapped.

Another object of the invention is to provide a packaging machine which will automatically fold up around the edges of the article to be packaged, the material of the wrapper, form the same into pleats and then fold the so formed pleats down upon the surface of the article to be packaged.

My invention is especially adapted for the packaging of relatively flat articles such, for instance, as paper plates or the like, and is particularly adapted to receive and package a stack of such plates automatically.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

For the purpose of disclosing the invention I have illustrated an embodiment thereof in the accompanying drawings in which Fig. 1 is an end elevation of a machine embodying my invention.

Fig. 2 is a plan view thereof.

Fig. 3 is a plan view of the folder.

Fig. 4 is a sectional view of the same, the above figures showing the folder in open position.

Fig. 5 is a plan view showing the folder in closed position.

Fig. 6 is a plan view showing the folder in closed position.

Fig. 7 is a plan view of the feeding and shaping means for the wrapping sheet.

Fig. 8 is an end elevation showing in detail certain structural features of the shaping means for the sheet.

Fig. 9 is a side elevation of the sheet paper feeding and shaping apparatus.

Fig. 10 is a perspective view of the article wrapped and the wrapper pleated ready for down fold.

Fig. 11 is a perspective view of the completely packaged article.

In the embodiment of the invention illustrated I provide a vertically reciprocable table 10 which in its vertical raising movement is adapted to pass through a center opening 11 in a top folder

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12 which folder consists of a plurality of radially disposed fingers 13 disposed around the periphery of the opening and pivoted as at 14 in the folder and movable from a retracted position shown in Fig. 4 wherein the opening is sufficiently large to permit the passage therethrough of the table 10 to a projected position shown in Figs. 5 and 6 wherein the folder fingers are moved in the position to press upon the top of the heretofore pleated wrapping material. Each of these fingers is provided with a top weight 16 which is so disposed as to maintain the fingers 13 in their retracted position when moved to that position and maintain the fingers in their projected or pressing position when moved in that position.

As the table ascends it passes through a center opening 17 in the pleating plate 18 which is provided with a plurality of radial slots or grooves 19. This pleating plate is stationarily mounted beneath a sheet support 20 which is formed in two sections 21 and 22, each section consisting of a plurality of transversely extending supporting ribs or rods 23. The sections are so arranged that when they are moved together they perform a supporting platform for the wrapping sheet but through suitable mechanism, hereinafter described, at the proper time interval are separated to permit the passage therebetween of the table 10 so that the wrapping sheet will be deposited thereon.

Above the sheet supporting frame is a transversely reciprocally mounted article support 24 having a central opening 25 provided with inwardly extending peripherally disposed fingers 26 which are more or less spring-like and on which the article or articles to be packaged are deposited while the holder is in its retracted position. When the holder is in its projected position the opening 25 is immediately above the opening in the pleater 18.

Above the pleater is reciprocably mounted a folder head 27 which is provided with a plurality of radially disposed fins 28 comparatively narrow in cross section and having upwardly and outwardly inclined faces 28'. These fins, there is one for each of the radial slots 19 in the pleater 18, are adapted to, as the head 27 descends, engage the material overlaying the slots 19 to assist in folding the pleat.

In addition to the reciprocal head 27 there is provided a reciprocal clamping head 29 which passes through the center of the head 27 and serves to clamp the plate slack and sheet upon the top of the table 10 when the table is raised to the uttermost limits of its vertical movement.

The material forming the wrapping sheet is preferably formed of a thermoplastic material taking the form of such commercial material as what is commercially known as cellophane and is delivered to the wrapping apparatus from a roll 30 suitably supported upon a roller 31 disposed at one side of the machine and in such a position that as the material is removed from the roll it will be deposited in the machine or the supporting racks 21 and 22.

The material is drawn from the roll by suitable feeding and shaping apparatus which consists essentially of an upper platen 32 cooperating with a bottom platen 33. The upper platen on its under face on the intake side is provided with an arcuate knife 34 having the top of the arc extending in the direction of travel of the material. Accordingly, as the material is fed from the roll 30 across the bottom platen when the knife 34 descends into cutting position the material will be severed from the roll and at the same time be given an arcuate end.

The other cutting knife 35 mounted on the upper platen has its arc in just the reverse direction so that the rear portion of the severed sheet will likewise be cut eventuating in a substantially circular sheet of wrapping material. After the severed sheet is completely shaped it is picked up by a series of bottom travelling belts 36 and a series of top rollers 37 and by these travelling belts deposited on the sheet support 20.

Bearing in mind that the parts operate in a timed sequence by apparatus to be more fully hereinafter described, after the wrapping sheet has been shaped or formed it is deposited by the travelling belts onto the sheet support 20 and immediately thereafter the article support 24 having had for the purpose of illustration, a stack of paper plates deposited thereon will move into a position immediately above the opening in the folder 18.

By the time the article holder has moved to depositing position the vertically movable table 10 will have been moved up through the opening in the platen 18 to position immediately beneath the wrapping sheet support. At this moment the two halves of the wrapping sheet support will be transversely separated and the clamping head 29 and fin head 27 will be descending forcing the supported article or plates out of the supporting fingers 26 and onto the top of the table 10.

The diameter of the table is about the same diameter as the head 27 and, accordingly, the fin 28 will project therebetween. The clamping head clamps the articles to be raised and the wrapping sheet upon the top of the table 10. The table 10 now commences its downward movement carrying with it the wrapping sheet and the article with the wrapped sheet clamped in the head through a clamping member 29 and also through the fin head 27.

As the parts continue to descend with the fins descending in unison with the table, that portion of the wrapping sheet which extends beyond the article to be packaged the diameter of the wrapping material being considerably greater than the diameter of the article to be wrapped will be folded upwardly around the edges of the article and at the same time due to the action of the fins 28 moving in the slots 19 will have its edges formed into pleats which extend vertically upwardly around the edge of the article.

As the table continues to descend the article and the pleated wrapping material passes

through the opening 11 in the folder 12 and, bearing in mind that the parts are operating in timed relation, the folder fingers 13 will be moved from their retracted position shown in Figs. 3 and 4 to their projected position, the position shown in Figs. 5 and 6. The fingers 13 rocking on their pivots will fold the pleated material down upon the surface of the article to be packaged. These fingers are heated through suitable electrical connections and while folding and pressing the material down upon the top of the article to be packaged, will apply sufficient heat to render the thermoplastic material soft enough to cause the heated pleats to adhere.

It should be mentioned that during the lowering movement of the table 10 and just before the pleats are completely withdrawn from the pleater slots 19 the table 10 is given a half-turn on its axis to fold the pleats over one upon the other.

Structurally the apparatus is mounted in a suitable frame comprising the side members 38, the end members 39 and leg members 40 with cross braces such as 41 and 42 provided wherever necessitated.

The table 10 is mounted on a vertically movable plunger 43 operating in a guide sleeve 44 supported on a cross member as 41. This plunger 43 is provided with a collar 45 and is adapted to receive and have pivoted thereto the bifurcated end 46 of a bell crank lever 47 pivoted as at 48 to one of the cross members 41. The opposite end of this bell crank lever is provided with a roller 49 adapted to ride the periphery of an operating cam 50 mounted on the main cam shaft 51 extending the length of the machine and suitably journaled on cross members as 41. This main cam shaft may be driven from any suitable power device as an electric motor or the like.

The rotary oscillating movement is imparted to the table 10 through the medium of a collar 51 secured or keyed to the plunger 43 and having a crank connection with the lever 52 in turn pivotally connected at the end of a lever 53 pivoted on one of the cross members 42. This lever 53 carries a roller (not shown) in turn engaged by an operating cam 53. An operating lever 54 pivoted at 55 to one of the cross members has a roller 57 which is adapted to be engaged by an operating cam 58 on the cam shaft. Through lever 54 arrangement of the folders 36 are moved into a folding or projected position.

To this end the folders 13 are mounted on arms 59 secured on the folder plate 12 which plate is stationarily mounted on the frame as on longitudinally supporting bars 60. Disposed above this plate 12 is the operating plate 61 vertically movable on pins 62 rising from the plate 12 and biased towards the plate by suitable coiled springs 63. In normal position with the folder fingers 13 in their retracted position the plate 12 and the plate 61 occupy the position illustrated in Fig. 4. However, in a suitable timed relation through the medium of operating fingers 64 the operating plate 61 is vertically raised against the bias of the springs 63 and in this movement engages the rear face of the weights 16 tilting or rocking the folders 13 to the position illustrated in Figs. 5 and 6. The fingers 64 are simultaneously operated through the medium of links 65 connected to arms 66 in turn connected to the opposite ends of a rocking arm 67 which rocking arm is connected by a rod 68 with the top end of the rocking lever or arm 54 engaged by an operating cam 58.

As has been heretofore pointed out the wrapping sheet support comprises a plurality of sets of cross wires 23. One set of wires 23 are mounted in a horizontally reciprocable side member 22 and rest at their opposite ends on a suitable guide rail 70. This member 22 has a reciprocating movement imparted thereto through the medium of a rod 71. This rod 71 is connected to one end of a rocking arm 72 pivoted at 73 and connected by an operating rod 74 to one end of an arm 75 pivoted as at 55 and oscillated by the cam 76. The opposite wires 23 are mounted at one end in a reciprocating slide 21, the opposite ends thereof being adapted to ride on the rail 70 and this slide has a reciprocating movement imparted thereto by being connected by a rod 78 with the opposite end of the rocker arm 72.

The article receiving and depositing plate 24 is mounted on a head 79 adapted to ride upon the parallel rails 80 secured between end members 39 and this head is reciprocated through the medium of a reciprocating rod 81 in turn connected to the end of one arm 82 of a bell crank lever pivoted on the pivot member 83, the other arm 84 carrying a roller adapted to be operated by the cam 85 mounted on the cam shaft 51.

The above cams are so shaped and operated that the operation of the various parts controlled thereby is in the proper sequence and timing relation to carry out the progressive steps heretofore described.

The fin hub 27 is arranged at the lower end of a sleeve 86 slidably mounted in a bearing 87 carried by an arm 88 supported upon an upright 89 suitably supported on one of the frame members. This sleeve 86 has operating therein the plunger 29 which at its lower end supports the clamping head.

These two members are respectively operated by rocking levers 91 and 92 pivotally mounted as at 93 and 94 on the upright 89. The rear end of these levers 91 and 92 are respectively connected by rods 95 and 96 to rocking arms 97 and 98 in turn operated by the cams 85 and 85'.

The paper, as heretofore described, is supplied from a roll 30 guided on a roller 31. This roller is supported in the arms of a supporting bracket 99 suitably supported between the side members of the frame and to one side of the packaging mechanism. The paper is fed from the roll 31, step by step through the medium of upper feeder rolls 100 and lower feeder rolls 101.

The upper feeder rolls 100 are intermittently rotated through the medium of a gear drive mechanism upon the shaft 102 which in turn is driven intermittently through a rack and gear mechanism 103. The gear of this structure is preferably connected to the shaft 102 by a one-way clutch which will engage as the rack is moved in one direction to rotate the feeder rolls in a direction to feed the paper or wrapping material and disengage as the rack is reciprocated in the opposite direction.

The upper platen 32 is alternately raised and lowered through the medium of a rock sleeve 104 mounted on a shaft 105. This sleeve is provided with a lever arm 106 connected between the vertical studs 107 on the top of the platen. The opposite end of the sleeve is provided with a rocking lever 108 which in turn is connected to an operating rod 109 driven from a suitable cam 110 mounted upon a shaft in turn driven by any suitable means.

The paper is held taut across the lower platen 33 through the medium of a pair of suction cups

111 connected by a suitable air pipe 112 with a suitable vacuum source. These suction cups are raised and lowered by operating arms 112' fixed on an oscillating shaft 113 in turn having an operating arm 114 in turn connected to a rod 115, the lower end of which is operated by a cam 116 rotating with the cam 110. During the feeding operation at the pause interval the cups are in their lowermost position with the suction turned on, thereby fixedly connecting the sheet with the cups and through the weight of the cups the sheet is maintained taut.

As soon as the cut is completed the vacuum is cut off from the vacuum source thereby releasing the severed scrap side pieces which will permit the pieces to drop below the machine and at this moment the cups are elevated to a position to permit the new section of the material to be fed therebeneath.

The conveyor belts 36 are driven from a series of pulleys on a driving shaft 117 which in turn is driven through a peripheral gear connection 118 through any suitable source, said source being connected with the driving shaft 119 by chain drive 120.

The folder fingers 13 as before stated, are heated and to provide this heat the folder fingers are provided with resistant elements (not shown) embedded therein and adapted to be connected by suitable wires with a source of electrical supply.

The invention claimed is:

1. A machine for packaging substantially flat topped articles comprising in combination a pleater having an opening therethrough and having a plurality of radial slots extending outwardly therefrom, a vertically movable table movable through said pleater to a receiving position above said pleater, means for depositing a wrapping sheet of greater dimension than the article to be packaged from said table in a position above said pleater, and a radially finned head having its fins coinciding with said radial slots and engaging the article to be packaged and movable downwardly with said table as it descends through the opening in said pleater.

2. The combination with a pleater having an opening therethrough and a plurality of radial slots extending beyond said opening, a vertically movable table movable through said pleater to a receiving position above said pleater, means for depositing a wrapping sheet of greater dimension than the article to be packaged upon said table while in a position above said pleater, a radially finned head having its fins coinciding with the radial slots in said pleater and engaging the article to be packaged and movable downwardly with said table as it descends through the opening in said pleater, and means for rotating said head while the pleats are still in the pleater slots.

3. The combination with means for pleating the exposed edges of a wrapping sheet about the edges of an article to be packaged, including a vertically movable article receiving table, of means for folding the pleated edges down upon the top of the article comprising a support having an opening therein to accommodate the passage of the table and article therethrough, a plurality of folding members pivotally mounted at the periphery of said opening to swing from a retracted position in which position the article is permitted to pass therethrough to a projected position to engage the pleated edge of the wrapping and fold and press the same upon the top of the ar-

ticle, and means for heating said members to iron the folds in their pressed formation and effect a sealing thereof.

4. The combination with means for pleating the exposed edges of a wrapping sheet about the edges of an article to be packaged including a vertically movable article receiving table, of means for folding the pleated edge of the wrapper down upon the top of the article to be packaged comprising a supporting plate having a central opening therein, a plurality of radially disposed folding fingers pivotally mounted about the periphery of said opening to swing from a retracted position in which position the passage of the table and article is permitted therethrough and into a projected position to fold and press the pleating material upon the top of the article, said folding fingers being swung to one position by the table, and means for swinging the folding fingers to the other position.

5. The combination with means for pleating the exposed edges of a wrapping sheet about the edges of an article to be packaged including a vertically movable article receiving table, means for folding the pleated edges down upon the top of the article comprising a supporting plate having a central opening therein, a plurality of radially disposed folding fingers pivotally mounted about the periphery of said plate and movable from a retracted position in which position the article and table are movable through said opening to a projected position to fold and press the pleated material upon the top of the article, and weighted portions on said fingers extending vertically from the backs and positioned forward of the pivotal point for maintaining the fingers in either their projected or retracted position.

6. The combination with a vertically reciprocable table, a pleater disposed in the path of movement of said table having an opening to permit the passage of the table therethrough and having a plurality of radial slots diverging from the periphery of said opening, a transversely separable sheet receiving support for sheet material disposed above said pleater, an article carrier transversely reciprocable having an opening therein adapted to coincide with the opening in said pleater and having peripheral supporting fingers for the article and disposed above said sheet receiving support, a vertically movable head disposed above said article carrier having radial fins coinciding with the radial slots in said pleater, means for moving said head downwardly into engagement with said article to disengage the same from its holding fingers and move the same into engagement with the sheet material supported by said sheet support and as the support is separated to move and hold the sheet material and article upon the table while the same is in its elevated position and finally force said fins through said radial slots of said pleater with the downward movement of the table to complete the pleating.

7. The combination with a vertically reciprocable table, a pleater disposed in the path of movement of said table having an opening to permit the passage of the table therethrough and having a plurality of radial slots diverging from the periphery of said opening, a transversely separable sheet receiving support for sheet material disposed above said pleater, an article carrier transversely reciprocable having an opening therein adapted to coincide with the opening in said pleater and having peripheral supporting fingers for the article and disposed above said sheet receiving support, a vertically movable head disposed above said article holder having radial fins coinciding with the radial slots in said pleater, means for moving said head downwardly into engagement with said article to disengage the same from its holding fingers and move the same into engagement with the sheet material supported by said sheet support and as the support is separated to move and hold the sheet material and article upon the table while the same is in its elevated position and finally force said fins through said radial slots of said pleater with the downward movement of the table to complete the pleating, and means for folding the pleated edges of a fin upon the top of the article.

JOHN BUECHEK.

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