March 31, 1942. L. SCHARF 2,277,783

MACHINE FOR BAG FORMING, FILLING AND SEALING ARTICLES IN CELLULOSE BAGS

Filed Sept. 16, 1939 6 Sheets-Sheet 1

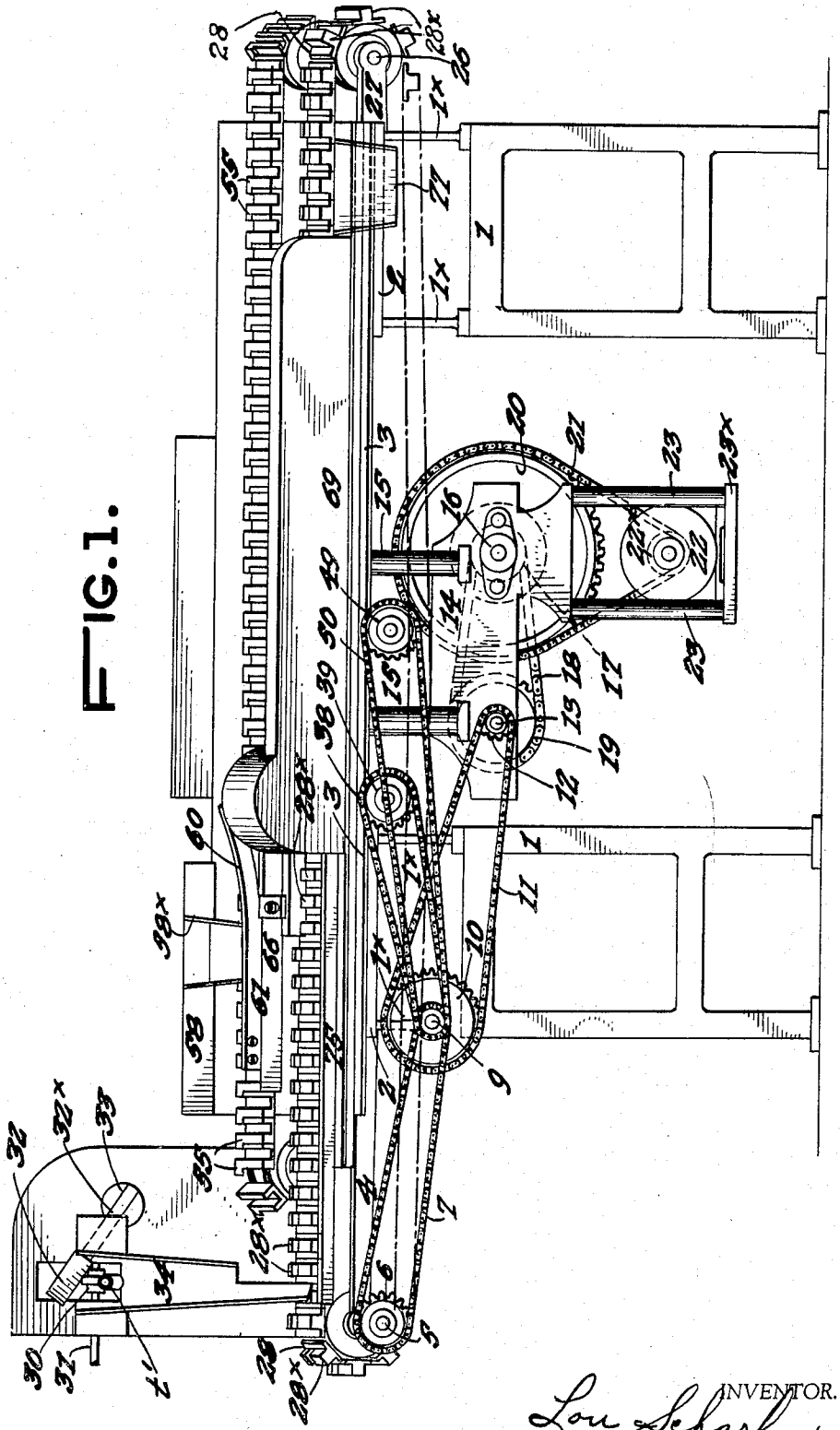


FIG. 1.

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BY

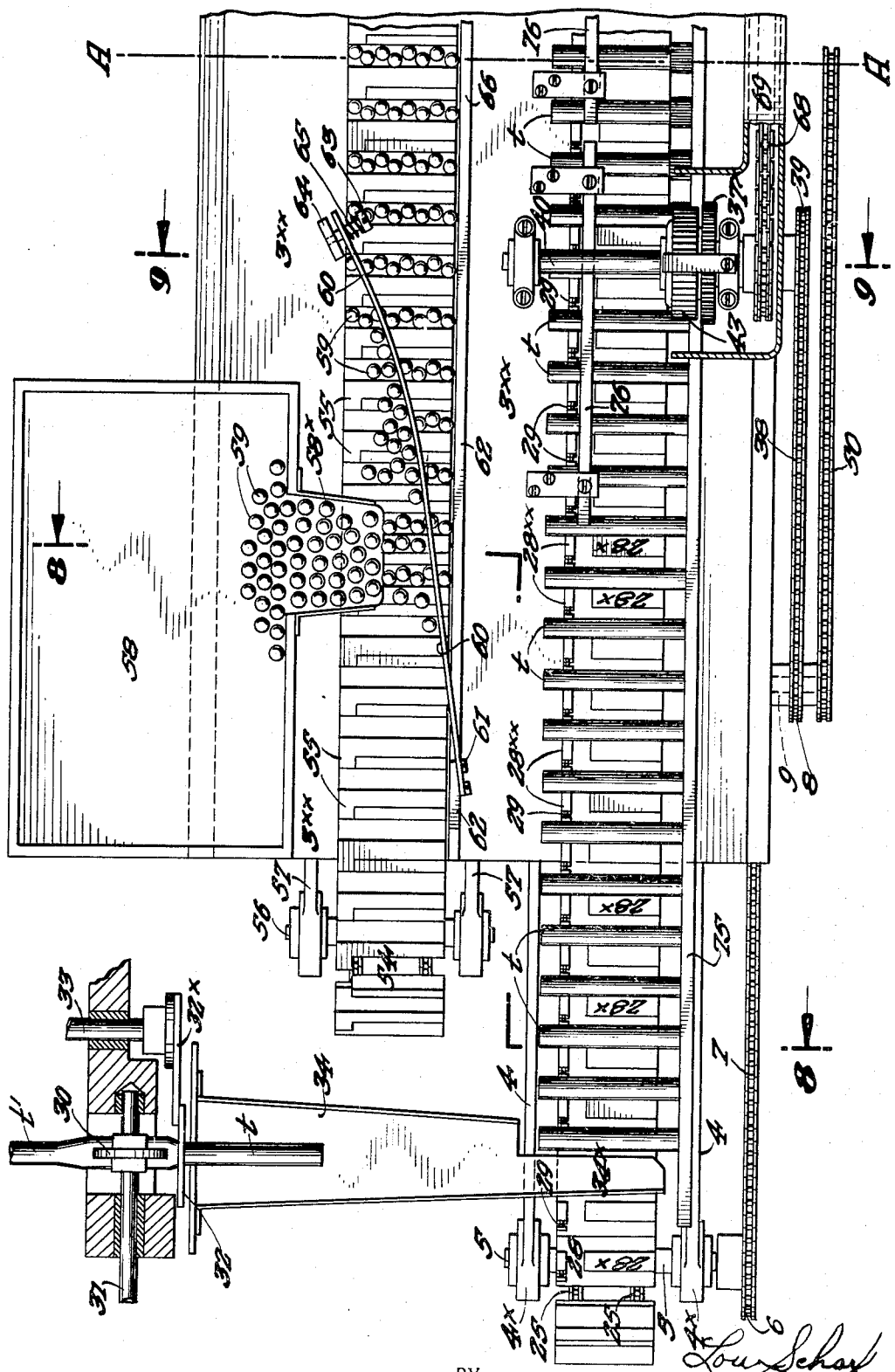
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MACHINE FOR BAG FORMING, FILLING AND SEALING ARTICLES IN CELLULOSE BAGS

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FIG. 2.



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MACHINE FOR BAG FORMING, FILLING AND SEALING ARTICLES IN CELLULOSE BAGS

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FIG. 5.

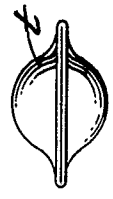


FIG. 4.

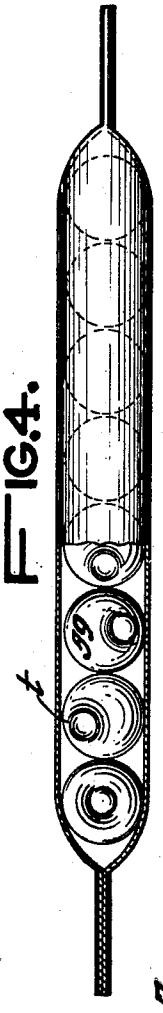
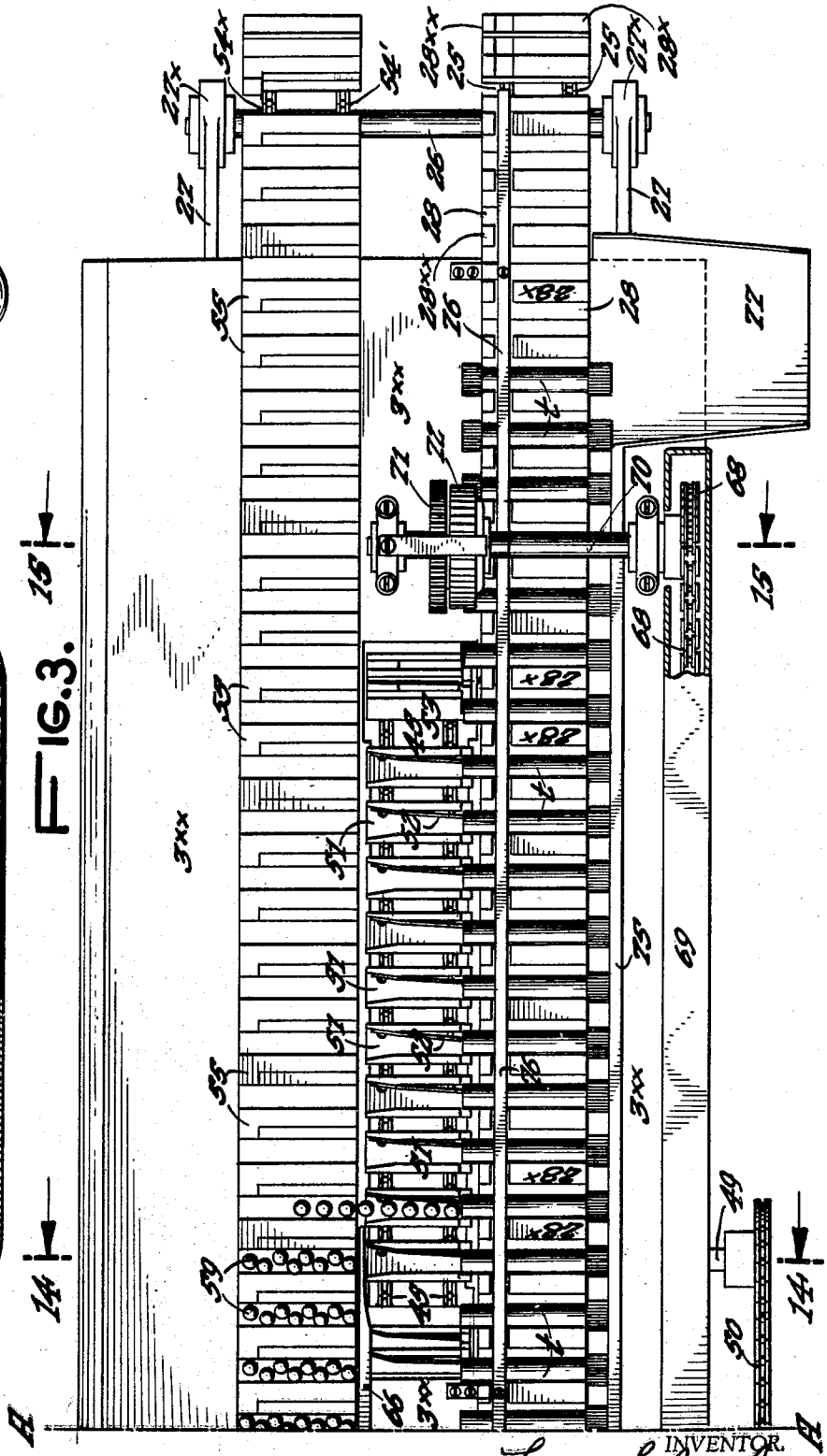


FIG. 3.



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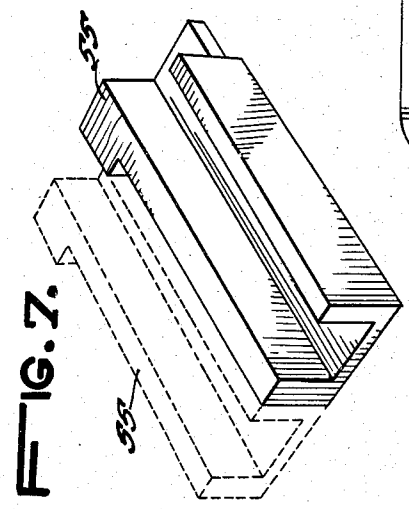


FIG. 7.

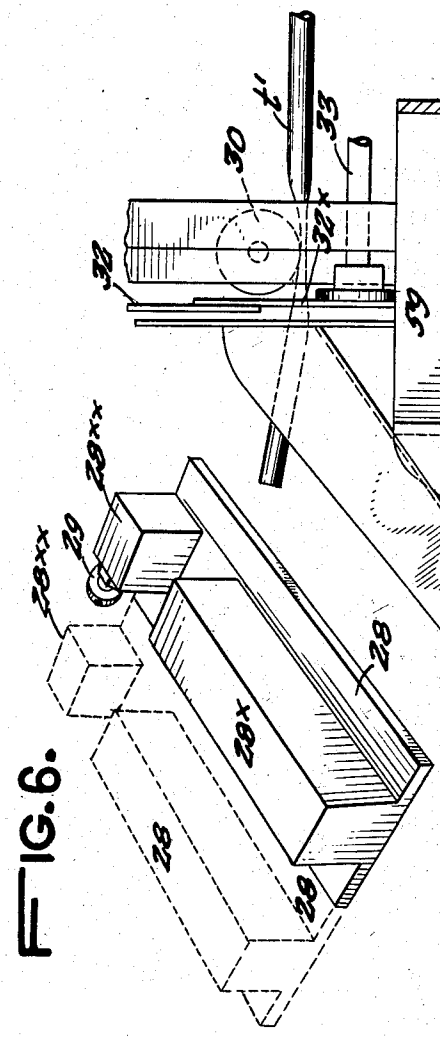


FIG. 6.

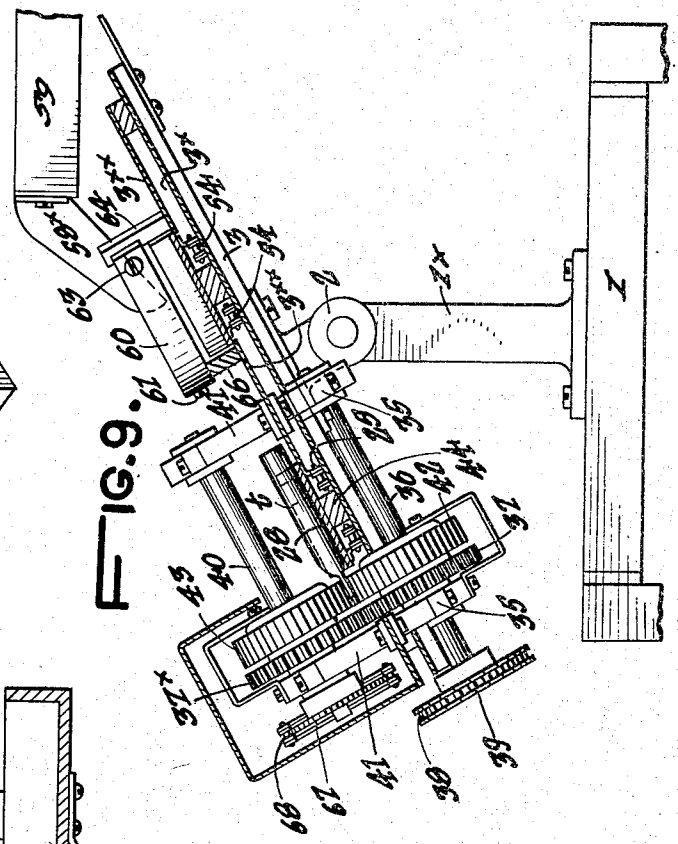


FIG. 9.

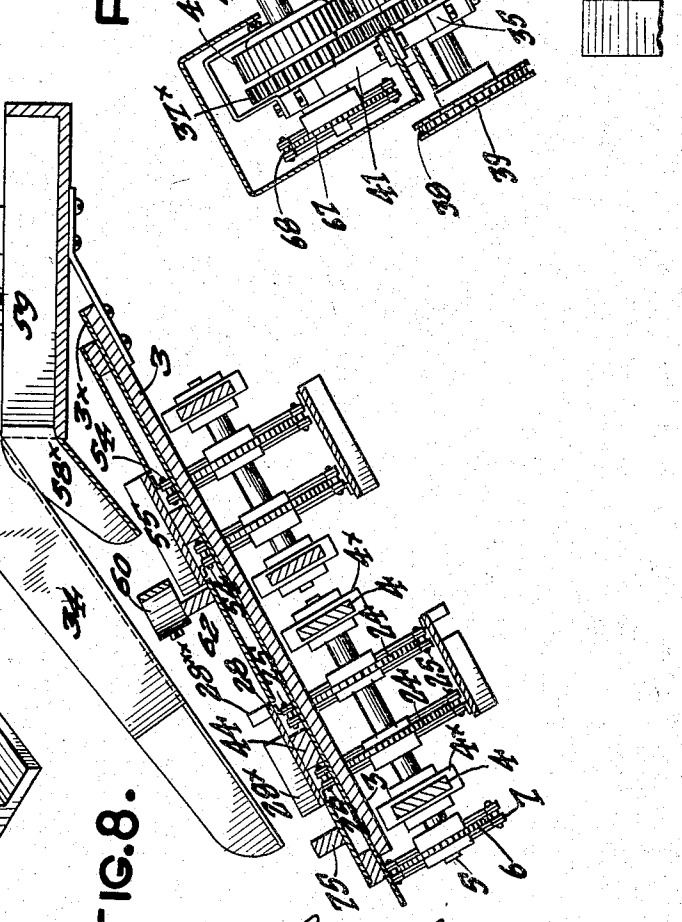


FIG. 8.

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MACHINE FOR BAG FORMING, FILLING AND SEALING ARTICLES IN CELLULOSE BAGS

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FIG. 13.

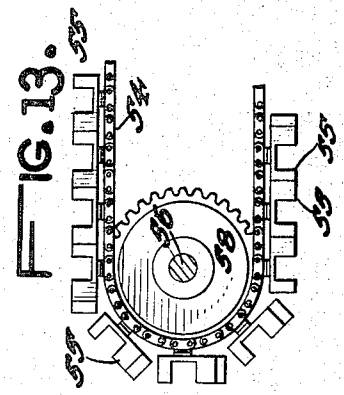


FIG. 12.

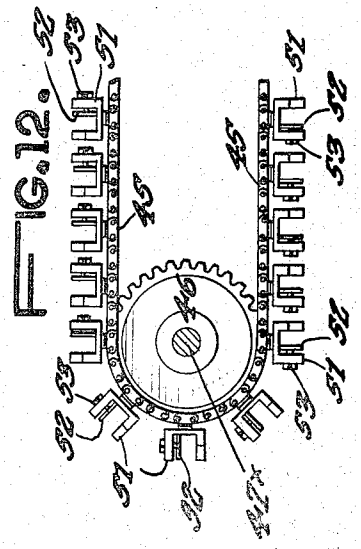


FIG. 11.

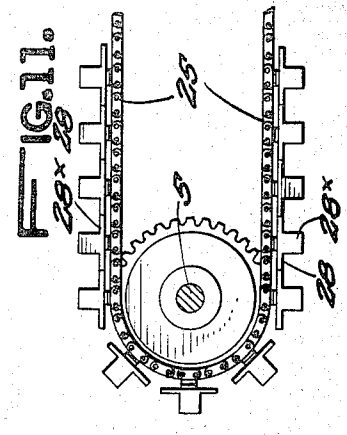


FIG. 10.

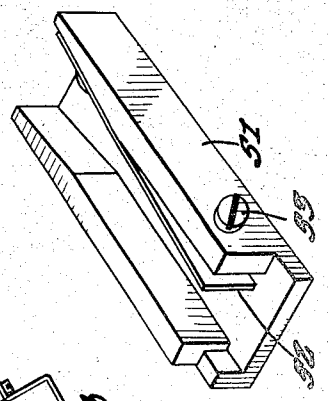


FIG. 15.

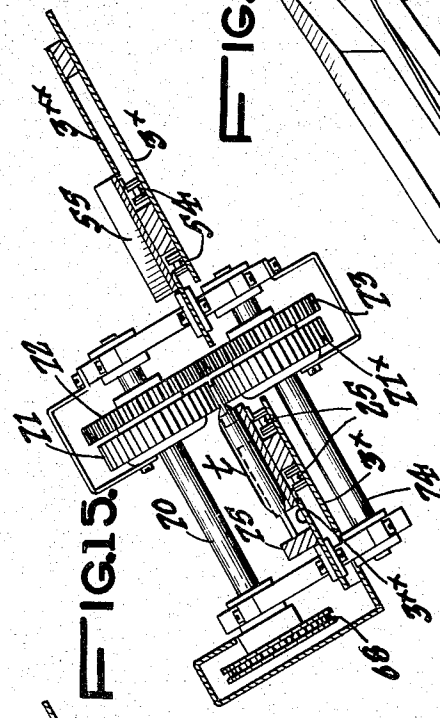
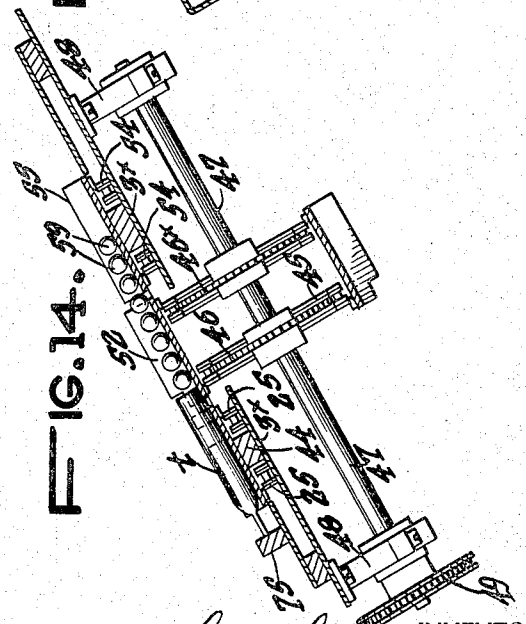


FIG. 14.



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MACHINE FOR BAG FORMING, FILLING AND SEALING ARTICLES IN CELLULOSE BAGS

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FIG. 17.

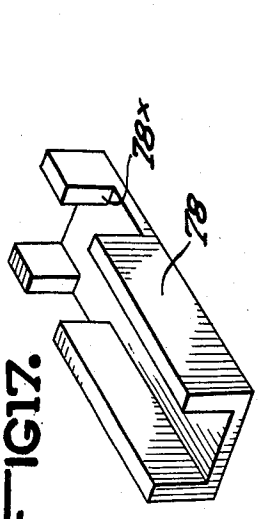


FIG. 16.

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Patented Mar. 31, 1942 2,277,783

UNITED STATES PATENT OFFICE

2,277,783

MACHINE FOR BAG FORMING, FILLING, AND SEALING ARTICLES IN CELLULOSE BAGS

Lou Scharf, New York, N. Y.

Application September 16, 1939, Serial No. 295,187

6 Claims. (Cl. 93—3)

The object of the present invention is to provide a machine which will receive successive cellulose tubes and feed the same progressively to end-closing mechanism forming an open-ended bag, thence to an article-receiving station, and thence to closing means for the open end of the bag, whereupon the filled bag is discharged.

In one form of the invention, the tubes may be filled from a station at which they are cut off from a propelled length of cellulose tubing at which point they automatically pass to a carrier on which they are positioned in spaced parallel relationship. As the tube carrier moves along an article carrier is given corresponding movement, the article carrier comprising receiving members or pockets for one or a measured plurality of articles. The tubes are successively closed at one end and at a stage in the combined progression of the tube carrier and the article carrier the articles of the carrier pockets are discharged into tubes, whereupon the ends of the tubes are closed and the filled bags discharged.

The invention will be described with reference to the accompanying drawings, in which:

Figure 1 is a view in elevation of an embodiment of the invention.

Figure 2 is an enlarged plan view of the left-hand end of the machine illustrated in Figure 1, constituting approximately one-half the length of the machine, certain elements being shown in horizontal section.

Figure 3 is an enlarged fragmentary plan view illustrating the right-hand portion of the machine illustrated in Figure 1, and completing the showing of Figure 2.

Figure 4 is a plan view, partly broken away, showing a completed bag and a plurality of articles contained therein.

Figure 5 is a view in end elevation of the structure shown in Figure 4.

Figure 6 is a perspective view illustrating one of the carrier blocks for the tubes in full lines and an adjacent carrier block in dotted lines.

Figure 7 is a perspective view of one of the article carrying blocks, an adjacent block being shown in dotted lines.

Figure 8 is a transverse sectional elevation on the line 8—8, Figure 2, looking in the direction of the arrows.

Figure 9 is a view similar to Figure 8 on the line 9—9, Figure 2.

Figure 10 is a perspective view of one of the funnel blocks which are employed intermediate the article carriers and the tube carriers.

Figure 11 is a fragmentary view in elevation showing a plurality of the article carriers, their supporting chain and a sprocket wheel for the latter.

Figure 12 is a view similar to Figure 11, showing a plurality of the funnel members, their supporting chain and a sprocket for the latter.

Figure 13 is a view similar to Figures 11 and 12, showing a plurality of the tube carriers, their supporting chain and sprocket for the latter.

Figure 14 is a transverse sectional elevation on the line 14—14, Figure 3.

Figure 15 is a transverse sectional elevation on the line 15—15, Figure 3.

Figure 16 is a view in elevation showing a modified form of the machine.

Figure 17 is a perspective view of the tube-carrying block as employed in the modification, Figure 16.

General construction

General construction of the machine illustrated in Figures 1 to 15 inclusive, is now described as follows:

At 1 are provided suitable strong and rigid supporting frame members which carry vertical risers 1*x* which are best shown in Figure 9. Pivotally mounted on risers 1*x* are a plurality of bracket supports 2 which are rigidly secured to a suitable table-like support 3 which may be faced by a metallic sheet-like covering 3*x*, or, as shown more particularly in Figures 14 and 15, the metallic member 3*x* may be made of heavy gauge metal so as to be directly carried by pivoted brackets 2.

As shown in Figure 2 the pivotally mounted table carries parallel rigid frame members 4 formed at their ends with bearing bosses 4*x* to receive a shaft 5 which carries a sprocket 6 over which is led a chain 7 leading to a sprocket on a shaft 9, the latter carrying a large sprocket wheel 10 driven by chain 11 from a small sprocket wheel 12 on a shaft 13 (Figure 1), the latter being journalled in suitable bearing members provided by opposed depending bearing plates carried by table 3. One of the plates is shown in Figure 1 at 14, it being connected to table 3 by means of the hangers 15. At the opposite side of the machine, the latter may be provided with suitable counterbalance means, if desired, to overcome in all or in part the weight of the drive and feeding mechanism now being described, such counterbalance means having been omitted from the drawings for clarity of illustration.

In some cases a single bearing plate 14 will be sufficient, and it (or both bearing plates when they are used) will carry a shaft 16 on which

is mounted a drive sprocket 17 connected by chain 18 with a sprocket 19 on shaft 13. Shaft 16 likewise carries a large sprocket 20 driven by a chain 21 from the sprocket 22x of a motor 22, the motor being hung from bearing plate 14 by the hangers 23 and base plate 23x.

By reference to Figure 8 it will be seen that shaft 5 carries parallel sprocket wheels 24 over which are led parallel chains 25. These chains 25 have mounted thereon the tube carriers and they extend the entire length of the machine. As shown in Figure 3, chains 25 at the right-hand end of the machine pass over sprockets (not shown) carried by a shaft 26 rotatably mounted in the bosses 27x of rigid supporting arms 27 suitably carried by the table.

The tube carriers or "tube carrying blocks"

The tube carrying blocks are preferably constructed in the manner shown in Figure 6, each block comprising a plate-like base portion 28 midway of which there projects upwardly a block-like extension 28x channeled or cut away near one end so that at that end the block has a section 28xx partially or entirely separated from the main portion 28x. Laterally projecting from block section 28xx is an adjusting screw 29 for the effective receiving face intermediate one of the blocks 28x—28xx and an adjacent block. The side face of the tube passing between these blocks will, therefore, abut and be steadied by adjusting screw 29.

The tube carrying blocks are placed side by side in the manner illustrated in Figure 6 and their plates 28 are secured to chains 25 so that the chains will move the blocks in a continuous path from one end of the machine to the other and thence back to the point at which the blocks begin their movement in propelling the tubes.

The tube delivery device

The tube delivery device, in the present embodiment, incorporates a feed roller 30 carried by driven shaft 31 (Figures 2 and 8) and a rotary knife 32 carried by knife arm 32x driven in a rotary path by shaft 33. Thus tube lengths t' will have severed therefrom successive tubes of the desired length, these tubes being indicated at t. The tube lengths t' may be formed continuously as the tube sections t are cut off.

As the tube sections t are cut off from the tube lengths they fall into an inclined chute 34, the reduced end 34x of which is cut away for a section approximately the length of a cut tube section and is positioned immediately over the tube carrying blocks and parallel with the tube receiving areas between them. Thus as the tube carrying blocks move along under chute 34 they will receive between them successive tubes.

Somewhat centrally of the machine and mounted under table 3, 3x, by the bearing hangers 35 is a shaft 36 which carries a gear wheel 37, Figure 9. Shaft 36 is driven by a chain 38 which engages a sprocket wheel on said shaft shown at 39, Figure 1, chain extending to the left and passing around a sprocket on shaft 9. Gear wheel 37 is employed to drive an overlying gear wheel 37x, Figure 9, on a shaft 40 mounted in bearing brackets 41 rising from the table. Shaft 36 carries a corrugated wheel 42 and shaft 40 carries a co-acting corrugated wheel 43. The path of travel of the tube sections t at the lower ends of the latter passes between the corrugated wheels 42, 43, and if desired, these wheels may be electrically heated, their function being to form a bag out of each tube section by closing the bottom end thereof through compression and heating, if heat is employed.

The table plate 3x may carry a longitudinally extending bar 44 to separate and form a guide for the chains 25 in their movement to actuate the tube carrying blocks, bar 44 also forming a support for the plate-like section 28 of each tube carrying block, as shown more particularly in Figures 8 and 9.

The bag thus formed moves on to the funnel mechanism now to be described.

The funnel mechanism

The funnel mechanism comprises two endless chains indicated at 45, Figure 3, which ride over sprocket wheels 46, 46x (Figure 14), there being two sets of said sprocket wheels, one set being carried on a shaft 47 mounted in bearing brackets 48 depending from the table, the shaft carrying a sprocket wheel 49 (Figures 3 and 14) connected by a chain 50 with a sprocket wheel on shaft 9, and the shaft 47x which carries the like set of sprocket wheels 46, 46x, (Figure 12) being mounted for idle rotation.

The chains 45 carry between them a plurality of the funnel devices shown in Figure 10 each device comprising a trough-like member 51, the trough being outwardly flared at its entrance end, and one vertical wall of the trough carrying a plate spring 52, the tension of which will hold it flat against said wall until moved inwardly by means of a screw 53. In this manner, the outlet end of the trough may be restricted as desired. Toward the rear or the discharge end of the machine, chains 45 lead over to idler sprocket wheels (not shown) and thence back to the drive sprocket wheels 46 (Figure 12).

Above the funnel blocks are two parallel chains 54, which carry the measuring blocks 55. These blocks are best shown in Figure 7 and consist of U-shaped members, the right-hand upwardly extending leg of each U-shaped member fitting into a clearance cut of an adjacent U-shaped member as shown in Figure 7. At the left-hand end of the machine chains 54 run over sprockets carried by a shaft 56 (Figure 2), which shaft is rotatable in bearing bosses carried by bracket arms 57. One of the sprockets for a chain 54 is shown in Figure 13 at 58. At the right-hand end of the machine, chains 54 run over sprockets carried by shaft 26 which, as earlier described, carries the sprockets for the tube carrier blocks.

Above the measuring blocks 55 is a container 58, in the present embodiment, adapted to hold a plurality of the articles to be received in the measuring blocks, in this instance the candy balls shown at 59. At the discharge end of the container 58 is a chute 58x which discharges the articles 59 onto the measuring blocks, and a wiper blade 60 secured at 61 to a bracket 62 carried by an upper table plate 3xx (Figure 9) supports one end of the wiper blade, the opposite end of the wiper blade being apertured to receive a stud 63 carried by bracket arms 64 held by said upper plate of the table, the coil spring 65 being interposed between the head of the screw and the wiper blade. As the measuring blocks move along, they receive the article in the manner shown in Figure 2. The articles are held in the measuring block, until proper time for discharge, by a bar 66 which closes the lower ends of the measuring block, and which may be a continuation of the bracket 62 if desired.

The filling of the tube-bags

Prior to reaching the right-hand end of bar **66** the tubes *t* have been closed at their bottoms by the action of the gripping rollers **42**, **43**, and as they move to the right beyond bar **66** they come into register with the funnel blocks **51**, and the tubes, funnel blocks and measuring blocks, the latter having their discharge ends freely open, move in alignment, as shown more particularly in Figure 3, for a predetermined distance so that in said travelling the articles carried by each measuring block are fed by the funnel blocks into the tubes.

The tube-bag closing mechanism

It has previously been shown with respect to Figure 9, that chain **38** drives a sprocket **39** carried by shaft **36** which, in turn, carries one of the initial lower end tube closing crimping rollers **42**. Through gear **37** shaft **36** drives the gear **37***x* on a shaft **40**. That shaft carries a sprocket **67** over which is led a chain **68**. Chain **68** leads to the right from its position in Figure 2 and extends through a casing **69** over a sprocket wheel carried by a shaft **70**, Figure 3, which carries a crimping roller **71** and a gear **72** which drives an underlying gear **73**. Gear **73** is on a shaft **74** which carries the lower crimping roller **71***x*.

It will be understood that the tube bags *t* will only be partly filled, so that as the tubes move along to the right they will be closed by crimping rollers **71**, **71***x* and will be discharged from the machine at a suitable point.

As the tubes move along, their lower ends abut a guide bar **75**, and as the tubes approach the point at which they receive the articles they are brought under a cam bar, or bars, **76**, which slightly deform them to a form better adapted to receive the article and also better adapted to enable action of the crimping rollers, **71**, **72** without tucking or plaiting the tubes.

At the discharge end of the machine the filled tube-bags, which will appear as in Figures 4 and 5, may be discharged by gravity onto a trough **77**, Figure 3, and from that point to any suitable boxing means or to a station where they may be boxed by hand.

By pivotally mounting the operating mechanism, as indicated in Figure 9, the degree of inclination, to insure proper action by gravity, may be changed if desired. It will also be understood that the articles may be moved manually from a table or the like and directly into bags held by moving carriers of the general type hereinbefore described.

In Figure 16 a modified form of machine is shown, the machine being simplified for hand insertion of the articles, the means for delivering tubes to the tube carriers are the same shown and described with reference to the preceding figures and the same reference characters are employed. Parallel endless chains, not shown, support between them trough-like tube carriers **78** cut away at **78***x* to permit the entrance of a cam bar **79** for slightly deforming the tubes to enable more ready insertion of the article. The chains are led over the rotary sprockets or drums **80**, **80***x*, the latter being carried by a shaft **81** to which is fixed a sprocket **82** driven by a chain **83** which is carried by a sprocket on a shaft **84**. Shaft **84** carries a large sprocket wheel **85** driven by a chain **86** which is engaged by sprocket **87** on a shaft **88**. Shaft **88** carries a sprocket wheel **89** driven by a chain **90**, the latter being engaged by a driving sprocket **91** carried by the shaft of a motor **92**.

The end crimping mechanism is the same in form and arrangement as that shown in the preceding figures, the driving shafts therefor being indicated by the same reference characters, to wit, **40** and **70**, although they are located by a different arrangement of belts or chains. To such end a sprocket **93** is carried by shaft **40** and the sprocket **94** is carried by shaft **70**, these sprockets being connected by chains **95** and **96**, respectively, with sprockets on shaft **84**. Aside from the elimination of the measuring blocks and the funnel blocks, with their driving mechanism, the general construction of the modified form of machine shown in Figure 16, is the same as illustrated in the preceding figures with the exception of the altered driving mechanism described with respect to Figure 16.

By means of the invention bags are automatically formed and filled with either a plurality of articles as indicated in Figure 2 and similar figures, or a single article as is contemplated by the invention. In fact, the measuring and funnel elements require little modification in form to adapt them for free flowing material, granular or powdered, in addition to the candy balls illustrated in the drawings. Various modifications may be made in the form and arrangement of the elements illustrated in the embodiments shown without departing from the spirit of the invention.

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

1. In bag-forming and packaging machines, the combination of a frame, a table, two parallel endless carriers on the frame, driving means for said carriers whereby they are moved at the same speed, a plurality of article-receiving members on the first carrier, a plurality of bag-tube carrying members on the second carrier, means for closing the discharge ends of the article-receiving members during a portion of their travel and inactive at a predetermined point in their travel, and compression means for closing the top ends of bag-tubes held in their carrying members, in combination with a third carrier intermediate the first and second carriers, means for moving said third carrier in synchronism with the other said carriers, and a plurality of funnel members on said third carrier.

2. In bag-forming and packaging machines, the combination of a frame, a table, two parallel endless carriers on the frame, driving means for said carriers whereby they are moved at the same speed, a plurality of article-receiving members on the first carrier, a plurality of bag-tube carrying members on the second carrier, means for closing the discharge ends of the article-receiving members during a portion of their travel and inactive at a predetermined point in their travel, and compression means for closing the top ends of bag-tubes held in their carrying members, in combination with a third endless carrier intermediate the first and second carriers, means for driving said third carrier, and a plurality of funnel members on said third carrier each funnel member having a passageway bounded by a movable wall, and means for adjusting said wall to vary the width of the funnel passageway.

3. In bag-forming and packaging machines, the combination of a standard, a frame, a table having a filling station supported on said frame, two parallel endless carriers mounted on said

frame and movable along the table and filling station thereof, driving means for said carriers whereby they are moved at the same speed, a plurality of article-receiving members on the first carrier, a plurality of bag-tube carrying members on the second carrier, means for adjusting the frame to various angular positions on said standard to vary the effect of gravitational discharge of articles from their receiving members to bag-tubes on their carrying members, means for closing the discharge ends of the article-receiving members during a portion of their travel and inactive at a predetermined point of their travel, and compression means for closing the top ends of bag-tubes held in their carrying members.

4. In bag-forming and packaging machines, the combination of a standard, a frame, a table having a filling station supported on said frame, two parallel endless carriers mounted on said frame and movable along the table and filling station thereof, driving means for said carriers whereby they are moved at the same speed, a plurality of article-receiving members on the first carrier, a plurality of bag-tube carrying members on the second carrier, a connection intermediate the standard and frame for holding the latter and its table and the carriers in inclined position for gravitational action upon articles held by their said receiving members, means for closing the discharge ends of said receiving-members during a portion of their travel and inactive at a predetermined point of their travel, means at a receiving end of the carrier for the bag-tube carrying members for feeding a bag-forming tube, means for cutting sections from the end of the tube, gravity-controlled means for depositing said sections successively upon said carrying members so that they are arranged in parallelism, compression means for closing the bottom ends of the tubes during their carrier-impelled movement, and compression means for closing the top ends of the tubes during a later stage of their said movement.

5. In bag-forming and packaging machines, the combination of a frame, a table, two parallel endless carriers on the frame, driving means for said carriers whereby they are moved at the same speed, a plurality of article-receiving members on the first carrier, a plurality of bag-tube carrying members on the second carrier, means for closing the discharge ends of the article-receiving members during a portion of their travel and inactive at a predetermined point in their travel, and compression means for closing the top ends of bag-tubes held in their carrying members, in combination with means for deforming the top ends of the bag-tubes to substantially oval shape in the stage of their travel wherein the discharge ends of the article-receiving members are opened.

6. In bag-forming and packing machines in combination with a frame, a table having a filling station, an endless multi-link carrier mounted on the frame and movable along the table and filling station station thereof, driving means for said carrier, a plurality of open-top bag receptacles on said carrier and so exposed that bags may be dropped from above into the receptacles by the action of gravity, a supporting connection intermediate the frame and the table and adapted to support the latter at an incline relatively to the horizontal for the gravitational movement of articles from the filling station to the bags held in the bag receptacles, and compression means at the discharge end of the carrier for closing the bags.

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