

Dec. 8, 1953

H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 1

FIG. 1.

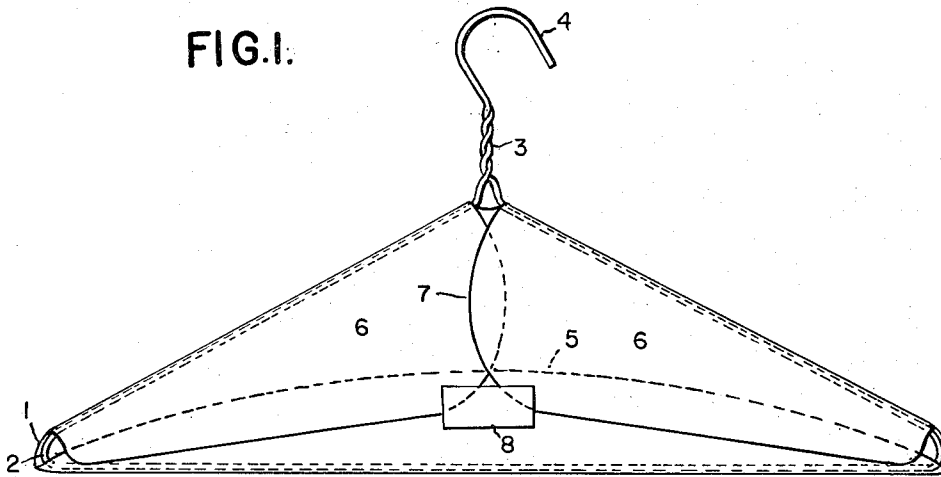
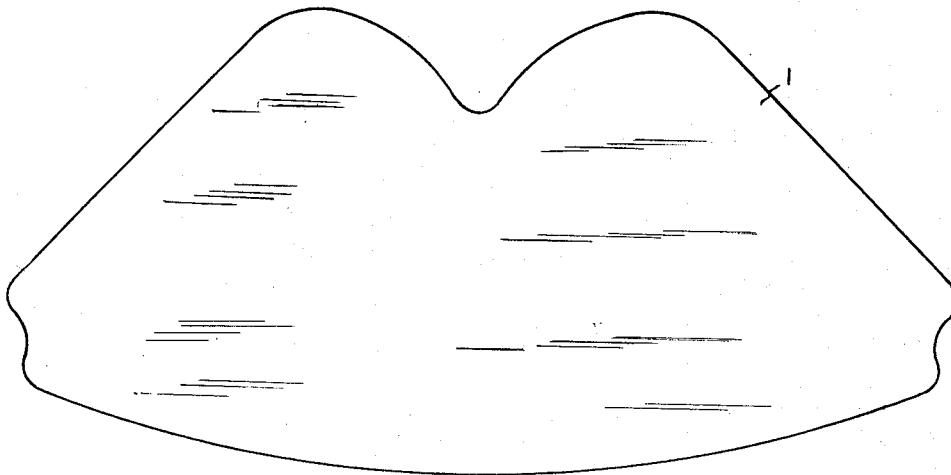


FIG. 2.



INVENTORS

HARRY M. SIMMONS

BY ROBERT M. SIMMONS

J. S. Murray
ATTORNEY

Dec. 8, 1953

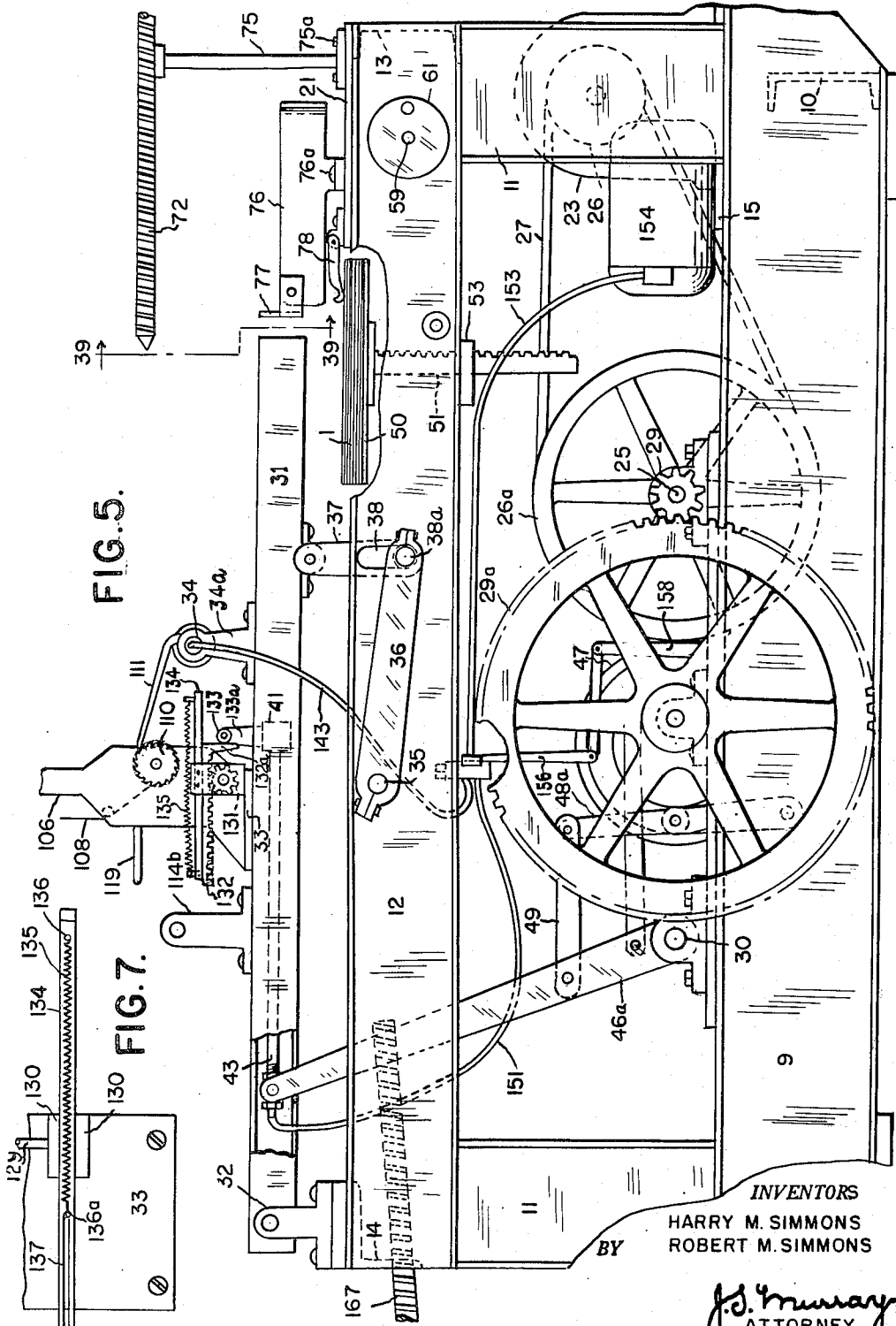
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 3



Dec. 8, 1953

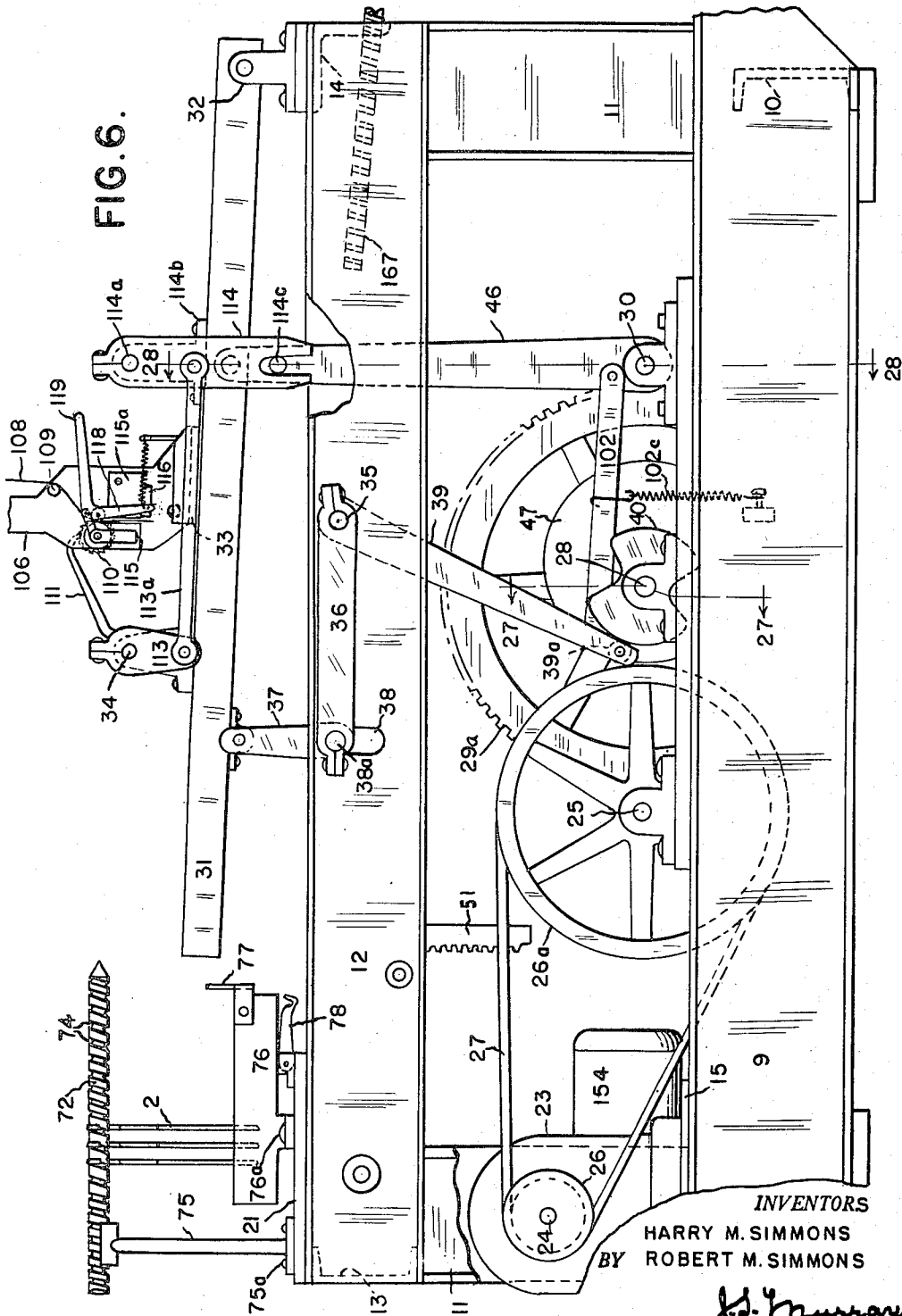
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 4



Dec. 8, 1953

H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 5

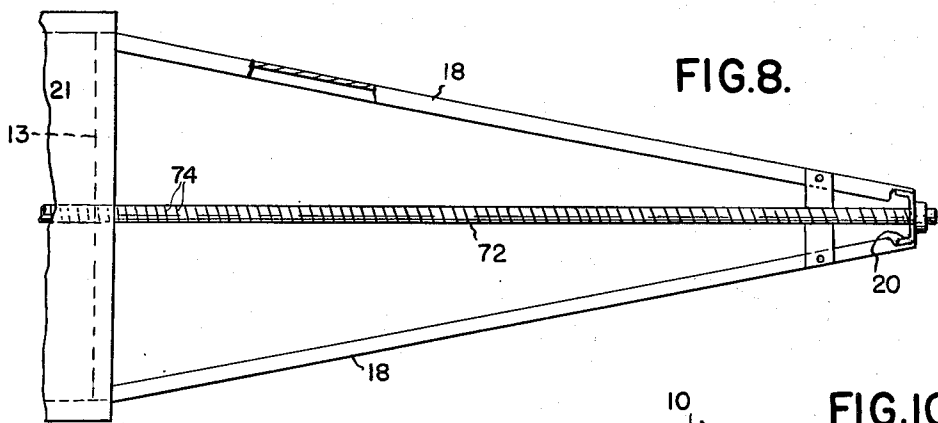


FIG.8.

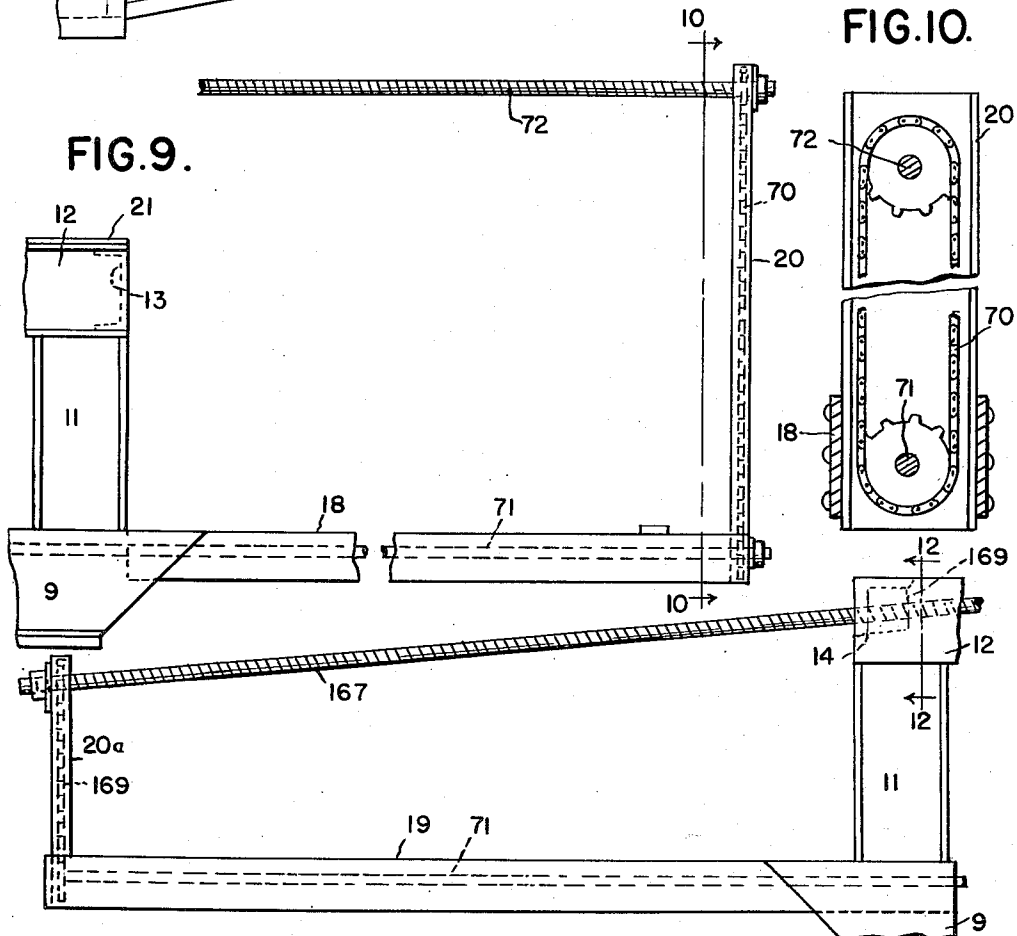


FIG.9.

FIG.10.

FIG.11.

INVENTORS
HARRY M. SIMMONS
ROBERT M. SIMMONS

BY

J. S. Murray
ATTORNEY

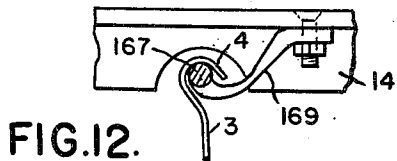


FIG.12.

Dec. 8, 1953

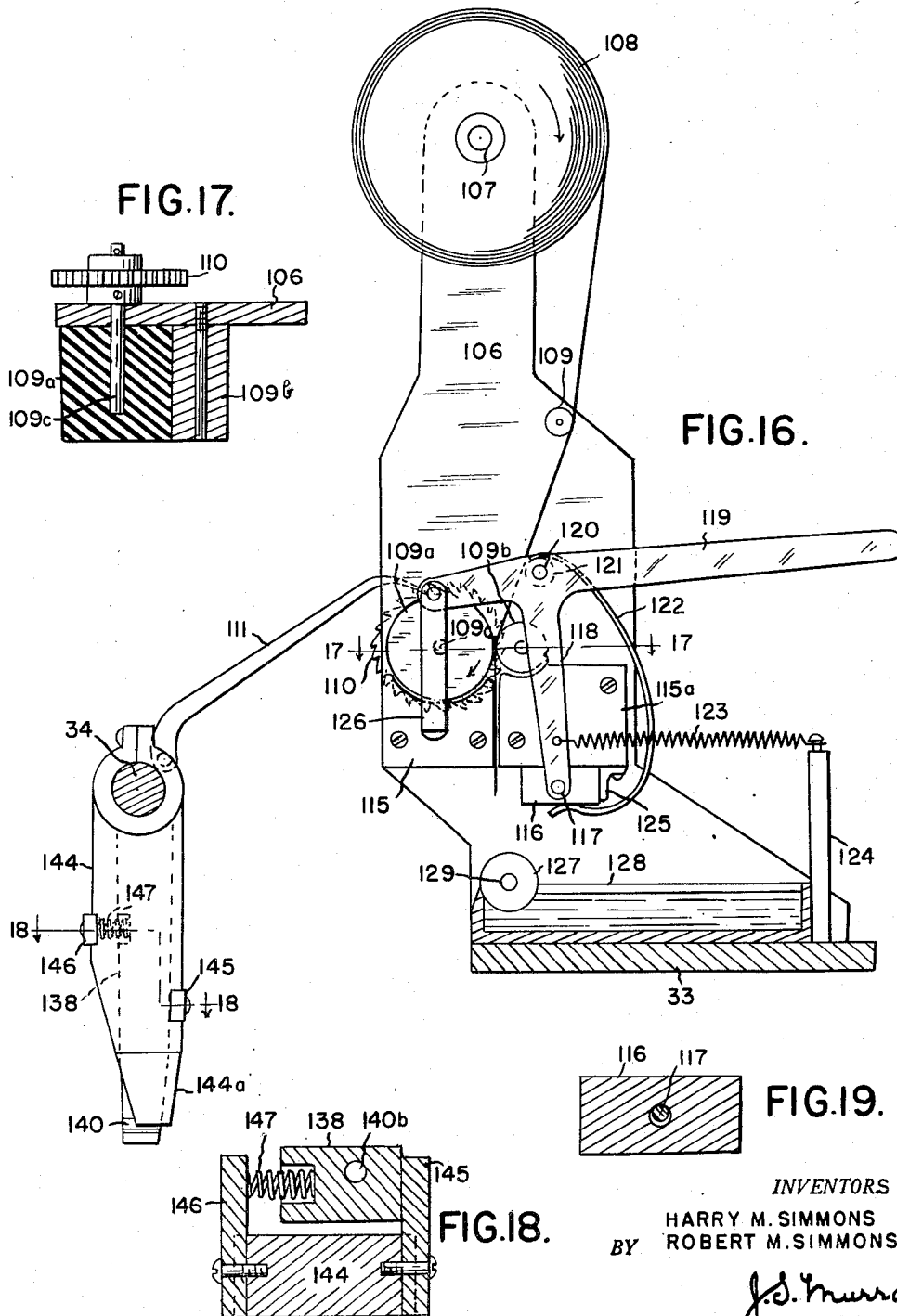
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 7



Dec. 8, 1953

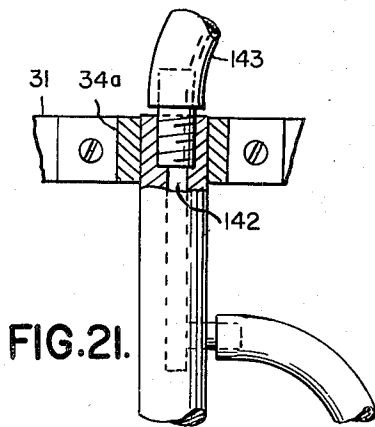
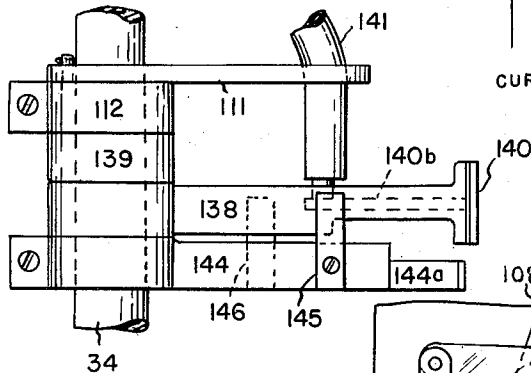
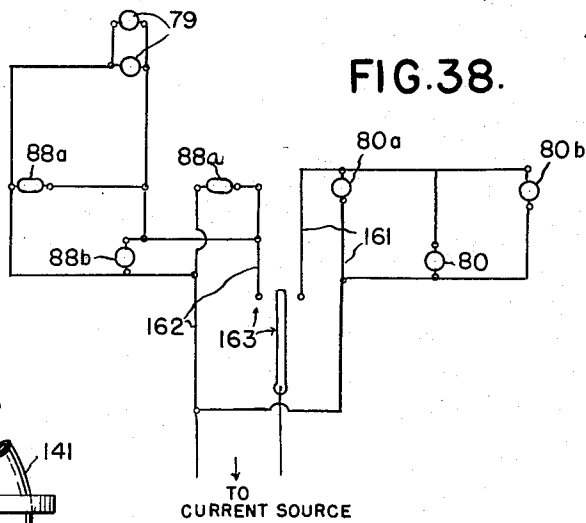
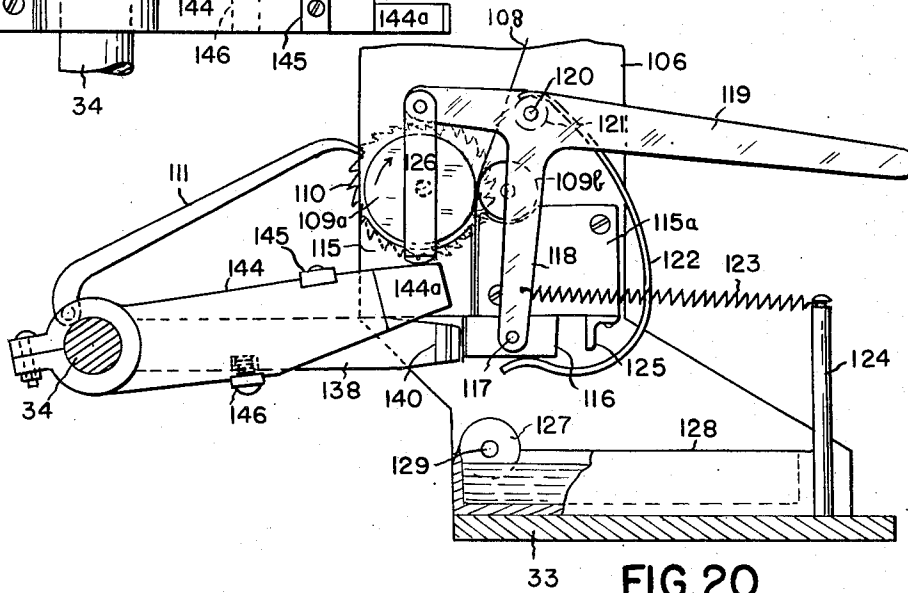
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 8



INVENTORS

HARRY M. SIMMONS
BY ROBERT M. SIMMONS

J. S. Murray
ATTORNEY

Dec. 8, 1953

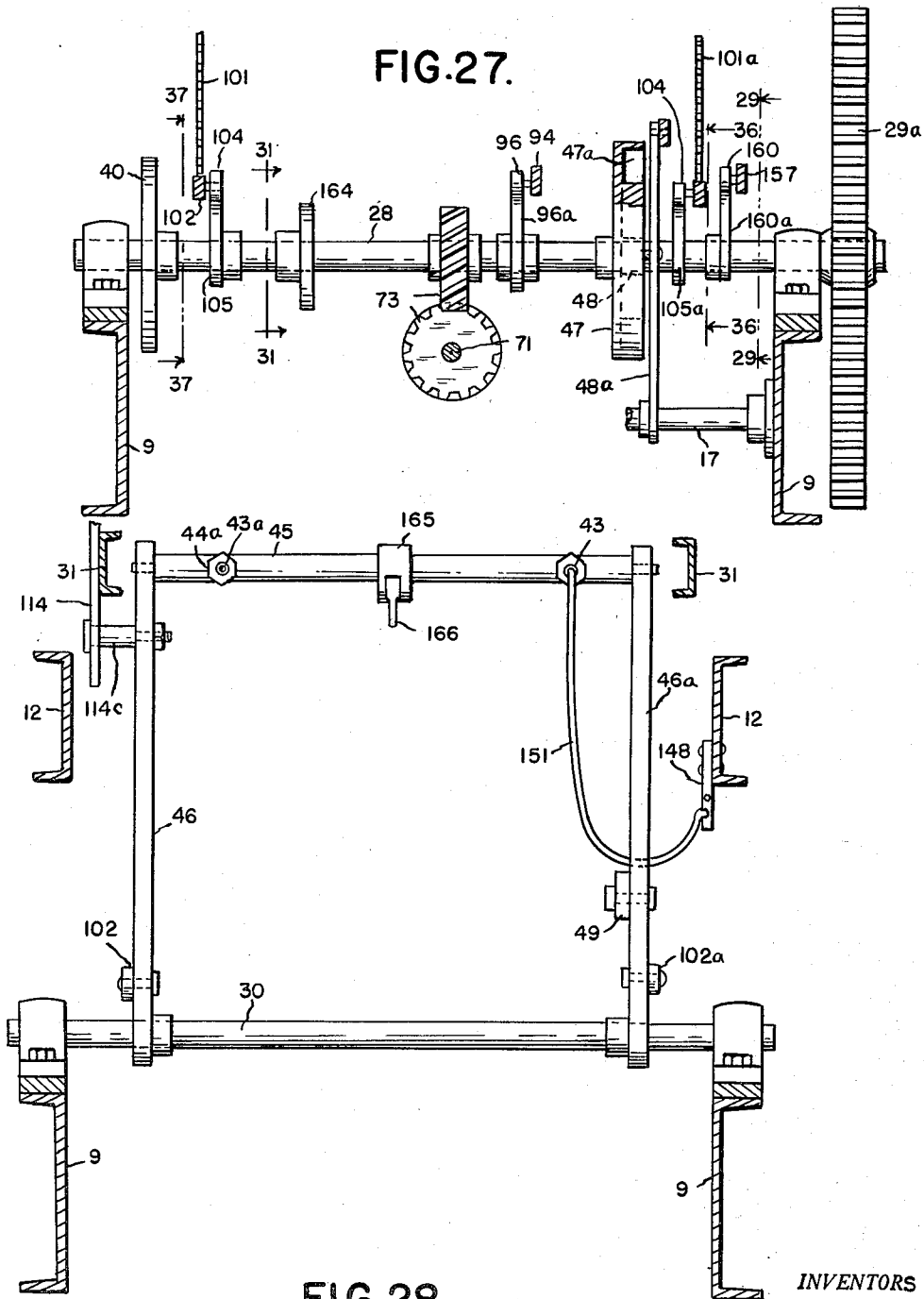
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 10



INVENTORS

HARRY M. SIMMONS
BY ROBERT M. SIMMONS

J. S. Murray
ATTORNEY

Dec. 8, 1953

H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 11

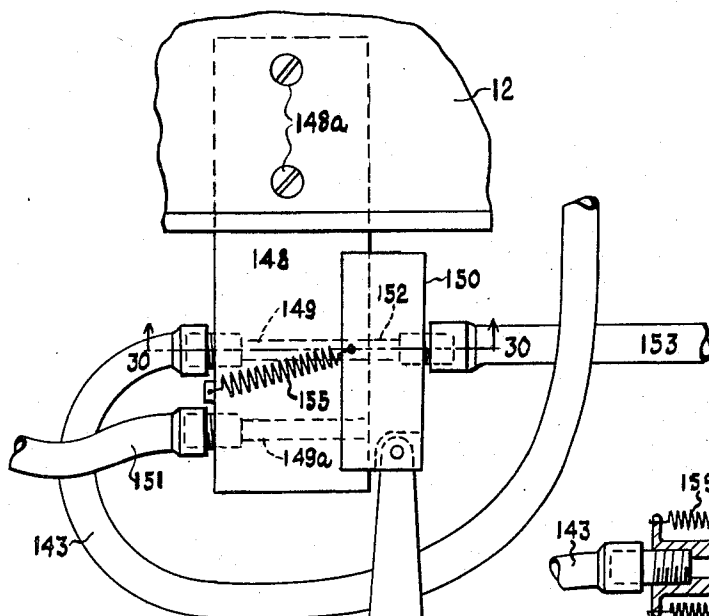


FIG. 29.

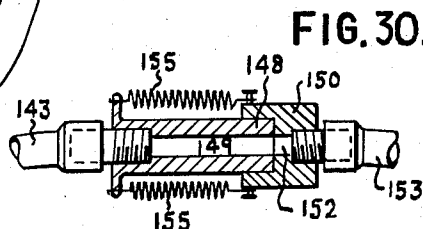


FIG. 30.

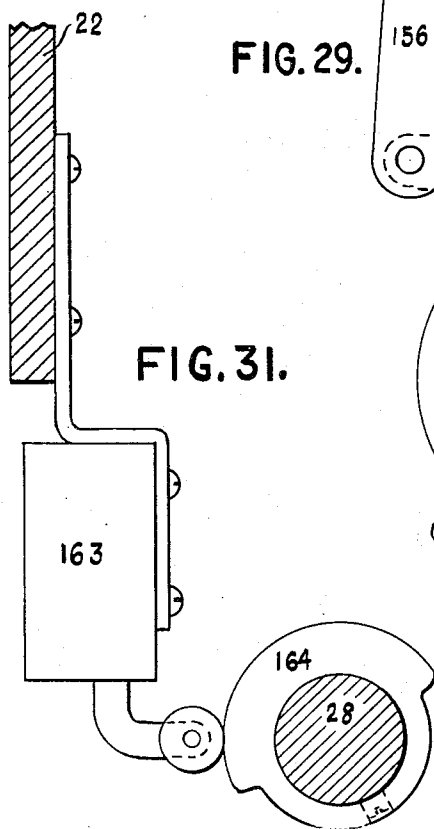


FIG. 31.

INVENTORS
HARRY M. SIMMONS
BY ROBERT M. SIMMONS

J. S. Murray
ATTORNEY

Dec. 8, 1953

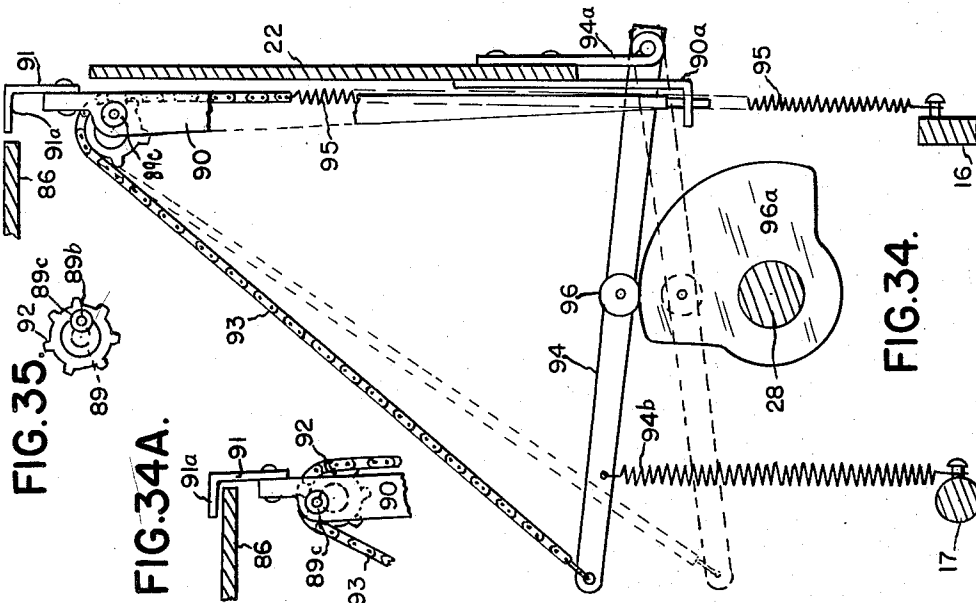
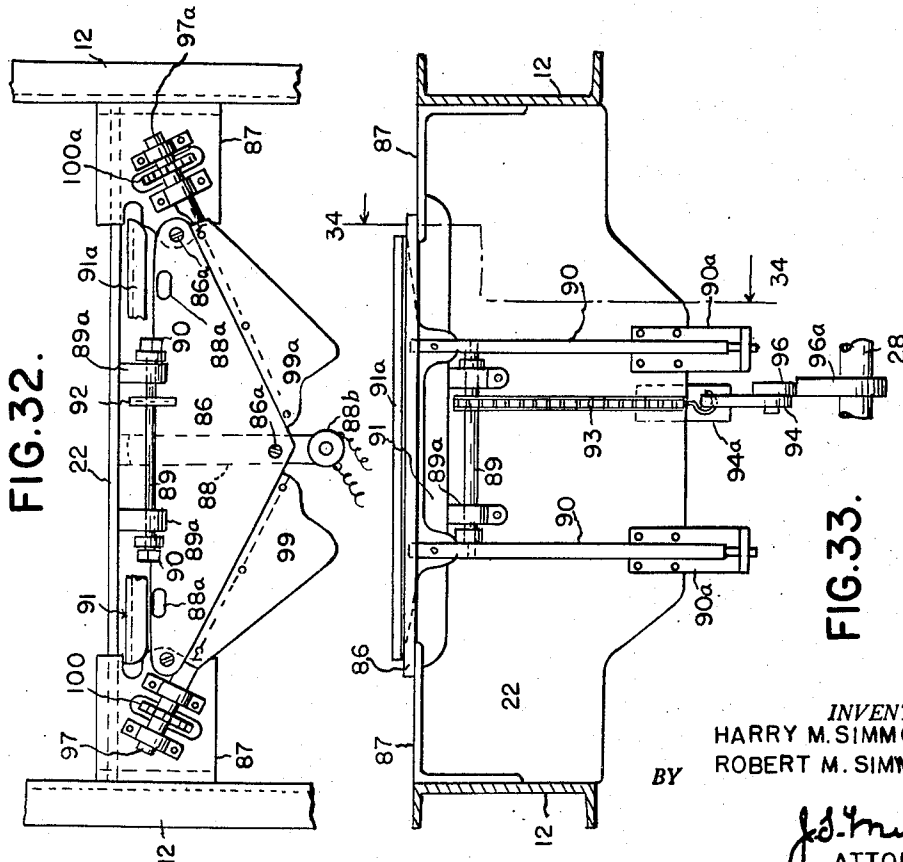
H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 12



INVENTORS
HARRY M. SIMMONS
ROBERT M. SIMMONS
BY

J. H. Murray
ATTORNEY

Dec. 8, 1953

H. M. SIMMONS ET AL

2,661,583

MACHINE FOR WRAPPING GARMENT HANGERS

Filed Jan. 12, 1951

13 Sheets-Sheet 13

FIG. 36.

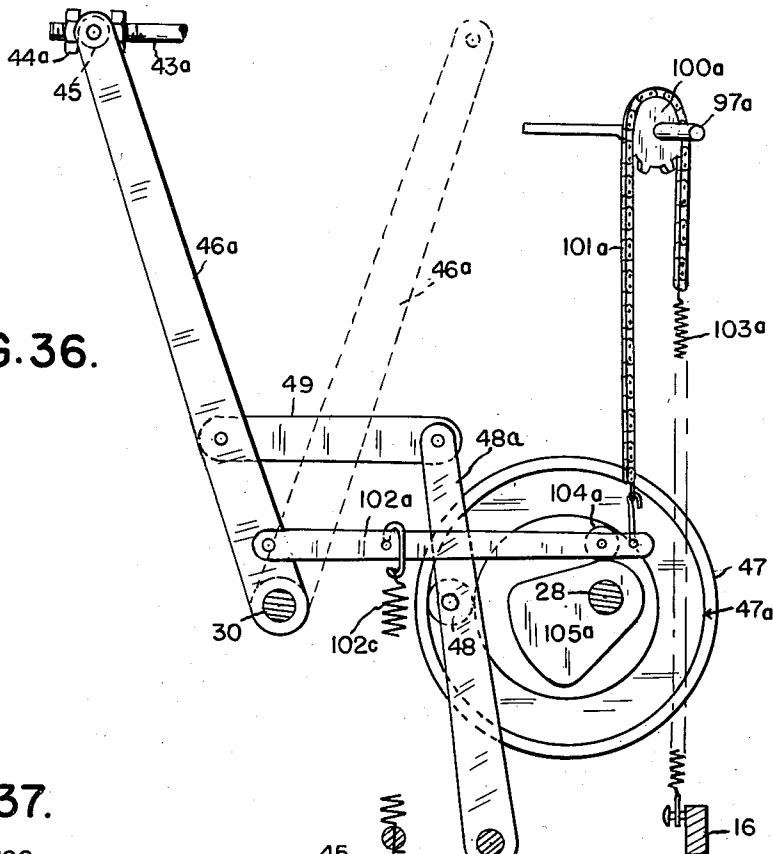


FIG. 37.

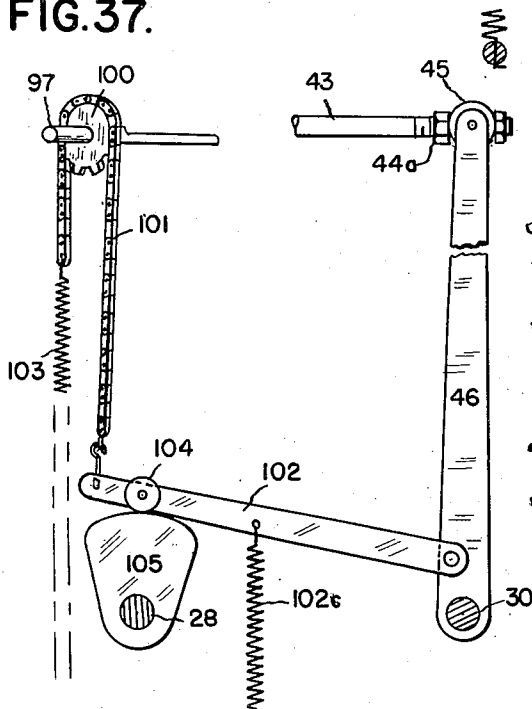
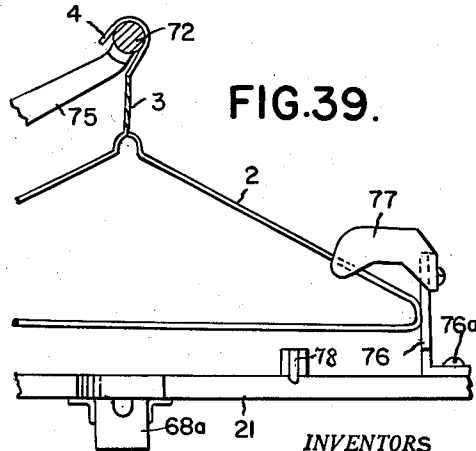


FIG. 39.



INVENTORS
HARRY M. SIMMONS
BY ROBERT M. SIMMONS

J. D. Murray
ATTORNEY

UNITED STATES PATENT OFFICE

2,661,583

MACHINE FOR WRAPPING GARMENT
HANGERS.

Harry M. Simmons and Robert M. Simmons,
Cleveland, Ohio, assignors to Cleaners Hanger
Company, Detroit, Mich., a corporation of
Michigan

Application January 12, 1951, Serial No. 205,818

25 Claims. (Cl. 53—25)

1

This invention relates to wrapping machines and particularly machines for wrapping garment hangers. It has become fairly common to manually apply paper covers to wire garment hangers, the covered hangers being less likely to become soiled prior to use, and safeguarding garments against any dirt, oil, or grease picked up by the hanger during manufacture or subsequent handling. Such covers moreover improve the appearance of wire hangers, are useful as an advertising medium, and add materially to load capacity.

An object of the invention is to provide a machine that will rapidly apply paper covers to wire garment hangers, saving much time and labor as compared to a manual operation.

Another object is to adapt the machine to seal the covers, as applied, affording the wrapped hangers at least such permanency as their customary use requires.

Another object is to provide for mechanically delivering garment hangers to a wrapping mechanism at a predetermined rate, and for automatically ejecting the wrapped hangers and conveying them from such mechanism at the same rate.

Another object is to equip the described machine with a table on which a large supply of hanger covers may be stacked, to successively deposit wire hangers on the stacked covers, to shift each hanger and the top-most cover, in unison to a wrapping table, to then mechanically effect a wrapping and sealing operation, and to finally discharge the wrapped hanger, effecting all said operations in rapid sequence.

Another object is to adapt a carriage to eject a wrapped hanger from the wrapping table, while delivering another hanger and its cover to such table.

Another object is to adapt the cover supply table to be automatically and gradually raised and thus maintain a desired top level of the stacked covers, whereby a pick-up mechanism may properly take effect on the uppermost cover and a superposed hanger, despite progressive depletion of the stack.

Another object is to accurately guide and position hangers, as individually deposited on a stack of covers, so that flap portions of the covers will suitably project beyond corresponding hanger spans.

Another object is to adapt one or more electromagnets to assist in properly positioning a hanger on the stack of covers.

Another object is to use electromagnets in

2

establishing the proper position of hangers on the wrapping table.

Another object is to adapt electromagnets on a carriage to pick up hangers at the cover stack and retain them during transfer to the wrapping table.

Another object is to adapt a suction device or devices on the carriage to pick up the topmost cover at the stack and transfer it in unison with a hanger to the wrapping table.

Another object is to provide mechanism for delivering and applying sealing stickers to the covers, and for automatically severing such stickers from a paper strip preliminary to such delivery.

Another object is to adapt a suction device to automatically pick up stickers as severed from the strip and deliver and accurately apply them to the wrapped hangers.

Another object is to establish a certain sequential relation between mechanisms for folding the several flaps of each cover whereby such flaps will properly lap each other without interference.

Another object is to employ reciprocation of a carriage for transferring hangers and covers from a cover stack to a wrapping table, to guide the carriage in a suitable track, and to mechanically raise and lower the track in its reciprocation, for clearance purposes.

Another object is to provide for accurately timing energization periods of electromagnets and suction devices, and of other operations incident to performance of the machine.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, wherein:

Fig. 1 is a rear elevational view of a garment hanger as wrapped by the described machine.

Fig. 2 shows the paper sheet employed as a wrapper.

Fig. 3 is a top plan view of the main portion of the machine, omitting the reciprocatory carriage for clearness.

Fig. 4 is a vertical sectional detail on the line 4—4 of Fig. 3 of one of a pair of hanger positioning fingers.

Fig. 5 is a view of one side of the machine, showing the lowered position of the carriage track.

Fig. 6 shows the other side of the machine, with the track raised.

Fig. 7 is a fragmentary top plan view, duplicating to an enlarged scale, the showing in Fig. 3 of a rackbar mechanism.

Fig. 8 is a top plan view of the forward extension

sion of the machine frame, and associated mechanism.

Fig. 9 is a side elevation of said extension and mechanism.

Fig. 10 is a vertical section on the line 10—10 of Fig. 9.

Fig. 11 is a side elevational view of a rear extension of the frame and associated mechanism.

Fig. 12 is a vertical sectional detail on the line 12—12 of Fig. 11, primarily showing a shaft support.

Fig. 13 is a top plan view of the carriage, cover supply table, and wrapping table, showing front and rear limiting positions of the carriage, respectively in full and dash lines.

Fig. 14 is an enlarged vertical cross section, on the line 14—14 of Fig. 13, primarily showing one of the suction nozzles and magnets on the carriage.

Fig. 15 is a vertical sectional detail on the line 15—15 of Fig. 13, showing a provision on the carriage for removing hangers from the wrapping table.

Fig. 16 is a vertical section on the line 16—16 of Fig. 3, detailing a mechanism for feeding a gummed tape to severing means, moistening stickers severed from the tape, and delivering the stickers to a point of use, the parts being in their position of sticker delivery to said point of use.

Fig. 17 is a section on the line 17—17 of Fig. 16, showing a pair of tape-feeding rollers.

Fig. 18 is a cross section on the line 18—18 of Fig. 16, showing two adjoined rock arms.

Fig. 19 shows in vertical section a cutter for severing the tape.

Fig. 20 is a view similar to Fig. 16, but showing the mechanism as positioned immediately after a severing operation.

Fig. 21 is a fragmentary top plan view of said adjoined arms and their shaft, as positioned in Fig. 20.

Fig. 22 is an end view of a suction head on one of said arms.

Fig. 23 is a sectional elevation on the line 23—23 of Fig. 3, showing the cover supply table, and parts of a mechanism for vertically adjusting such table.

Fig. 24 is a horizontal sectional detail on the line 24—24 of Fig. 23, further illustrating said mechanism.

Fig. 25 is a vertical section on the line 25—25 of Fig. 3, showing another portion of said mechanism.

Fig. 26 is a vertical sectional detail on the line 26—26 of Fig. 3, showing an automatic switch controlling said mechanism.

Fig. 27 is a vertical sectional view of the machine on the line 27—27 of Fig. 6 and primarily showing the main cam shaft and its cams.

Fig. 28 is a vertical section on the line 28—28 of Fig. 6 and primarily showing the main rock shaft and parts thereon.

Fig. 29 is a vertical section on the line 29—29 of Fig. 27, showing a cam operable actuating mechanism for a suction control valve.

Fig. 30 is a cross section of said valve and its mounting, on the line 30—30 of Fig. 29.

Fig. 31 is a vertical section on the line 31—31 of Fig. 27, showing a cam operable electric switch, controlling the magnet circuits.

Fig. 32 is a top plan view of the wrapping table and its wrapping mechanism.

Fig. 33 is a rear view of the same.

Fig. 34 is an enlarged vertical sectional view of the same, on the line 34—34 of Fig. 33.

Fig. 35 is an end view of a rockshaft employed in the mechanism for folding over the long cover flap.

Fig. 36 is a vertical section on the line 36—36 of Fig. 27 and showing two cam mechanisms for respectively effecting carriage reciprocation and folding over one of the shorter cover flaps.

Fig. 37 is a vertical section on the line 37—37 of Fig. 27 and showing a cam mechanism for folding the other short cover flap.

Fig. 38 is a diagram of electrical connections.

Fig. 39 is a rear view, as indicated by the line 39—39 of Fig. 5, particularly showing one of a pair of stops engageable by hangers as they are fed to the machine.

Product of the machine

With particular reference to Figs. 1 and 2, the purpose of the machine is to apply a paper cover 1 to a wire garment hanger 2. The hanger comprises the usual triangular body and a shank 3 integrally upstanding from the body and forming a supporting hook 4. The cover 1 is of a size and shape to form a long flap 5 foldable over the lower span of the lower span of the hanger and duplicate shorter flaps 6 to fold over the hanger sides. One of the flaps 6 slightly overlaps the other at 7, centrally of the hanger body, and both of the short flaps marginally overlap the flap 5. A rectangular sticker 8 elongated lengthwise of the hanger overlaps and interconnects all three flaps, thus sealing the cover, such sticker preferably registering fully with the lower flap, midway of its length. The three flaps are proportioned to jointly form a rear cover face of substantially the same area as the triangular front face of the cover.

Frame of the machine

The frame comprises a pair of horizontally spaced parallel sills 9, rigidly interconnected at their ends by cross beams 10. Rigidly surmounting said ends are uprights 11, bridged lengthwise of the frame by beams 12 and rigidly and terminally interconnected by front and rear cross bars 13 and 14. The sills 9 are bridged across their front portions by a shelf 15 and their mid- portions carry cross bars 16 and 17. The sills further carry forward and rearward extensions of the frame, designated respectively 18 and 19, such extensions terminally mounting posts 20 and 20a. The front portions of the beams 12 carry a shelf 21, and a vertically disposed plate 22 is disposed between and rigidly interconnects the mid- portions of such beams.

Drive to main shafts

The shelf 15 carries an electric motor 23, whose shaft 24 has a speed-reducing drive to a shaft 25 through front and rear pulleys 26 and 26a and a belt 27. A cam shaft 28, spaced rearwardly from the shaft 25, is driven from the latter, at a considerable speed reduction, through a pinion 29 and gear 29a. Spaced rearwardly from the cam shaft is a rock shaft 30, driven as hereinafter appears. Bearings for the shafts 25, 28, and 30 surmount the sills 9.

Track and its rocking mechanism

Surmounting and extended lengthwise of the frame is a track comprising a pair of channel bars 31 having their rear ends coaxially pivoted on a pair of brackets 32 positioned on the ends of the cross bar 14. Bridged across the mid- portions of said bars is a shelf 33 and a rock shaft

5

6

34 is spaced forwardly of said shelf and journaled in bearings 34a surmounting said bars.

The track is required at certain intervals in the machine cycle to rock up and down on its brackets 32. To effect this movement, a rock shaft 35 is journaled in the beams 12 and terminally rigidly carries a pair of forwardly projecting arms 36 adjacent the outer faces of said beams. Lifter links 37, inwardly adjacent said beams, connect the front ends of the arms 36 to the track. The beams are vertically slotted at 38 to accommodate the shaft 38a interconnecting said links and arms. The rack shaft 35 rigidly carries a downwardly extending arm 39 having a roller 39a (Fig. 6) on its lower end seated against a cam 40 fixed on the shaft 28, said cam being designed to raise and lower the frame twice per revolution (or cycle).

Carriage and its drive mechanism

Mounted for forward and back travel in the described track is a carriage (Fig. 13) comprising a hollow cross bar 41 of square cross section, supported by a pair of rollers 42 journaled on the bar ends and fitted in the channels of the bars 31. A pair of tubes 43 and 43a have threaded front ends inserted in the bar 41 and clamped thereon by nuts 44, the rear ends of the tubes being inserted in the end portions of a cylindrical bar 45 and clamped to such bar by nuts 44a. The bar 45 is supported at its intended elevation by journaling its ends in the tops of a pair of long rock arms 46 and 46a having lower ends fixed on the shaft 30.

Reciprocation of the carriage is effected by cam 47 (Fig. 36) fixed on the shaft 28, and formed with a circular groove 47a eccentric to said shaft. Such groove receives a roller 48 journaled on the mid portion of an upright rock arm 48a and connected at its upper end by a link bar 49 to the long rock arm 46a for actuating the latter. The arrangement is such as to considerably multiply the forward and back travel of the roller 48 as transmitted to the carriage. The primary function of the carriage is to successively rearwardly transfer hangers 2, each paired with a cover 1, from a table receiving a stack of the covers to a wrapping mechanism.

Cover supply table and its adjustments

In rearward proximity to the shelf 21 and at the approximate level of such shelf, there is installed a table 50 (Fig. 13) receiving a stack of the covers 1. Front and rear pairs of arms 50a and 50b (Fig. 3) carry upright bars 50c which engage the edges of the stacked covers assuring vertical registration and correct positioning of the covers. By a mechanism hereinafter described, the carriage is adapted to successively withdraw covers from this stack, and replenishment is manually effected whenever necessary. Preferably the described table conforms to the cover shape appearing in Fig. 2. It is necessary to adapt the table to be automatically lifted at a very gradual rate to maintain the top level of the stack substantially constant despite gradual diminution of the stack, since otherwise pick-up mechanism of the carriage would vary in its operative relation to the stack. Also it is necessary to afford a much more rapid adjustment of the table, when desired. Thus, for example, a maximum downward adjustment is a necessary preliminary to substitution of a full stack for an exhausted one. The table is centrally carried by a vertical rack bar 51 (Fig. 23) surmounted by

a circular head 52 underlying the table. Screws 52a or the like secure the table to said head. The rack bar slides in a bearing 53 carried by a cross bar 54 of the frame. Meshed with the rack bar is a pinion 55, fixed on a shaft 56 journaled in the frame. Said shaft is driven, at an end thereof, (Fig. 24) through a worm 57 and worm wheel 57a, and the worm shaft 57b is driven through bevel pinions 58 from one end of a shaft 59 extending across the frame. Such shaft, near its other end, (Fig. 25) rigidly carries a ratchet wheel 60 and further carries a crank disk 61 in exterior proximity to the frame. Said ratchet wheel is actuable by a pawl 62 fixed on an upright lever 62a pivoted at a point 62b between its ends on a substantially transverse lever 63. The latter is terminally pivoted some distance forward of the point 62b on the frame and extends a much greater distance rearwardly of said point to rest freely on the shaft 38a having lifter link connections 37 to the track. For yieldably urging the pawl against the ratchet wheel a coiled spring 65 takes effect on the lower end of the lever 62a.

As so far described, it is evident that the shaft 38a, when raised twice in each operating cycle, will correspondingly raise the rear end of the lever 63 and will lift the lever 62a to a much smaller extent, whereby the pawl 62 may effect a slight predetermined advance of the ratchet wheel. The arrangement is designed to effect a quite gradual periodic upward adjustment of the table 50, such adjustment being further greatly retarded by its transmission through the worm 57 and worm wheel 57a. The crank disk 61 permits a much more rapid adjustment of the table, either upward or downward, when desired. The pawl 62 is held clear of the ratchet wheel during use of the crank disk drive, this being permitted by extending the lever 62a above the shelf 21 through a slot 66 in such shelf. A slight forward actuation of the projecting portion of the lever will shift the pawl clear of the ratchet wheel, as shown in dash lines in Fig. 25.

It would be very difficult, if not impossible to perfectly synchronize the upward feed of the table with the rate of depletion of the stack of covers, and it is hence desirable to automatically discontinue the automatic upward feed when the top level of the stack is suited to properly coact with pick-up mechanism (hereinafter described) on the carriage. To secure this result, a solenoid coil 67 (Fig. 25) is fixed on a bracket 67a rigidly depending from the lever 63 rearwardly of the lever 62a, the plunger 67b of the solenoid being pivoted to the lower portion of the upright lever. The solenoid circuit 68 is controlled by a micro-switch 68a (of a standard type) carried by and beneath the rear margin of the shelf 21 (Fig. 26). Said switch has a thin flexible control arm 69 projecting upwardly from the switch and rearwardly beyond said margin to carry a roller 69a spaced above the forward margin of the table 50. When the stack of covers on the table encounters and slightly raises said roller, the switch 68a is closed with resultant energization of the solenoid coil 67. There results a retraction of the plunger 67b serving to swing the lever 62a counter-clockwise (with reference to Fig. 25), whereby the pawl 62 is withdrawn from the ratchet wheel. Upon a slight diminution in height of the cover stack, the switch 68a will automatically open, allowing the pawl to again engage the ratchet wheel re-

sponsive to the spring 65. Thus it is impossible for the automatic feed mechanism to excessively raise or lower the table 50.

Hanger delivery to stack of covers

(Figs. 8, 9 and 10.) Housed in the post 20 surmounting the front extension 18 of the frame is a chain 70 transmitting a drive from a shaft 71 journaled in said extension to a shaft 72 having its front end journaled in said post. The drive shaft 71 extends the full length of the machine, being driven from the shaft 28 through a pair of spiral gears 73 (Fig. 27). The shaft 72 extends rearwardly to a point overlying the table 50, and is formed with a shallow spiral groove 74 to receive the hooks of hangers 2 hung on said shaft, the drive to said shaft being such as to feed the hangers gradually rearwardly in said groove. The elevation of said shaft is such as to afford the hangers adequate clearance from the shelf 21. Underlying and supporting the rear portion of the described feed shaft is an arm 75, laterally extended to clear the bodies of the hangers and then downwardly extended and bolted to the frame at 75a. In approaching the rear or discharge end of the feed shaft, the hangers travel between parallel upright guide plates 76 (Fig. 3) fixed at 76a on the shelf 21 and occupying a proximity to the hanger ends preventing lateral hanger sway and assuring substantial centering of the hangers relative to their supporting shaft. Said plates carry stops 77 extending sufficiently into the rearward path of the hangers to limit advance of the hanger ends just prior to escape of the hanger hooks from the coned rear end of the feed shaft. Consequently each hanger, upon its discharge, falls in a predetermined manner and path such that the lower hanger span will be received in the notches 78a of a pair of positioning fingers 78, coaxially pivoted on and rearwardly projecting from the shell 21, and resting at their free rear ends on the cover stack. This assures an accurately transverse relation of said span to the machine and a correct space interval between such span and the forward edge of the cover stack. As a hanger encounters the fingers 78, it has a material rearward inclination from bottom to top. Hence, in completing its fall, it swings about the definitely positioned lower span as an axis, such span largely predetermining the final flat position of the hanger on the stack. It is preferred to dispose two adjacent electromagnets 79 in rearward proximity to the table with their pole faces at the stack top level and centered in the medial vertical plane of the table, as a further contribution to an accurate disposal of hangers. These magnets take effect respectively on the base of the hanger shank 3 and on the hook, assuring a medial relation of the shank to the ends of the underlying cover. A provision for energizing and deenergizing these magnets at required intervals is hereinafter described. It is preferred to mount the magnets on a bracket 79a, fixed on and rearwardly projecting from the slide bearing 53 (see Fig. 23).

Pick-up mechanism on carriage

Fixed on the cross bar 41 of the carriage are three electromagnets 80, 80a, and 80b having downwardly directed pole faces for jointly picking up a hanger from its position on the cover stack and retaining such hanger during its rearward delivery by the carriage to a wrapping mechanism hereinafter described. The magnet 80 assumes a position above the hanger shank

and the other two magnets are disposed above the hanger ends at the forward limit of carriage travel (see Fig. 13). Said magnets are mounted respectively on arms 81 fixed on and suitably projecting from the bar 41. A provision for energizing and deenergizing such magnets at proper time intervals is hereinafter described.

As each hanger is rearwardly transferred from the cover stack, the carriage also transfers the topmost cover 1 of the stack. This is accomplished by a pair of suction devices (Figs. 13 and 14), respectively comprising approximately semi-circular suction nozzles 82 and 82a, of tubular form, each having a partially flattened suction end 82b rearward of the bar 41 for applying suction, and each being arched above said bar and pivoted at its flattened and fully closed front end on the head 83 of a pin 83a inserted in said bar. A set screw 83b is set into said bar above each pin 83a, holding the latter properly adjusted. A hose 84 interconnects the two nozzles, maintaining the same air conditions in both, and a hose 85 forms a suction connection from the nozzle 82 to the front end of the tube 43. The suction ends 82b are disposed to lie above the rear margins of the stacked covers and equidistant from the medial vertical plane of the stack, when the carriage is at its forward limit. Thus in rearward transfer of a cover, it is dragged by its rear margin, hanging free at its front margin. Pivoting of the nozzles at their front ends permits swinging them forwardly, when desired, for ready access to their suction ends and the screws 83b.

Wrapping table and wrapping mechanism

The wrapping table is formed by a plate 86 preferably of brass or other non-magnetic metal. Said table is triangular, conforming substantially in shape and size of the body of the wire hanger 2, and is located sufficiently rearwardly of the table 50 to avoid interference and is centered, like the table 50, in the medial longitudinal vertical plane of the machine. The wrapping table is fixed on the machine frame in any suitable manner, as by three screws 86a respectively engaging the respective table apexes. The two end screws fasten to angle brackets 87 on the beams 12, and the third screw fastens to an arm 88 fixed on and rearwardly projecting from the plate 22. Two front magnets 88a and a rear magnet 88b are associated with said table.

Describing now a provision for folding over the long flap 5 of a cover occupying the table 86 (Figs. 32-35), a rockshaft 89 is horizontally journaled on the frame plate 22 in bearings 89a adjoining the top edge of said plate. Said shaft terminally carries a pair of aligned crankpins 89b which journal rollers 89c set into the upper portions of a pair of duplicate upright levers 90, having their lower ends set into angle brackets 90a, fixed on the plate 22 at its lower margin. Such brackets afford the described levers a combined reciprocating and rocking travel of small amplitude. Carried jointly by the upper ends of said levers is a folder bar 91 of slightly less length than the flap 5, the upper margin of such bar being rearwardly flanged at 91a. Said flange is flush with the wrapping table in a lowered position of the folder bar and overlaps said table in a raised position of the bar as is clear from Figs. 34 and 34A. As the bar rises the flap 5 assumes an upstanding position and it is folded down by rearward actuation of the bar. To rock the shaft 89 for actuating the folder bar, a sprocket wheel 92 on such shaft is engaged by a chain 93 down-

wardly extending from said wheel, its ends respectively engaging a lever 94 and a substantially vertical and relatively weak coil spring 95 anchored to the frame bar 16. Said lever is pivoted at 94a on the plate 22 and is downwardly stressed by a relatively strong coil spring 94b anchored to the frame bar 17. Journaled on the mid portion of the lever 94 is a roller 96 stressed by the spring 94b against a cam 96a fixed on the shaft 28, such cam during substantially a quarter turn holding the lever raised and affording a lowered position of the lever during an opposite quarter turn. The intervening quarter turns respectively rapidly raise and lower the lever. Such arrangement maintains the upper and lower positions of the folding bar each for a quarter cycle and affords a rapid shift from either such position to the other.

Duplicate mechanisms for folding the cover flaps 6 comprise shafts 97 and 97a extending along the two short edges of the table 86, and projecting oppositely beyond such table to rock in bearings 98 and 98a, a pair of which are fixed on each angle bracket 37. Said shafts are of reduced cross section in extending adjacent to the wrapping table and carry a pair of folder plates 99 and 99a, actuable through substantially one hundred and eighty degrees. Thus in exercising their function, the folder plates swing from a flush relation to the table 86 to positions overlapping such table. Fixed on the outer end portions of the shafts 97 and 97a are sprocket wheels 100 and 100a over which ride chains 101 and 101a. Corresponding ends of said chains are anchored respectively to front ends of substantially horizontal levers 102 and 102a, downwardly urged by coil springs 102c and having their rear ends respectively pivoted on the rock arms 46 and 46a near the pivotal lower ends of such arms. The other chain extremities are downwardly stressed by elongated and relatively weak springs 103 and 103a both anchored to the frame cross bar 16. Journaled on the levers 102 and 102a are rollers 104 and 104a riding on cams 105 and 105a fixed on opposite end portions of the shaft 28.

Travel of the chains induced by either upward or downward camming of the levers 102 and 102a is such as to effect the desired one hundred and eighty degree rocking of the folder plates. The cams are similarly so designed as to maintain said plates flush with the wrapping table during about half the operating cycle and overlapping such table for about a sixth of such cycle. The intervening intervals suffice to effect a rapid swinging of the folder plates.

The cam 96a takes effect slightly in advance of the cams 105 and 105a, whereby the cover flap 5 will be predeterminedly overlapped by the shorter flaps 6. Also one of the cams 105 and 105a is slightly advanced beyond the other, avoiding interference between the short flaps as they are folded.

Sticker tape feed and severing and sticker applying means

The track-surmounting shelf 33 rigidly carries an upright plate 106 having fixed on and projecting from its upper end a pin 107 on which a roll of glued paper tape 108 is rotatable. From said roll the tape feeds downward to a guide roller 109, and from the latter to and between paired feed rollers 109a and 109b. The roller 109a is fixed on a shaft 109c journaled in said plate, and rigidly mounting a ratchet wheel 110, engaged by an elongated pawl 111 pivoted on a

collar 112 fixed on the shaft 34. One end of the shaft 34 (Fig. 6) rigidly carries a driven crank arm 113 to which a connecting rod 113a extends from a driving crank arm 114 having its stub shaft 114a journaled in a bracket 114b upstanding on one of the track bars 31. The arm 114 extends downwardly beyond the connecting rod to engage a pin 114c fixed on the upper end of the long rock arm 46. The described mechanism is such as to rock the shaft 34 back and forth through substantially a ninety degree angle once per cycle of operation, effecting a desired slight advance of the tape. From the paired feed rollers, the tape descends through a narrow slot between front and rear guide blocks 115 and 115a having flush bottom faces. Against such faces slides a cutter 116 having a shearing coaction with the block 115. A pin 117 fixed on the lower end of an arm 118 is inserted in a slightly oversized socket in the cutter, said arm projecting rigidly downward from a lever 119. The latter is pivoted at its juncture with said arm on a pin 120 fixed in the plate 106, a sleeve 121 on the pin holding the lever so spaced from said plate as to clear the feed rollers. A vertically elongated sheet metal spring 122 has forwardly bent ends snapped on the sleeve 121 and cutter 116 to impose an upward pressure on the latter. A coiled spring 123 rearwardly extending from the arm 118 to a post 124 maintains the cutter normally retracted against a stop piece 125. The lever 119 extends rearwardly of its pivot to form a handle serving occasionally for test operation of the cutter, and has a lesser extent forward of said pivot to carry a pivotal depending thrust pin 126. The position of the cutter following severing of the tape and corresponding position of the actuating parts appears in Fig. 20.

Immediately on severing of a sticker 8 from the tape 108, the sticker is delivered, as will presently appear, to a moistening roller 127 partially immersed in water held by a tank 128 fixed on the shelf 33. To keep the roller 127 moist, it is rotated about one turn in each operating cycle of the machine. Thus said roller is fixed on a shaft 129 extending to an end portion of the shelf 33 and journaled in spaced lugs 130 on such end portion. Between such lugs, the shaft carries a pinion 131, and a rack-bar 132 meshed with the pinion is guided by said lugs. A thrust head 132a on the front end of the rack-bar is engageable by a roller 133 on the carriage during the rear portion of the carriage stroke, said roller being mounted on the upper end of a bracket 133a upstanding from the cross bar 41. The rack-bar is held engaged with the pinion and guided horizontally by an overlying bar 134 fixed between the lugs 130. The forward limiting position of the rack-bar is reestablished after each rearward actuation by a coiled spring 135 interconnecting pins 136 and 136a respectively carried by the guide bar and rack bar, the pin 136a being guided in a slot 137 of the guide bar.

Loosely mounted on the midportion of the rockshaft 34 is a suction arm 138 separated by a spacer collar 139 from the collar 112. The free end of said arm is enlarged to form a hollow rectangular head 140 formed in its end face with a considerable number of small suction apertures 140a. An air passage 140b extends from said head within the arm to communicate with one end of a flexible air hose 141 fixed at its other end on the end portion of the shaft 34 remote from the crank arm 113. Said end portion has

a central air passage 142 in communication with the hose and extending from the latter to the adjacent shaft extremity, and opening into an air hose 143 carried by and leading downward from said extremity. A provision for withdrawing air from the suction head through the line comprising the passage 142b, hose 141, passage 142, and hose 143 is hereinafter described.

It is evident from Fig. 20 that the arm 138 is so mounted and proportioned that in a raised and substantially horizontal position thereof, it will extend rearwardly from its supporting shaft, upwardly abutting the block 115 and presenting its suction head to an end portion of the tape projecting below said block. Immediately after this position is established, an arm 144 fixed on the shaft 34 closely adjacent the arm 138 upwardly actuates the thrust pin 126, slightly rocking the lever 119 and sliding the cutter 116 forwardly to sever a sticker 8 from the tape. Such sticker is promptly drawn to the suction head and upon lowering of the arm 138 to a vertical position (Fig. 16), the sticker will be brushed over the moistening roller 127 and then positioned accurately above its point of proper application to a wrapped hanger occupying the table 86.

As best appears in Fig. 21, the arm 144 has a reduced free end 144a to engage the pin 126. Two lugs 145 and 146 fixed on said arm extend in a straddling relation to the adjacent suction arm, while affording a material relative angular play between the two arms. This play, however, is normally taken up by a coiled spring 147 interposed between the lug 146 and the suction arm and set slightly into the latter. It is the described interconnection of the arms that adapts the shaft 34 to rock the suction arm, since such arm is loose on such shaft. In abutting the block 115, the suction arm completes its upward travel slightly prior to completion of the corresponding rocking actuation of the shaft 34. Being fixed on said shaft, the arm 144 travels upwardly beyond the suction arm, this being permitted by the coil spring 147, which then undergoes compression. It is this final upward actuation of the arm 144, carrying it higher than the suction arm, that accomplishes severing of the paper tape by lifting the thrust pin 126. As the two arms are lowered, expansion of the coiled spring 147 again establishes the normal parallel relation of such arms.

Control of suction devices

As best appears in Fig. 29, a cam operated valve applies an automatic control whereby suction is applied during one half the operating cycle to the carriage-mounted nozzles 82 and 82a, and during the other half to the suction arm 138. Said valve comprises a rectangular plate 148 bolted at 148a to one of the frame beams 12 and depending therefrom. Upper and lower horizontal passages 149 and 149a in said plate are jointly controlled by a slide 150 straddling a vertical edge of the plate. The hose 143 which leads down from an end of the shaft 34 and is a part of the air line leading to the suction arm 138, is connected to the passage 149, and a hose 151 opening from the passage 149a connects with the rear end of the carriage tube 43, a part of the suction line for the nozzles 82 and 82a. A port 152 in the slide 150 registers at the upper and lower travel limits of the slide with the passages 149 and 149a and is connected by a hose 153 with a suction pump 154 installed on the shelf

15. Built into the casing of said pump and driving the latter is an electric motor (not shown). A pair of coiled springs 155 installed on opposite sides of the plate 148 maintain a sealing pressure of the slide against the plate.

The slide is actuatable through a swinging link 156 from one end of an approximately horizontal lever 157 pivoted at its other end on bracket arm 158, upstanding from the frame. A coil spring 159 acting on said lever holds a roller 160, journaled on the lever, downwardly pressed against a cam 160a fixed on the shaft 28. The design of this cam is such as to maintain the valve slide raised during substantially a half turn of the shaft, while permitting the spring to lower the slide during the other half turn. The timing is such that suction at the pick-up nozzles is applied just as the carriage reaches its forward position and is transferred to the suction arm 138 as the carriage completes rearward travel.

Control of magnets

As best appears from the diagram (Fig. 38), the three carriage-mounted electromagnets 80, 80a, and 80b are connected in parallel in a circuit 161, while the magnets for retaining and positioning hangers on the two tables are in an alternative circuit 162. The switch 163, under control of the cam 154 (see Fig. 31) is adapted to break each of said circuits upon closing the other, the arrangement being such that the carriage magnets become energized during the short interval that the carriage occupies its forward position, the table magnets being at the same time deenergized. Thus as the carriage magnets pick up a hanger, the latter is released by the magnets fixed adjacent the cover supply table. As the carriage is momentarily stationary above the wrapping table, the carriage magnets are deenergized and the magnets adjoining such table receive current to retain the hanger in wrapping position. While the carriage travels forward without load the magnets 79 adjoining the supply table assist in properly positioning a hanger on the covers stacked on such table.

Discharge of wrapped hangers

Fixed centrally on the rear bar 45 of the carriage is a collar 165 (Fig. 15) whereon a hook 166 is pivoted beneath said bar. Said hook is maintained in a forwardly projecting position by a slight extension 166a from its pivotal end, preventing downward swinging beyond the position illustrated but affording a slight upward swinging. As the carriage arrives at its forward limit of travel the hook 166 rides over the rearwardly projecting hook 4 of a wrapped hanger, being lifted slightly in so riding, and dropping after clearing the hanger hook. Hence when the carriage recedes a moment later, the completed hanger is pulled from the wrapping table and travels rearwardly with the carriage. As the carriage pauses at its rearward limit, the hanger slides off the hook 166 and the hanger hook drops on the forward portion of a shaft 167 which conveys the wrapped hangers rearwardly. The shaft 167 is driven from the rear end of the shaft 71 through a chain 169 housed in the post 20a, and is spirally grooved to apply a rearward feed to the wrapped hangers, while spacing them predeterminedly. It is preferred to incline the shaft 167 slightly downward from front to rear to facilitate the desired feed. As a support for the forward portion of the shaft 167, a bracket 170 (Fig. 12) is secured to and

13

beneath the rear cross bar 14 of the frame, such bracket extending only sufficiently beneath the shaft to seat the latter without blocking travel of the hangers.

Operation of the machine

Hangers to be wrapped may be deposited on the rotating feed shaft 72 either manually or by any suitable automatic conveyor (not shown). The rate of hanger advance to the discharge end of such shaft is accurately timed to assure removal of each hanger from the stack of covers prior to depositing another on such stack. It is vital to accurately deposit each hanger on the stack in a proper wrapping relation to the topmost cover, since the pick-up mechanism on the carriage is designed to maintain an undisturbed relation between a cover and hanger in transferring them to the wrapping table. Vital also is the automatic vertical adjustment of the table 50, achieving a substantially constant top level of the stacked covers, since the pick-up mechanism operates at maximum efficiency only in close proximity to said level. Upon manually renewing the stack as need arises, the operator need not resort to measurements as to height of the renewal stack, since the table may be quite rapidly adjusted by the crank disk 61 to bring the new stack to a proper level. The up and down rocking actuation of the track is so timed relative to carriage travel, that at least a slight lift of the track at either carriage limit precedes shifting of the carriage from such limit. This assures adequate initial clearance for the carriage, and continued lift of the track as the carriage advances assures clearance from the bars 50c. At the rear limit of carriage travel, the final descent of the track acts through the suction arm 133 to press a sticker carried by such arm firmly on the folded cover flaps, assuring good adhesion of the sticker. During application of the sticker to the flaps, the latter are momentarily held down by the folder bar 91 and folder plates 99 and 99a. Productivity of the described machine is increased materially by the fact that it concurrently operates on three hangers, all at different stages of progress through the machine. Thus a fully wrapped hanger is ejected by the carriage in course of its retraction, and another hanger is deposited on the cover stack as soon as such retraction permits. Wrapping of a third hanger occurs during forward carriage travel, proceeding as fast as the carriage clears the wrapping table. Removal of wrapped hangers from the ejection shaft 167 may be effected manually or by mechanism not shown.

The described machine requires only slight skill to operate and needs only occasional attention.

What we claim is:

1. A machine for wrapping garment hangers, comprising a wrapping table for receiving a cover of flexible sheet material and a superposed substantially triangular garment hanger, said cover having three flaps to be folded over the sides of the hanger, mechanism for folding the flaps over the hanger in substantial unison, means for maintaining substantially definite positions of the hanger on the cover and of the cover on the table during such folding, means for sealing the flaps in their folded positions, and means for relatively timing the folding and sealing operations.

2. A machine for wrapping garment hangers, comprising a cover supply table to receive a stack

14

of covers formed of flexible sheet material, each cover having flaps to be folded over a hanger, means for continuously advancing hangers toward the supply table, means for periodically delivering such hangers individually upon said stack, a wrapping table, a carriage for delivering the topmost cover of the stack and the hanger superposed on such cover in unison to the wrapping table, a track guiding the carriage, an actuating mechanism for the carriage, mechanism associated with the wrapping table for folding the flaps over the hanger in substantial unison, means for maintaining a substantially definite position of each hanger on its cover during such folding, means for sealing the flaps in their folded position, and means for relatively timing the several specified operations.

3. In a wrapping mechanism, a wrapping table, means including a suction device for individually delivering to the table covers to be wrapped on articles, means including a suction device for delivering stickers individually to the table for sealing the covers when wrapped on the articles, a suction pump, a valve for connecting the pump selectively to said suction devices, and an actuating mechanism for said valve, energizing each of said devices as needed.

4. In a cyclic machine for wrapping magnetizable articles, a wrapping table, means including an electromagnet for periodically delivering said articles to the table, means including an electromagnet for properly positioning the articles on the table for wrapping, two circuits respectively including the respective electromagnets, a switch adapted to selectively close said circuits, and means for periodically operating the switch in timed relation to said delivery means to energize and deenergize the magnets during predetermined portions of the cycle.

5. In a machine for wrapping hooked garment hangers, a hanger delivery shaft having a discharge end and formed with a spiral groove receiving the hooks of hangers hung on such shaft, means for rotating the shaft to advance the hangers in said groove toward said discharge end, means laterally confining the hangers as they approach said discharge end, a table beneath said discharge end receiving a stack of hanger covers, and means for guiding the hangers in their discharge from the shaft to a predetermined position on the stacked covers.

6. In a machine for wrapping hooked garment hangers, a table receiving a hanger cover, means for feeding hangers to the table including an elongated support for the hanger hooks, whereby the hangers are suspended from and beneath said support in approaching said table, said support having a discharge end substantially above the table, and means laterally confining the hangers as they approach said discharge end.

7. In a machine for wrapping hooked garment hangers, as set forth in claim 6, an obstruction encountered by the lower portions of the suspended hangers as they approach said discharge end, whereby the hangers are tilted, preliminary to their discharge from the support.

8. In a machine for wrapping hooked garment hangers, a table receiving a hanger cover, means for feeding hangers to the table, including an elongated support for the hanger hooks, whereby the hangers are suspended from and beneath said support in approaching said table, said support having a discharge end substantially above the table, and an obstruction encountered by the lower portions of the suspended hangers as they ap-

15

proach said discharge end, whereby the hangers are tilted, preliminary to their discharge from the support.

9. In a machine for wrapping hooked garment hangers, a table receiving a hanger cover, means for feeding hangers to the table including an elongated support for the hanger hooks, whereby the hangers are suspended from and beneath said support in approaching said table, said support having a discharge end substantially above the table, and a pair of spaced arms pivoted substantially coaxially adjoining said table and having free end portions overhanging the table and notched to receive the lower spans of hangers discharged from said support upon said hanger cover.

10. In a machine for wrapping magnetizable garment hangers, a table for receiving a garment hanger cover and a garment hanger superposed on said cover, and a magnet associated with said table for positioning the garment hanger.

11. In a machine for wrapping wire garment hangers of the type having a substantially triangular body and a supporting shank projecting from such body, a table for receiving a cover for such a garment hanger, an element for receiving and locating the lower span of a hanger with relation to the table, and a magnet associated with the table for locating said shank with respect to said element.

12. In a machine for wrapping articles, a wrapping table, a carriage for delivering to such table articles and covers to be wrapped on the articles, a track mounting the carriage and guiding it to and from the table, means for reciprocating the carriage on the track, mechanism for applying a cover on the table to an article on the table, mechanism for periodically raising and lowering the track, means on the track for delivering a sticker to the wrapped article for sealing its cover, deriving sealing pressure from said lowering of the track, and means for relatively timing the specified operations.

13. In a machine for wrapping articles, a wrapping table for receiving a cover of flexible sheet material, and a superposed article, mechanism for applying a cover on such table to the superposed article, a rock arm disposed substantially above said table and having a suction head for delivering sealing stickers to wrapped articles, means for rocking said arm between predetermined limits, means for delivering sealing stickers to the suction head at one of said limits, and means for applying sealing pressure to the arm at its other said limit for applying stickers to the wrapped articles.

14. A machine for wrapping garment hangers, comprising a wrapping table for receiving a cover of flexible sheet material and a superposed garment hanger formed of magnetic metal, said cover having flaps to be folded over the hanger, mechanism for folding the flaps over the hanger, means including a magnet for maintaining a substantially definite position of the hanger on the cover during such folding, means for sealing the flaps in their folded position, and means for relatively timing the folding and sealing operations.

15. A machine for wrapping garment hangers, comprising a wrapping table, mechanism for delivering hangers formed of magnetic metal and hanger covers of flexible sheet material periodically to the table, such mechanism including a magnet for carrying the hangers, and each of said covers having flaps to be folded over a hanger, means for maintaining a substantially definite

16

position of each hanger on its cover during such folding, means for sealing the flaps in their folded position, and means for relatively timing the several specified operations.

16. A machine for wrapping garment hangers as set forth in claim 15, said delivery mechanism including a suction device for carrying the covers.

17. A machine for wrapping garment hangers comprising a cover supply table to receive a stack of covers formed of flexible sheet material, each cover having flaps to be folded over a hanger, means for periodically delivering hangers individually upon said stack, a wrapping table, a carriage for delivering the topmost cover of the stack and the hanger superposed on such cover in unison to the wrapping table, a track guiding the carriage, an actuating mechanism for the carriage, means for raising and lowering the track during each actuation of the carriage from either table toward the other table, mechanism associated with the wrapping table for folding the flaps over the hanger, means for maintaining a substantially definite position of each hanger on its cover during such folding, means for sealing the flaps in their folded position, and means for relatively timing the several specified operations.

18. In a machine for wrapping garment hangers as set forth in claim 17, said track being substantially rectangular and pivoted at an end thereof, means for rocking the track up and down about its pivotal end during each actuation of the carriage from either table toward the other table.

19. A machine for wrapping garment hangers as set forth in claim 18, said sealing means being installed on said track.

20. A machine for wrapping garment hangers, comprising a wrapping table for receiving a cover of flexible sheet material and a superposed garment hanger, said cover having flaps to be folded over the hanger, mechanism for folding the flaps over the hanger in substantial unison, means for maintaining a substantially definite position of the hanger on the cover during such folding, a mechanism for delivering stickers to said table for sealing the flaps in folded position, such mechanism comprising a sticker delivering arm disposed above the table and movable upward to receive a sticker and downward to apply the sticker under pressure, and means for relatively timing the operations of the folding mechanism and sticker delivery mechanism.

21. A machine for wrapping garment hangers, comprising a wrapping table, a carriage reciprocatory to and from such table for delivering to the table, at each reciprocation, a hooked garment hanger and a cover for wrapping such hanger, a mechanism associated with said table for wrapping the cover on the hanger, and an ejector on the carriage including an element engageable with the hook of a hanger on the table as the carriage reaches one limit of its reciprocation and effective through said hook to eject the hanger from the table, as the carriage recedes from said limit.

22. In a machine for wrapping garment hangers as set forth in claim 21, a conveyor for wrapped hangers, automatically receiving such hangers from said ejector.

23. In a machine for wrapping hooked garment hangers, a hanger wrapping mechanism, means for conveying wrapped hangers from said mechanism including an elongated support for the hanger hooks, whereby the hangers are suspended from and beneath such support, and

17

means for transferring the wrapped hangers from said mechanism to said support.

24. In a machine for wrapping hooked garment hangers as set forth in claim 23, said support being a shaft spirally grooved to receive the hanger hooks, and means for rotating said shaft to concurrently advance the hangers on the shaft.

25. A machine for wrapping garment hangers, comprising a cover supply table to receive a stack of covers formed of flexible material, means for periodically delivering hangers individually upon said stack, a wrapping table, a carriage for delivering the topmost cover of the stack and the hanger superposed on such cover in unison to the wrapping table, means on the carriage for picking up said topmost cover, another means on the carriage for picking up said superposed hanger, the two said pick-up means maintaining a required relation between the cover and hanger in delivering them to the wrapping table, wrapping mechanism associated with the wrapping table,

18

actuating mechanism for the carriage, and means for relatively timing the operation of said hanger delivery means, carriage actuating mechanism, and wrapping mechanism.

HARRY M. SIMMONS.
ROBERT M. SIMMONS.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,269,308	Reifsnider et al.	June 11, 1918
1,764,081	Jones et al.	June 17, 1930
1,772,143	Grunlee	Aug. 5, 1930
2,276,683	Bailey	Mar. 17, 1942
2,291,280	Joplin	July 28, 1942
2,479,552	Blessing	Aug. 23, 1949
2,520,322	Mestre	Aug. 29, 1950
2,530,670	Von Hofe	Nov. 21, 1950
2,543,004	Dewyer	Feb. 27, 1951
2,583,746	Peterson	Jan. 29, 1952