

Dec. 22, 1936.

T. A. FEDERWITZ ET AL

2,065,178

FEEDING AND COATING SYSTEM

Original Filed Nov. 24, 1928

4 Sheets-Sheet 1

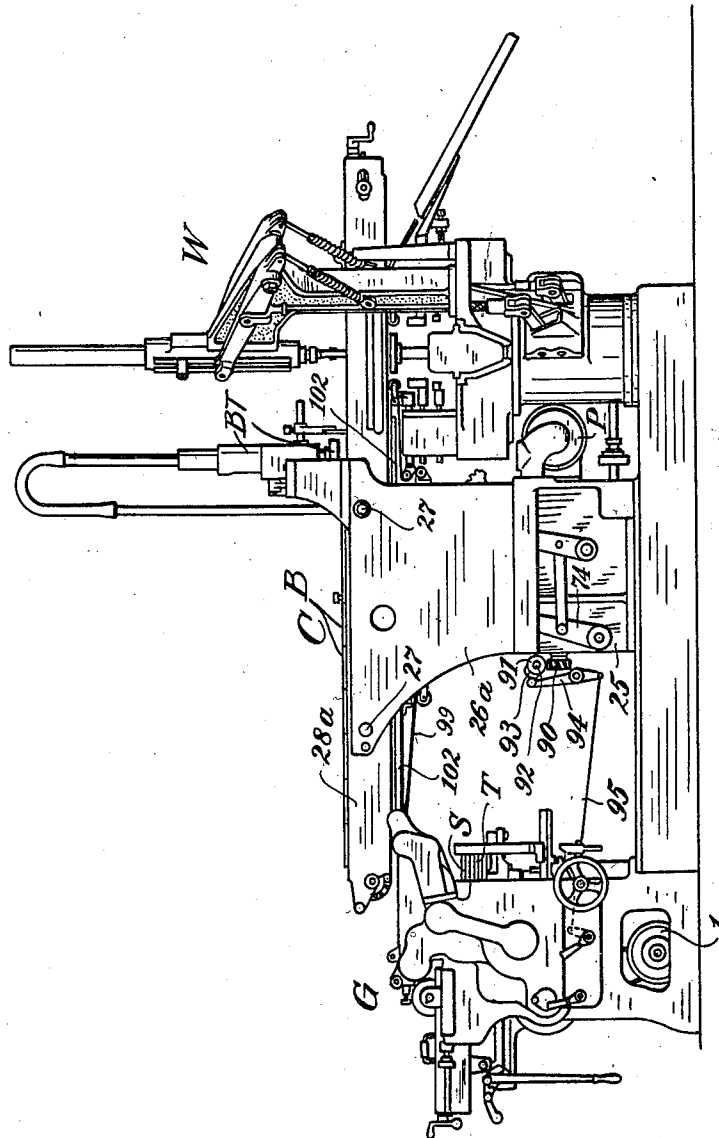


Fig. 1.

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Dec. 22, 1936.

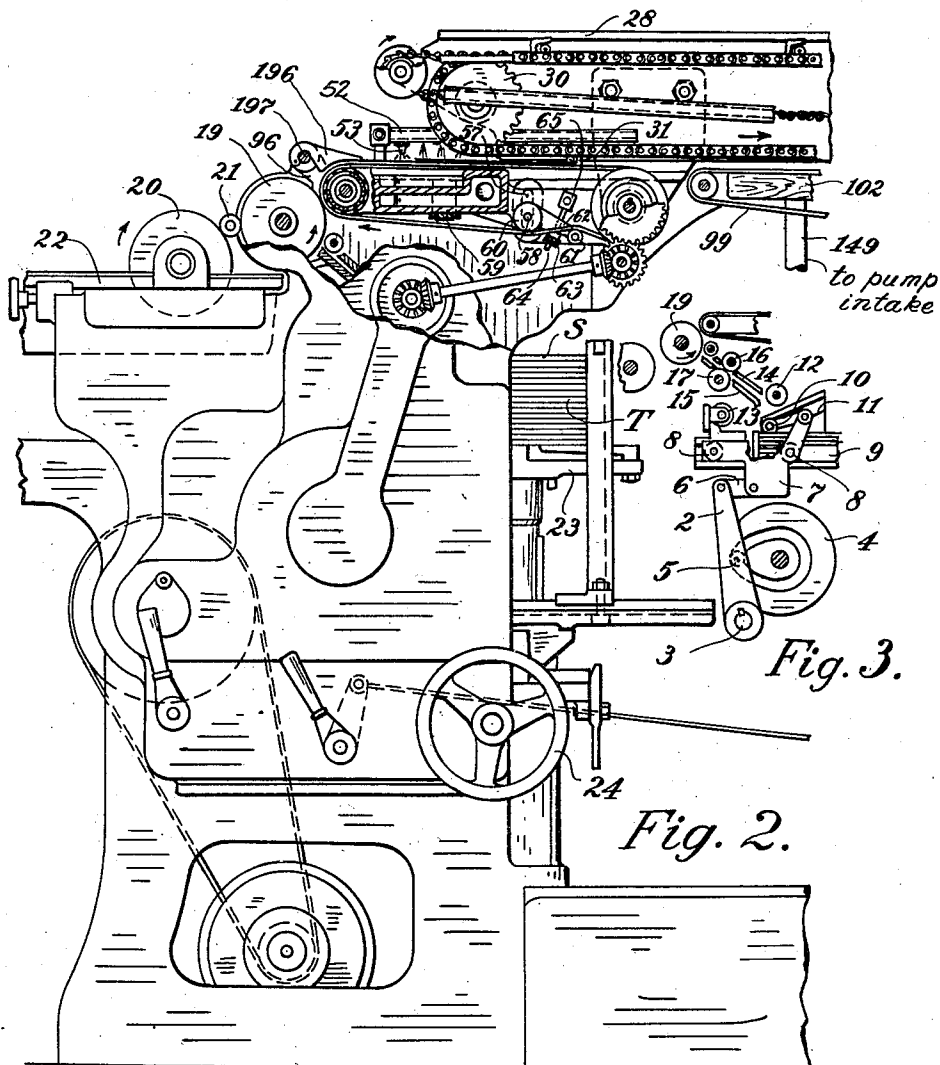
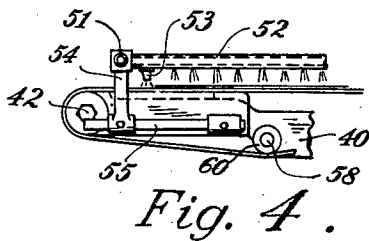
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FEEDING AND COATING SYSTEM

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4 Sheets-Sheet 2



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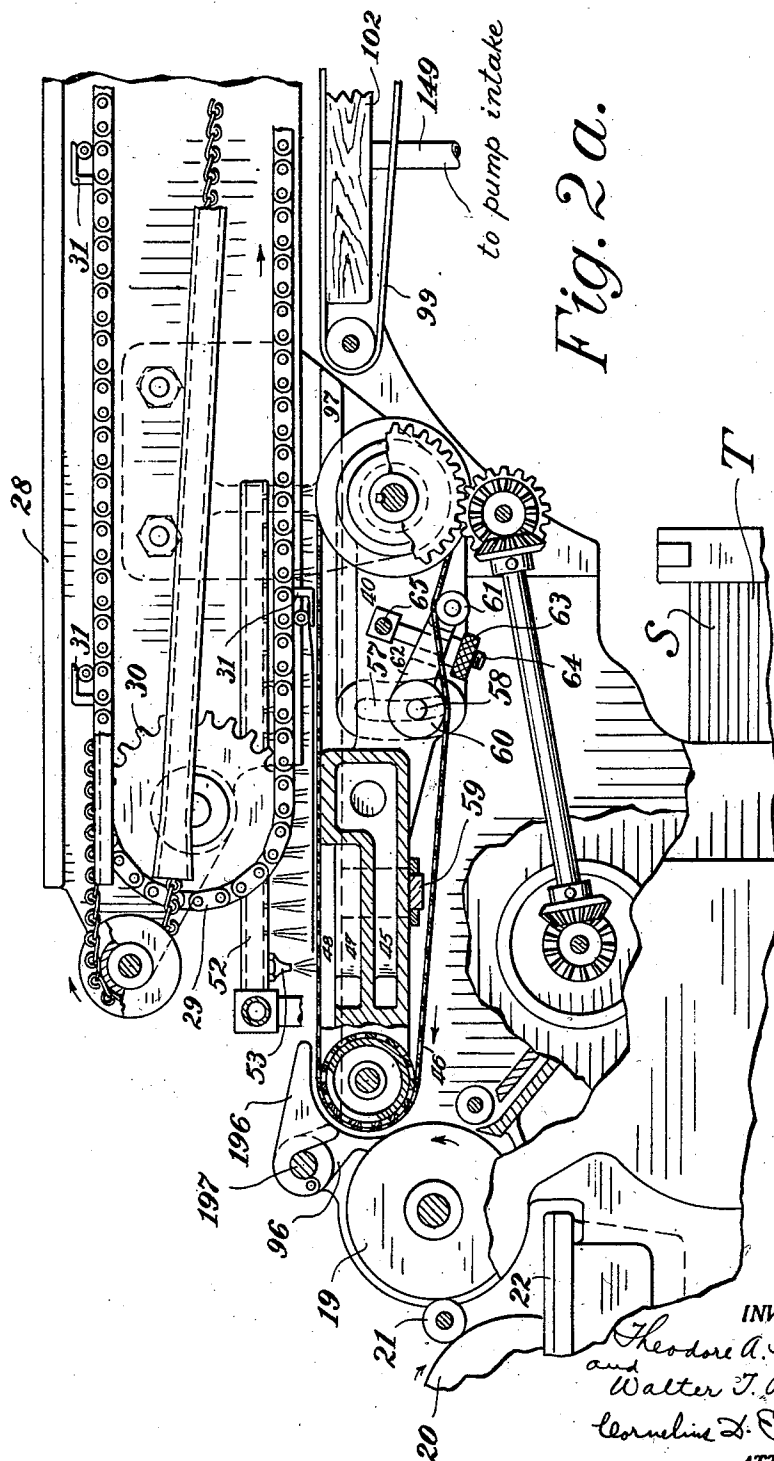
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4 Sheets-Sheet 4

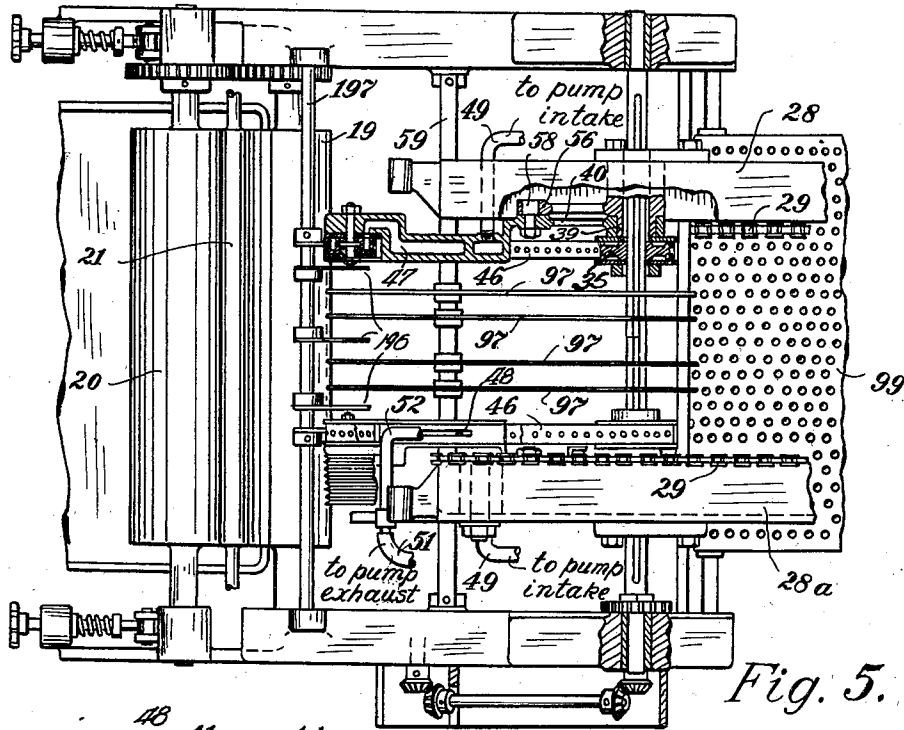


Fig. 5.

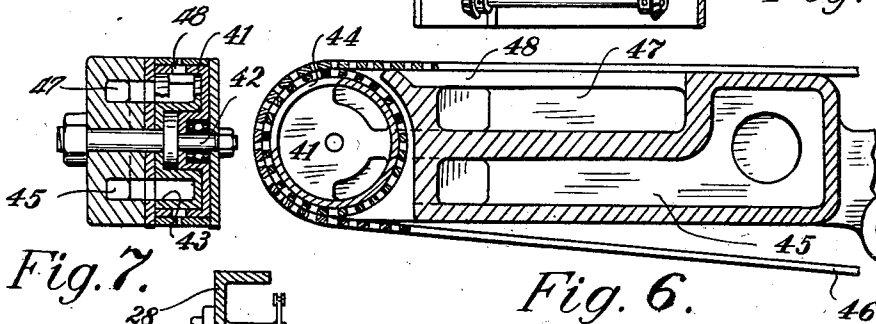


Fig. 7.

Fig. 6.

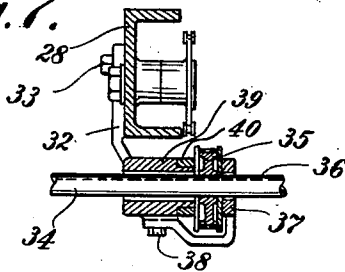


Fig. 8.

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UNITED STATES PATENT OFFICE

2,065,178

FEEDING AND COATING SYSTEM

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Original application November 24, 1928, Serial
No. 321,635. Divided and this application No-
vember 25, 1931, Serial No. 577,210

26 Claims. (Cl. 91—50)

Our invention relates to methods of and appa-
ratus for feeding and coating wrappers, sheets,
labels, or equivalent, hereinafter generically
termed "wrappers".

5 This application is a division of our application
Serial No. 321,635, filed November 24, 1928, upon
which has issued Letters Patent 1,906,051.

In accordance with our invention, suction is
applied in stripping a wrapper from an adhesive
6 applying roll as it is fed from or advanced by the
roll, through conveyor belt structure as it passes
over a perforated suction drum or pulley, whose
periphery closely approaches the periphery of the
coating roll.

15 Also in accordance with our invention, appli-
cation of suction is continued as the wrapper
travels with the belt structure beyond the suction
drum in a rectilinear path; and, preferably, dur-
ing this further movement, an air blast supple-
20 ments the suction in control of the wrapper and
for holding it against the conveyor belt.

Further in accordance with our invention, the
wrapper is transferred to a second conveyor, and,
more particularly, in passing the air blast permits
25 the blast to break the suction thereby releasing
the wrapper therefrom for movement by or with
the second conveyor; preferably, the second con-
veyor comprises a belt through which suction is
exerted, the aforesaid cooperation of the air blast
30 and successive wrappers avoiding the need for
valves or the like for cutting off suction from the
first conveyor, while maintaining suction in the
second conveyor, and permitting the suction
chambers of both conveyors to be in continuous
35 communication with a common suction pump.

Also in accordance with our invention, particu-
larly as the wrapper is straightening out in
passing beyond the suction drum and before ap-
plication of the air blast, it is mechanically guided
40 or held against the belt structure as by thin
plates or fingers.

More specifically, the first conveyor comprises
two units each having a suction drum and belt,
and preferably the units are adjustable trans-
45 versely of the machine to accommodate wrappers
of different dimensions; and more particularly,
the units have a common mounting for tilting
them away from the coating roll.

Our invention further resides in the method,
50 features of construction and arrangement here-
inafter described and claimed.

For an understanding of our invention, and for
illustration of a preferred embodiment thereof,
reference is to be had to the accompanying draw-
55 ings, in which:

Fig. 1 is a side elevational view of a box-wrap-
ping system including our invention.

Fig. 2 is a side elevational view, partly in sec-
tion, of wrapper coating and feeding mechanism
shown in Fig. 1.

Fig. 2a is a detail view on enlarged scale of
parts shown in Fig. 2.

Figs. 3 and 4 are detail views.

Fig. 5 is a plan view, with parts omitted, and
parts in section of the mechanism shown in Fig. 2. 10

Figs. 6 and 7 are detail views, in front and
side elevation, showing in section, and on en-
larged scale, wrapper conveyor mechanism of
Figs. 2 and 5.

Fig. 8 is a front elevational view, partly in sec- 15
tion, of structure shown in Figs. 2 and 5.

Referring to Fig. 1, there is shown an adhesive
applying unit G, and a wrapping machine W or
equivalent. Unit G and machine W are coopera-
20 tively related by mechanism synchronizing the
operations or movements of the unit G with the
operations or movements of the machine W and
with a conveying or transferring unit C which de-
livers to the wrapping machine W boxes, or
equivalent as aforesaid and sheets or equivalent, 25
as aforesaid, the latter gummed or glued and de-
livered by the unit G to the transferring unit C.

The adhesive applying unit G may be of any
suitable type capable of applying adhesive to
sheets of box-wrapping paper, or other suitable
material, and delivering the gummed sheets in
succession at uniform intervals. In the example
illustrated the unit G is of the same general type
disclosed, for example, in Nitsch and Federwitz
Letters Patent 1,472,614 granted October 30, 1923. 35

The wrapping machine W may be of any suit-
able character and in the example illustrated is
broadly of the type disclosed in prior Letters Pat-
ent to Nitsch and Federwitz 1,540,900, and in our
prior Letters Patent 1,541,036. 40

The conveying unit C is generally of the type
disclosed in our co-pending applications 698,841
filed May 13, 1924; 40,769, filed July 1, 1925;
70,462, filed November 21, 1925 and 158,183, filed
December 31, 1926, and Stokes application 45
147,405, filed November 10, 1926, which have is-
sued as Letters Patents Nos. 1,804,094—1,803,935—
1,804,406—1,831,236 and 1,796,731, respectively.

The adhesive applying unit G is driven at suit-
able speed by any suitable source of power, as a 50
motor I, and includes apparatus to remove single
sheets S from a stack T of unglued sheets. Re-
ferring to Fig. 3, the mechanism which may be
of the type described and claimed in co-pending
Nitsch and Baker application 3,316, filed January /

19, 1925, upon which has issued Letters Patent No. 1,684,741, comprises a lever 2 pivoted at 3 to a side frame of gluer G and rocked by a cam 4 having a slot engaging a roller 5 secured to the lever. The upper end of lever 2 is connected by a link 6 to a carriage member 7 having rollers 8 guided in channels provided by bracket members 9. Movement of the carriage 7 to the right as viewed in Fig. 3 effects upward movement of and rotation of a suction roller 10 adapted to engage the top sheet of the stack near its front edge and to lift it therefrom as the roller 10 moves along the inclined guideway 11, until the point of its travel is reached at which the front edge of the sheet is clamped between the feed roll 12 and cooperating roller 13. The sheet S guided between plates 14 and 15 is engaged by the feed rolls 16 and 17 and moved thereby into engagement with the coated surface of a glue- or adhesive-applying roll 19.

Preferably adhesive is supplied to this roller by mechanism of the type described and claimed in copending Federwitz application Serial No. 187,646, filed April 29, 1927, which has issued as Letters Patent No. 1,772,344. A constantly rotating agitating roller 20, whose lower surface dips in a reservoir of adhesive within a pan or tank 22, maintains a fountain of adhesive between the constantly revolving rolls 19 and 20, the intermittently rotated roller 21 interposed therebetween forming a scraper to insure a smooth coating on the surface of roller 19. By suitable mechanism, for example, similar to that described in our copending application Serial No. 244,124, filed January 3, 1928, for which has been granted Letters Patent No. 1,770,483, the stack T is fed upwardly as sheets S are removed therefrom. The table or support 23 carrying the stack of sheets may be raised or lowered when desired or necessary by manual operation of the hand-wheel 24.

Referring to Figs. 1 and 5, to opposite sides of the conveyor base member 25 and extending upwardly therefrom are the side frames 26a connected by tie-bolts 27 which pass through and support the adjustable conveyor frames 28 and 28a, each of which is provided with a chain 29 or equivalent, supported by idler sprockets 30 disposed adjacent opposite ends thereof. Sheet-grippers 31, preferably of the character disclosed in our aforesaid co-pending application Serial No. 40,769 are uniformly spaced along the chains. Each frame, as is shown most clearly in Fig. 8, adjacent its end near gluer unit G, is provided with a depending bracket 32 secured thereto as by bolts 33, and through which freely passes the intermittently rotated shaft 34 journaled in the side frames of the gluing machine. A pulley 35 is provided with a slot loosely fitting a key 36, or equivalent, secured to shaft 34, effecting rotation of the pulley with the shaft but permitting its movement longitudinally thereof with bracket 32. A retaining member 37 secured to bracket 32 as by bolt 38 engages one face of the pulley and the bracket 32 the other face thereof. The bracket 32 is provided with a hub portion 39 on which is pivotally mounted a lever 40, to the other end of which, adjacent the roller 19 of the gluer unit G is pivotally mounted for rotation, a suction drum or pulley 41. As illustrated in Fig. 7, the pulley may be mounted on ball bearings the inner race of which is secured to a bolt 42 extending through the lever 40 and clamping thereto a hollow, apertured member 43 having a cut-away portion 44 which permits suction within a com-

partment 45 of a housing secured to or integral with lever 40 to be applied through perforations of the pulley 41 and of the belt 46, preferably of rubber composition, passing thereover and engaging pulley 35. The hollow member 43 also forms a communicating passage between the lower suction chamber 45 and an upper chamber 47, the latter having a slot 48 which registers or is in alignment with perforations of the belt 46.

The outlet of chamber 45 may be suitably connected, as by a pipe 49, Fig. 5, to the intake of a suction pump P. Fig. 1, whose outlet side may be connected through a pipe 51 to a tube 52 positioned above lever 40, and provided with a series of holes in its lower surface, opposite belt 46, at least one of which particularly the one nearest the adhesive applying unit G is or may be provided with a nozzle 53. The pipe 52 is supported by member 54 adjustably clamped to a bar 55 (Fig. 4) secured to housing 40.

Bracket 32 is provided with an extension 56, Fig. 5, having a slot 57 through which passes a guide bolt 58. Ready access to the rolls of the gluing machine may be had by tilting upwardly either or both of the levers 40 and the conveyor structure carried thereby. The guide fingers 196 are pivoted on stop bar 197 so that they do not obstruct the tilting of the suction conveyors toward or away from the coating roll 19. A stop bar 59, (Fig. 2a) extending between the side frames of the gluing unit G defines the proper position of lever 40. The belt 46 passes over an idler pulley 60 freely rotatable on bolt or shaft 58, and a tension-adjusting pulley 61 mounted on an end of an arm 62 loosely pivoted on shaft 58. The position of arm 62 and the tension of belt 46 may be varied by adjustment of nut 63 along a threaded bolt 64 passing through arm 62 and extending from a post 65 secured to the lever 40.

By mechanism fully described and disclosed in our application Serial No. 321,635, filed November 24, 1928, of which this application is a division, the levers 74 (Fig. 1) oscillate to effect intermittent movement of the conveyor chains 29 in timed relation to operation of the wrapping machine W. A gear 90 drives gear 91 to effect rotation of shaft 92 to which is secured a cam 93, which once for each cycle of the wrapping machine, rocks a lever 94 connected by cable 95 or equivalent to tripping mechanism of the gluer unit G, synchronizing feeding of sheets S from stack T, and the transportation of sheets by conveyor chains 29.

In the operation of the mechanism thus far described, sheets are intermittently and periodically fed from a stack, coated with adhesive and stripped from the adhesive applying roll 19 by strippers 96. Suction exerted through the drums 41 and belts 46 during the stripping operation draws the wrapper as it advances from the coating roll 19 onto the belts 46. As the wrapper curves over the top of the drums 41 onto the straight part of the belt, the fingers 196 guide it and keep it against the belts particularly before it is acted upon by the suction through slots 48 of chamber 47. When on the upper lift of the conveyor belts 46, control of the wrapper is ensured both by suction and the air blast from orifices in pipes 52. As the rear edge of each wrapper passes beyond nozzle 53, at which time its leading edge is within the jaws of grippers 31 of the second conveyor, the air blast from the nozzle enters chamber 47 directly below and so breaks the vacuum to release the wrapper from suction dur-

ing movement by the second conveyor. By this cooperation between the wrapper and air-blast, it is not necessary to provide valves and operating mechanism intermittently to break and re-establish the vacuum.

As the wrapper is transported by conveyor belts 46, it is thrust against the vertical portion of the open grippers. As stated in our aforesaid application, Serial No. 40,769, now issued as Patent No. 1,893,736, should the sheet be laterally displaced with respect to a line extending at right angles to the longitudinal axis of the conveyor, its advanced corner will meet and be stopped by one of the grippers, whereupon the lagging corner will be carried forwardly into engagement with the other transversely-aligned gripper by the belts 46 to effect proper registration or alignment of the wrapper. In the construction herein disclosed, the suction is broken, as above described, allowing relative movement of the wrapper with respect to the belts 46 without hindrance by suction.

The second conveyor includes a belt 99 through which suction within chamber 102 connected by conduit 149 to pump P is exerted to hold the wrappers flat during their transportation by the second conveyor. Belt 99 may be of porous fabric, or preferably of a rubber composition and provided with perforation of suitable size and spacing. The suction chamber 102 extends to the wrapping machine W (Fig. 1) so that the wrappers are held flat until they reach the wrapping station. As more fully described and claimed in the parent application, the transfer plunger BT deposits boxes B in succession upon the wrappers while flat upon belt 99 and during continuance of suction.

The suction for chamber 102 and for the drum 41 and chamber 47 of the primary conveyors is supplied from a common source, pump P. Because of the cooperation between each wrapper in succession and the air blast, above described, suction is intermittently effective in the primary conveyors and continuously effective in the second conveyor, without use of any valves, and notwithstanding that all chambers are in continuous communication with the single suction pump.

The guide plates 97 adjustably positioned on cross bar 59 extending transversely of the gluer unit between the side frames thereof support the middle portions of the wrappers to prevent sagging.

Though the adhesive applying mechanism is disclosed as incorporated in a complete and full automatic box-wrapping system, it is to be understood that the gluer G is a unit capable of being used, for example, to deliver coated wrappers to an operator who manually transports the box and wrappers to a wrapping machine.

What I claim is:

1. The method which comprises applying adhesive to a face of a box-wrapper, effecting engagement between the uncoated face of the wrapper and a moving surface, applying an air blast to the coated face and suction to the uncoated face of the wrapper to hold it against the moving surface, and at a point in the travel of the wrapper with said surface discontinuing the suction only.

2. The method which comprises applying adhesive to a face of a box-wrapper, effecting engagement between the uncoated face of the wrapper and a moving surface, applying an air blast to the coated face and suction to the uncoated face of the wrapper to hold it against the mov-

ing surface, and as the trailing edge of the wrapper reaches a predetermined point destroying the suction by the air blast and holding the wrapper against the surface solely by the air blast.

3. The method which comprises applying adhesive to a face of a box-wrapper, effecting engagement between parallel, spaced strips of the uncoated face of the wrapper and moving surfaces, and holding the wrapper in engagement with said surfaces by applying suction to the uncoated face and an air blast to the coated face of the wrapper.

4. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a suction chamber adjacent said roll, conveyor belt structure passing thereover, to transport adhesive coated wrappers, and means to provide an air blast on the coated side of wrappers conveyed by said belt structure.

5. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a suction drum adjacent said roll, a suction chamber, conveyor belt structure passing over said drum and chamber to transport adhesive coated wrappers, and means to provide a blast of air on the coated side of wrappers to the uncoated side of which is simultaneously applied suction within said chamber.

6. Wrapper feeding and coating mechanism comprising conveyor chains having wrapper gripper elements thereon, an adhesive applying roll, a suction chamber terminating adjacent said roll, a conveyor belt passing thereover to transport adhesive coated wrappers to said gripper elements, and means to provide an air blast destroying suction within said chamber as the wrappers are engaged by said gripper elements.

7. Wrapper feeding and coating mechanism comprising conveyor chains having wrapper gripper elements thereon, an adhesive applying roll, a suction chamber terminating adjacent said roll, a conveyor belt passing thereover to transport adhesive coated wrappers to said gripper elements, and means to direct a blast of air against the coated face of said wrapper to hold it in engagement with said belt, and to destroy suction within said chamber as the wrappers are engaged by said gripper elements.

8. Wrapper coating and feeding mechanism comprising an adhesive applying roll, a plurality of spaced suction drums positioned adjacent said roll, perforated belts passing over said drums to transport coated wrappers from said roll, and means for adjusting said drums and belts toward and away from each other parallel to said roll.

9. Wrapper coating and feeding mechanism comprising an adhesive applying roll, a plurality of spaced suction drums positioned adjacent said roll, conveyor chains having gripper elements, and perforated belts passing over said drums to transport coated wrappers from said roll to said gripper elements, said conveyor chains and respective suction drums and belts being simultaneously adjustable parallel to said roll.

10. Wrapper coating and feeding mechanism comprising an adhesive applying roll, a plurality of units each comprising a suction chamber terminating adjacent said roll, a perforated belt passing over said drum to transport coated wrappers, and a perforated pressure chamber, disposed opposite the suction chambers, and means for adjusting said units toward and away from each other parallel to the axis of said roll.

11. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a perforat-

ed drum rotatable adjacent said roll, conveyor belt structure engaging said drum, means for applying suction through said drum and belt structure, and stationary structure for guiding the wrapper as it straightens out in passing with said belt beyond said drum.

12. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a perforated drum rotatable adjacent said roll, a suction chamber spaced therefrom, conveyor belt structure successively passing over said drum and chamber, suction means connected to said roll and said chamber, and stationary structure for guiding a wrapper as it travels with said belt from said roll to said suction chamber.

13. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a perforated drum rotatable adjacent said roll, conveyor belt structure engaging said drum, means for applying suction through said drum and belt structure, stationary structure disposed adjacent said drum for guiding the wrapper as it straightens out in passing with said belt beyond said drum, a second conveyor for receiving a wrapper transported by said belt structure comprising a second belt structure and associated suction chamber, means connecting said suction chamber to said suction means, and means controlled by a wrapper on said first conveyor belt structure to cut off the suction through said drum without effect upon the suction of said chamber.

14. Wrapper feeding and coating mechanism comprising an adhesive applying roll, conveyor belt structure for transporting wrappers from said roll, a suction chamber disposed adjacent said belt to hold wrappers thereagainst, a second conveyor including belt structure and suction chamber therefor, and means to direct a blast of air against a wrapper during its movement with said first belt structure and to destroy suction within said first chamber to release the wrapper from suction for movement with said second conveyor, and without release of suction upon wrappers upon said second belt structure.

15. Wrapper feeding and coating mechanism comprising an adhesive applying roll, conveyor belt structure for transporting wrappers from said roll, a suction chamber for holding wrappers against said belt, a second conveyor, and means to direct a blast of air against a wrapper during its movement with said belt structure and to destroy suction within said first chamber as said wrapper moves to a position for transfer to said second conveyor.

16. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a pivoted suction chamber, a perforated drum carried by and in communication with said chamber, normally disposed adjacent said roll, a conveyor belt passing over said drum and chamber to transport coated wrappers, and wrapper guiding structure pivotally mounted to avoid obstruction to pivotal movement of said chamber.

17. The method which comprises applying suction to transfer a box wrapper from an adhesive applying surface to a conveyor, continuing application of suction and applying an air blast during movement of the wrapper with said conveyor, transferring the wrapper to a second conveyor, and for said transfer disconnecting suction and maintaining only the air blast.

18. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a suction drum adjacent said roll, a suction chamber, belt structure passing over said drum and chamber,

and a nozzle disposed to deliver a blast pressing the wrapper against said belt structure and to break the vacuum in said chamber when the trailing end of the wrapper passes said nozzle.

19. Wrapper feeding and coating mechanism comprising an adhesive applying roll, perforated drums rotatable adjacent said roll, conveyor belts passing over said drums, means for applying suction through said drum and belt structure, a second conveyor for receiving wrappers transported by said belt structure, and stationary supporting members disposed between said belts and shorter than the distance between said applying roll and the adjacent end of said second conveyor.

20. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a suction conveyor drum, and pivoted supporting structure for said drum movable to one position to bring said drum closely adjacent said roll and movable to another position to permit access to said roll.

21. Wrapper feeding and coating mechanism comprising an adhesive applying roll, stripper blade structure for deflecting coated wrappers from said roll, a suction conveyor drum, and pivoted supporting structure movable to one position to bring said drum closely adjacent said roll at the region where the wrappers are deflected therefrom by said stripper blade structure and to another position to permit access to said roll and said stripper blade structure.

22. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a suction drum, a suction chamber, conveyor belt structure passing over said drum and said chamber in succession, and a pivoted supporting structure for said drum and said chamber movable to one position to bring said drum closely adjacent said roll and to another position permitting access to said roll.

23. Wrapper feeding and coating mechanism comprising an adhesive applying roll, a perforated drum rotatable adjacent said roll, conveyor belt structure engaging said drum, means for applying suction through said drum and belt structure, stripper blade structure for deflecting coated wrappers from said roll toward said belt at a region of its engagement with said drum, and stationary structure for guiding the wrapper as it straightens out in passing with said belt beyond said drum.

24. A wrapper coating and feeding system comprising mechanism for applying adhesive to a wrapper, conveying means for moving the coated wrapper along a path from said mechanism, means associated with said conveying means for applying suction to the coated wrapper, wrapper registering means at a region in said path, and means for releasing said wrapper from suction while in said region for registration by said registering means.

25. A wrapper coating and feeding system comprising mechanism for applying adhesive to a wrapper, conveying means for moving the coated wrapper along a path from said mechanism, means associated with said conveying means for applying suction to the coated wrapper, wrapper registering means at an intermediate region in said path, and means for temporarily releasing said wrapper from suction while in said intermediate region for registration by said registering means.

26. A wrapper coating and feeding system comprising mechanism for applying adhesive to a wrapper, conveying means for moving the coated wrapper along a path from said mechanism com-

prising a conveyor terminating adjacent a second conveyor, each of said conveyors comprising endless belt structure, means for applying suction to the coated wrapper through the endless belt structure of said conveyors, mechanism for transferring a wrapper from said first to said second

conveyor, and means for releasing the wrapper from suction for movement by said transfer mechanism.

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CERTIFICATE OF CORRECTION.

Patent No. 2,065,178.

December 22, 1936

THEODORE A. FEDERWITZ, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 69-70, claim 10, for "wrapners" read wrappers; and line 71, same claim, for "chambers" read chamber; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of March, A. D. 1937.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.