APPARATUS FOR FEEDING LETTER ENVELOPES OR THE LIKE

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Filed: Jan. 8, 1970

Appl. No.: 1,347

U.S. Cl. 271/30 A, 271/62 B, 271/DIG. 10

Int. Cl. B65B 1/14, B65h 3/12

Field of Search 271/30, 30 A, 26 ES, 26 E, 271/31, 38, 39, 40, 8 A, 24, 25, 43 A, 62 B, 87, DIG. 10

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ABSTRACT

Work station apparatus for individually successively feeding elongate planar work items such as letter envelopes including main feed means including ported vacuum belt means for rapidly successively endwise edgewise shifting a continuous supply of work items and including supply feed means for progressively broadwise advancing a juxtapositioned supply of envelopes or the like to the main feed means and with the supply feed means including automatically operative means for regulating the feed rate of the supply feed means in response to the feed rate of the main feed means.

12 Claims, 6 Drawing Figures
The invention relates generally to work item feeding apparatus and particularly relates to such apparatus adapted for individually successively feeding thin flat work items of material such as letter envelopes or the like.

Various apparatus has heretofore been designed for processing or handling letter envelopes or the like and for rapidly successively feeding such work items to other apparatus operative for stamping, cancelling, inspecting, sealing or opening letter envelopes or the like. In the design and operation of the prior art work handling apparatus certain problems of particular import are noted. For example, the typical letter-handling apparatus is of complicated and intricate design and is prone to frequent malfunction by mishandled work items during the work feeding process. Not infrequently, a letter work item may not be handled properly and become jammed in the apparatus thereby obstructing the work feeding process and resulting in downtime of the apparatus. Moreover, a mishandled letter item causing apparatus obstruction may be mutilated to the extent requiring taping or repair of the envelope and perhaps damage to the envelope requiring notification to the sender or the addressee of such mail item. Certain prior art apparatus adapted for handling mail items utilize complicated electronic circuitry including microswitches and photoelectric devices in individually successively feeding the letter work items. The operation and maintenance of such apparatus required machine operators of considerable skill and maintenance personnel trained in repair and operation of such complicated electronic apparatus.

A primary object of the present invention is to provide apparatus for feeding letter envelopes or the like which is of relatively simple design and construction and does not include complicated or intricate electronic devices or the like subject to malfunction; the apparatus of the instant invention is of sturdy and durable design and construction resulting in less breakage and downtime and requiring minimum repair and maintenance. The apparatus may be attended by workmen having negligible skill and practice in the operation of the apparatus. The letter envelope work items or the like may be rapidly processed with substantially reduced likelihood of damage or mutilation to each work item; the apparatus is consistently uniformly operative and is of design and construction substantially obviating mishandled letter work items and reduces considerably the downtime or work stoppage heretofore resulting from such occurrences. The invention may be embodied in work station apparatus operative for collecting and individually successively feeding the letter items or the like to other work station apparatus operative for stamping, cancelling, opening or sealing the envelope items. A further object of the invention is to provide work feeding apparatus adapted for use in manufacture and for use in rapidly successively feeding thin planar work items such as paperboard blanks, sheet or plate products or the like.

In the drawings:

FIG. 1 is a top plan view of the planar work item feeding apparatus of the instant invention;

FIG. 2 is a vertical plane sectional view of the advancing rack means thereof taken on the line 2—2 of FIG. 1;

FIG. 3 is a vertical plane view of the advancing screw feed mechanism taken as on the line 3—3 of FIG. 1;

FIG. 4 is a vertical sectional view of the main feed means of the invention taken as on the line 4—4 of FIG. 1;

FIG. 5 is a horizontal sectional view of the mechanical-vacuum feedhead assembly of the apparatus taken as on the line 5—5 of FIG. 4; and

FIG. 6 is a view, similar to FIG. 3, and showing an enlarged vertical section of the mechanical-vacuum feedhead assembly of the apparatus.

The feed apparatus of the instant invention is generally indicated by numeral 10 and is shown and described as being embodied in apparatus adapted for handling or processing letter envelopes L. The feed apparatus 10 includes main feed means 12 operative for rapidly successively endwise edgewise shifting the letter envelopes to the right as viewed in FIGS. 1 and 5. The main feed means 12 basically includes a mechanical-vacuum feedhead assembly 14 including a thin flat belt 16 having a pair of port openings 18, pull-up and driving members 19, 20b, 22 unidirectionally driving belt 16 and defining a running belt reach section 24; vacuum pump means 26, vacuum box means 28 having stationary port openings 30, and a vacuum conduit 32 communicating pump 26 with the vacuum box structure. The apparatus 10 further includes supply feed means 34 for successively introducing a plurality of work item envelopes L to flatwise juxtaposition with the flat belt reaching section 24 of the vacuum head assembly 14. The supply feed means 34 preferably includes advancing rack means 36 adapted for arranging and advancing the letter items L in groups G, and advancing screw means 38 simultaneously operative with the advancing rack means.

The letter envelope items L are adapted to be progressively moved in flatwise juxtaposition arrangement generally in a path of movement perpendicular to the plane of movement of the vacuum belt running reach section 24 of the mechanical-vacuum feedhead assembly 14. The advancing rack structure of the supply feed means 34 basically includes a plurality of clean elements 40 intermittently continuously arranged and runningly supported by chain and sprocket means 44, 45 and operatively defining a running series of clean elements 40a, 40b, 40c, 40d, 40e, 40f. The advancing screw means 38 basically includes a long cylindrical screw member 46 turnably supported in bearing means 48 in perpendicular arrangement with the running belt reach section 24 of the vacuum head assembly 14 and in parallel arrangement with the series of clean elements 40 of the advancing rack means 36 (see FIG. 1). The threaded upper portion 46' of the horizontal screw member 46 preferably is arranged generally coplanar with the lower edge portion of the vacuum belt reach section 24 and with the threaded portion 46' being adapted to engage and edgewise support a plurality of groups G of letter items L in flatwise juxtaposition arrangement (see FIGS. 2 and 6).

Returning now to the main feed means 12, the mechanical-vacuum feedhead assembly 14 provides means for laterally edgewise shifting the leading letter envelope L' of the leading group of envelopes G as the multiplicity of envelope work items are broadly conveyed through simultaneous action of the advancing rack and screw means respectively 36, 38. The vacuum box means 28 is arranged in the enclosure of belt 16 and includes a vertical forward wall portion 50 having formed therein the vertical series of stationary port openings 30 (4 circular port openings 30 being shown — FIGS. 4 and 5). The movable port openings 18 of belt reach section 24 (two port openings 18 being shown) can be in contact with the stationary port openings 30 of the vacuum box 28 and operatively provides means for momentarily vacuum holding a leading envelope L' against the outer surface of the running belt section 24 and for releasing the letter item L' as it moves in a tangential path over the belt driving pulley 20b (see FIGS. 4 and 5). With reference to these Figures, it will be noted that the vacuum chamber 52 of box 28 is open to the atmosphere only when the port openings 18, 30 are in register and an item L' is not occluding the registered port openings 18, 30. The outer surface of the vertical vacuum box wall 50 is arranged in close ad- jacency with the inner surface of the belt reach section 24 and defines running seal means for maintaining the vacuum of chamber 52 when a letter item L' is being successively conveyed by the feedhead assembly 14 and the letter item L' is occluding vacuum air passage through the indexed port openings 18, 30. The rate of output of letter envelopes L by the feedhead assembly 14 may be regulated by changing the speed of drive pulley 22'.

The advancing rack means 36 of the supply feed means 34 preferably includes a pair of chain members 42a, 42b coaxially parallely arranged and guidingly constrained in a circumferential movement by respective sprocket and chain means 44a, 54a; 44b, 54b; 44c, 54c. A horizontal frame
member 56 of inverted U configuration supports respectively bearing means (not shown) parallel journaling shaft means 54a, 54b, respectively of sprockets 44a, 44b. The parallel arrangement of vertical sidewall portions 56a, 56b respectively of the channel frame structure 56 fixedly supports horizontal parallel arranged angle iron runner members 58a, 58b defining respectively oppositely flanged flange portions 58a', 58b' providing coplanar runner portions respectively for horizontal chain reach sections 42a', 42b' (see FIG. 4). The shaft 54c of the sprocket inclined shaft assembly 44c, 44d journalized in a vertical parallel support plate 60 (one support plate only being illustrated) is supported respectively from channel frame member 56 by bolt means 62. Turnable manipulation of the bolts 62 permits vertical adjustment of the support plates in bolt slots 60' in maintenance of feed rack means 36 and tensioning of the paired conveyor chains 42a, 42b. Electric motor means 64 communicates motion to the sprocket shaft 54c by belt and pulley means respectively 66, 68, 68.

The plurality of cleat elements 40 are intermittently arranged in outwardly extending disposition from the paired channel elements 42a, 42b. Each cleat element 40 preferably is formed of small rod stock and configured generally broad U-shape in front perspective. The plurality of cleat elements 40 are arranged at regular intervals continuously about the paired channel members 42a, 42b and with each cleat element 40 being supported respectively by corresponding transversely aligned chain link elements 42a', 42b'. The opposite end portions of each U-shaped cleat element 40 is fixedly secured respectively by nut means 70, 70 to the respective corresponding pairs of channel link elements 42a', 42b'; each cleat element 40 is supported from the channel members 42a, 42b in firm standing relation respectively to the paired chain members. The intermittently arranged cleat elements 40 cyclically move in a vertical circumferential path symmetrically arranged of the horizontal channel frame member 56.

A long low platelike runner member 72 is correspondingly fixedly supported superjacently on the frame member 56 by capscrew members 74. The horizontally extending runway member 72 is symmetrically arranged of the frame 56 and extends through the intermittently arranged series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f. The runway member 72 defines an upwardly facing planar runway surface 78 arranged generally coplanar with the lower edge margin of the vacuum belt reach section 24 of the mechanical-vacuum feedhead assembly 14 and provides slide surface means for the envelope work items L as they are progressively moved toward the vacuum head assembly 14. The lower margin edge of each vertical envelope L of the groups G of envelopes slightly overlaps the runway surface 78 during the broadband transfer of the envelope work items by the horizontally moving series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f.

The actuating means of advancing rack 36 preferably includes means for controlling the rate of feed movement of the series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f responsive to the rate of feed of the mechanical-vacuum feedhead assembly 14. The operative horizontal feed movement of the running series of cleat elements (toward the left as viewed in FIG. 2) preferably includes means for increasing or decreasing the progressive advancing movement of the horizontal series of cleat elements in response to the rate of actuation of the vacuum feedhead assembly 14 of the main feed means 12; the automatic control means preferably includes differential movement means for shifting the running series of cleat elements forwardly and rearwardly and progressively forwardly in response to the rate of work item handling by the mechanical-vacuum feedhead assembly: The motor means 64 for actuating the advancing rack 36 preferably is clockwise counterrotative respective of the running series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f respectively toward the left and right as viewed in FIG. 2. The bidirectionally operative motor means 64 may be in the form of a single bidirectionally operative electric motor unit but preferably is in the form of a pair of contra directionally operative electric motor units with one motor being energized clockwise and the other motor energized counterclockwise respectively for driving a common power output shaft 80 respectively clockwise or counterclockwise (see FIG. 2). A single-pole double-throw switch 82 is preferably the circuit means energizing motor 64 connects with the motor through conductors 84, 86, 88. A pivoted baffle member 90, actuated by forward movement of the leading letter envelope L' and connected with switch means 82 through mechanical linkage 92 (schematically shown) provides means for the bidirectional positioning of switch means 82 and for causing respective clockwise counterclockwise movement of motor means 64.

The baffle member 90 is dependently pivotally supported on horizontal pin means 94, supported in turn from upright support lug structure 96 superjacently mounted on the runway member 72 and at a disposition downward of the horizontal series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f. The front face of the baffle member 90 generally is arranged in horizontal coplanar relation with the belt reach section 24 of the feedhead assembly 14; the baffle member 90 is adapted to be pivotally moved clockwise by engagement of the front face of the leading letter work item L' upon forward horizontal movement of the series of cleat elements (the lower end of the baffle element 90 being pivotally moved toward the left as viewed in FIG. 2). Spring means, as compression spring 98 supported in baffle lug structure 96 provides means for pivotally urging the baffle member 90 counterclockwise and in contra direction to movement of the plurality of letter work items L'.

When the baffle member 90 is in a clockwise disposed disposition (as shown in FIG. 2), the switch arm 100 connects with contact 102, thereby energizing motor means 64 clockwise, causing forward movement of the horizontal series of cleat elements and moving the leading letter envelope L' against the front face of the baffle member 90. Forward movement of the leading letter envelope against the baffle member 90, pivotally moves the baffle member clockwise, compressing spring 98, and moving the switch arm 100 to engagement with contact 104. Closing the contact 104 energizes the motor means 64 counterclockwise, causing rearward movement of the series of cleat elements. The reversing of the leading letter item L' away from the baffle member permits the spring 98 to pivotally move the baffle member counterclockwise thereby moving the switch arm 100 from contact 104 and stopping the reverse feed movement of the letter items. The forward and rearward shifting movement of the series of cleat elements with the corresponding shifting movement of the groups of letter items occur cyclically in shifting forward and rearward movement forwardly and rearwardly in parallel movement; such structure and function provide means for successively introducing a leading letter envelope L' to a disposition for pickup or engagement by the mechanical-vacuum feedhead assembly. As may well be appreciated, the switch and spring means 82, 98 may be incorporated in switch unit form, as for example, in a microswitch unit.

The advancing screw means 38 of the supply feed means 34 is simultaneously operative with the advancing rack means 36. The screw member 46 is unidirectionally driven by electric motor means 106 and pulley and belt means 108, 108, 110. The electric motor means 64 driving the horizontal series of cleat elements 40a, 40b, 40c, 40d, 40e, 40f and the electric motor means 106 driving the cylindrical screw member 46 preferably are synchronously operative for broadband conveying of the envelope work items forwardly and rearwardly in parallel arrangement with the belt reach section 24 of the feedhead assembly. The left and right half portions indicated respectively L' and L' of each letter envelope L (see FIG. 8) are substantially horizontally disposed by the advancing rack means 36 and advancing screw means 38. The left half portions L' of the plurality of letter envelopes L are edgewise supported on the runway surface 78 and carried forwardly or rearwardly by the series of upstanding cleat elements 40a, 40b, 40c, 40d, 40e, 40f; the right half portions L'
of the plurality of letter envelopes L are edgewise supported on the threaded upper portion 46' of the screw member 38 (see FIGS. 1 and 4). The threaded upper portion of the cylin-
drical screw member 46 and the horizontal runway surface 78 lie in flatwise contiguous arrangement and are coaxially oper-
ate in simultaneously edgewise supporting and convey-
ing respective leftward and rightward half portions respective-
ly L', L" of each envelope of a supply S of envelopes.

The screw member 46 is counterclockwise rotated (as viewed in FIG. 4) and is operative in urging a plurality of en-
velope work items toward the horizontal running series of
clet elements and against an upstanding horizontally extend-
ing abutment sideline 112. As the plurality of letter items L are shiftedly moved forwardly or rearwardly and progressively-
ly forwardly, the left vertical margin of each envelope engages
the abutment sideline structure 112 by action of the coun-
terclockwise rotating screw member 46 runningly engaging the
right half bottom edge portion of each envelope.

The advancing screw member 46 preferably is provided
with flat longitudinally extending surfaces 114c, 114b, 114c
formed respectively in the threaded cylindrical periphery of
the screw member. The flat surfaces 114c, 114b, 114c are
equiangularly spaced 120° apart and longitudinally arranged at
three integral axial sections of the screw member. The long-
itudinally flat surface acts as a screw action by the screw means thereby preventing overfeeding
of the right half portions L" of the envelope work items and
permit forwardly rearwardly shifting movement of the work items L by the series of clet elements of the progressively-
advancing rack means 36; and, additionally, in the case of
letters, joggle the envelopes to properly position the contents with respect to the left edge of the envelope so as not to be
damaged by subsequent processing.

The apparatus may include horizontal floor structure 116
supported on leg means 118. If desired, vertical wall structures
120a, 120b, 120c may be fixedly secured in upstanding rela-
tion at the periphery of the floor 116, defining enclosing wall
structure for containing loose letter items prior to and during
letter processing procedure. If desired, partition wall structure
122, 124 may be fitted within the enclosure of walls 120a,
120b, 120c for partitioning off the enclosed area for mail or
letter sorting. Conveyor belt and pulley means 126, 128 (frag-
mentarily shown in FIG. 1) may be utilized for receiving the
outfeed envelopes from vacuum head assembly 14 and for transporting the envelopes to another work station. The con-
veyor belt and pulley means 126, 128 is substantially of typical
design and is not intrinsic to the invention: A plurality of letter
items L processed by the main feed means 12 and feedhead
assembly 14 are successively intermittently introduced edgewise
between synchronized belt reaches 124', 124" in the con-
veying of the work items to another work station or the
like. A deflector element 129 supported on the distal end of
partition wall 122 may be utilized for deflecting the leading
edge of the envelopes between the mating belt reaches 124',
124" of the conveyor belt structure. In operation of the feed
apparatus, a workman has only to hand gather the envelope
items and arrange them in groups G between respective ad-
jacent clet elements of the running series of clet elements
40a, 40b, 40c, 40d, 40e.

While the instant invention has been shown and described therein in what is conceived to be the most practical and
preferred embodiment, it is recognized that departures may be
made therefrom within the scope of the invention.

What is claimed is:

1. Apparatus for successively feeding elongate planar work
items comprising; main feed means including movable port
means including a thin flat belt having an apertured area
at least at one location along the longitudinal extension of said
belt, pulley and drive means unidirectionally driving said belt
and defining a substantially planar running series of work
items having said vacuum generating means and defining a
planar fixed apertured area disposed flatwise contiguous the
inner reach surface of the belt, and supply feed means for in-
dividually and successively introducing a plurality of work
items to flatwise contiguity with the belt outer surface of
the running belt reach section, said supply means defining a path
leading to the plane of said reach section, and an abutment
sidewall bounding one side of said path in spaced relation
laterally from said reach section at the intersection with the
plane of the reach section a distance less than the lateral span
of the work items in the path, such that when the leading work
item abuttingly engages the sideline at said plane it simultane-
ously is in flatwise contiguity with the belt outer surface at
the reach section, and said supply means includes means to con-
tinuously urge the work items into abutting engagement with
said sideline.

2. Apparatus as set forth in claim 1 wherein said supply feed
means includes advancing rack means for flatwise juxtaposedly arranging and broadly advancing the planar work
items generally in a direction toward and perpendicular to the
planar running reach section of the belt of said main feed
means, to an intersection with said plane of the reach section
intermediate the abutment sideline and said reach section,
and said means to continuously urge the work items into
abutting engagement with said sideline comprises advancing
rack means parallel to said advancing rack means and in per-
pendicular relation to said reach section and means for rotat-
ing said advancing rack means so that the rotation of the item
engaging surface is toward said sideline.

3. Apparatus as set forth in claim 2 wherein said advancing
rack means includes a continuous plurality of clet elements,
chain and sprocket means supporting said clet elements in
continuous intermittent arrangement and defining a horizon-
tal series of intermittently spaced clet elements disposed per-
pendicular to the plane of the planar reach section of the
belt of the main feed means and adapted for receiving between adjacent clet elements a group of vertical flatwise juxtapositioned work items, and includes actuating means for
moving said chain and sprocket means and for advancing said
horizontal series of intermittently spaced clet elements
toward the plane of the belt reach section of the main feed
means and includes means for controlling the actuation of said
chain and sprocket means and the advancement of said series of clet elements.

4. Apparatus as set forth in claim 3 wherein each clet ele-
ment of said advancing rack means is of U configuration and
includes a substantially long, narrow runway member sta-
tionarily horizontally supported at a disposition extending
through the series of intermittently spaced clet elements and
having a recess through which the advancing screw means
project, said runway member defining a horizontal upwardly
facing slide surface adapted to engage the bottom margin edge of each work item of the groups of work items arranged
respectively between adjacent clet elements.

5. Apparatus as set forth in claim 4 wherein said means for
controlling the rate of advance movement of the horizontal se-
ries of clet elements includes automatic control means
responsive to the rate of feed of the work items of said main
feed means.

6. Apparatus as set forth in claim 4 wherein said automatic
control means includes differential movement means for shifting
said series of clet elements forwardly and rearwardly and
progressively forwardly in response to the rate of feed move-
ment of said main feed means and includes clockwise counter-
clockwise operative electric motor means operative respec-
tively for driving said series of clet elements forwardly and
rearwardly, single-pole double-throw switch means for ener-
gizing said motor means clockwise and counterclockwise and
switch-actuating means including baffle means defining a sur-
face of abutment, means supporting said baffle means
downward of said series of clet elements with the surface of
abutment being disposed generally along the plane of the belt
reach section of said main feed means, means for straining said baffle means in bidirectional movement generally perpendicular of the plane of the belt reach section
and between a first position and a second position, spring
means urging said baffle means toward said first position, said baffle means being urged against said spring pressure and moved toward said second position by forward movement of said series of cleat elements of said advancing rack means, and electric circuit means connecting said motor means and switch means for energizing said motor means clockwise when said baffle element is in a first position and counterclockwise when said baffle element is in a second position.

7. Apparatus for successively feeding elongate planar work items each having left and right portions, said apparatus comprising movable port means including a thin flat belt having an apertured area at least at one location along the longitudinal extension of said belt, pulley and drive means unidirectionally driving said belt and defining a substantially planar running reach section having generally flat inner and outer reach surfaces, vacuum generating means, stationary port means communicating with said vacuum generating means and defining a planar fixed apertured area disposed flatwise contiguous the inner reach surface of the belt, and supply feed means for advancing a plurality of work items toward the belt reach section of said main feed means including guide means along one side of the path of advancement to abut one edge of one of the portions of each advancing work item, advancing rack means for flatwise juxtaposedly arranging and broadband advancing the planar work items and engaging substantially only the portion including said one edge of each work item and including advancing screw means simultaneously operative with said advancing rack means and operative substantially for engaging substantially only the other portion of each work item in advancing the work items toward the running reach section of the belt of the main feed means, the direction of rotation of said screw means at the engaging surface with the work items being toward said guide means.

8. Apparatus as set forth in claim 7 wherein said advancing rack means includes horizontal runway means defining an upwardly facing slide surface adapted to engage the bottom margin edge of each work item of a plurality of work items and adjacent the left half portion of each work item and wherein said advancing screw means includes a substantially cylindrical screw member, bearing means horizontally turnably supporting said screw member generally perpendicular to said belt reach section and with the upper longitudinal extension upper threaded portion of said screw member being arranged generally horizontally coplanar with the slide surface of said work item runway means and extending at least to a disposition adjacent the vertical plane of the belt reach section of said main feed means, the threaded portions of the upper longitudinal extension of said screw member being adapted to engage and edgewise support a plurality of groups of work items adjacent the right half bottom edge margin of each work item, motor means rotatably driving said screw member in a direction toward said advancing rack means, causing the edge supported work items to be urged toward said advancing rack means, said screw member having cooperative thread pitch and rotation for causing feed movement of the plurality of work items toward the belt reach of said main feed means and including horizontal abutment slideway means generally arranged in a plane parallel with said screw member and disposed on that side of said series of cleat elements opposite from said advancing screw member, said abutment slideway means defining a horizontal surface adapted to abuttingly slidingly engage the left margin edge of each planar work item and operative to limit leftward edgewise endwise movement of the plurality of work items during the broadband feeding of the work items toward the belt reach section of said main feed means.

9. Apparatus as set forth in claim 8 wherein said screw member includes structure defining at least one planar surface area extending longitudinally along said advancing screw member and generally coincident in transverse extension with a chord line disposed in the circular periphery of said screw member, said flat surface area defining interrupted screw thread portions adapted for intermittent running engagement with the bottom margin edges of the planar work items in the broadband feeding of the work items toward the main feed means.

10. Apparatus for successively feeding elongate thin planar work items comprising, means for vertically edgewise arranging a supply of work items in broadband juxtaposed relation and in a horizontal group of work items, means for advancing the group of work items simultaneously broadband along a horizontal path of movement, means for successively edgewise endwise horizontally shifting the leading work item of the group of work items in a first direction away from the path and along a stationary vertical plane intersecting the path of movement of the group of work items, and abutment means bounding the path of movement on the side opposite said first direction at the intersection with the vertical plane, and said means for advancing includes means urging the group of work items toward the abutment means with a force less than that of the force exerted by said means for shifting the leading work item.

11. Apparatus as set forth in claim 10 wherein said means for advancing the group of planar work items includes advancing rack means and advancing screw means acting on opposite half portions of each planar work item and substantially simultaneously coatingly operative in advancing the group of work items, and said screw means is provided with axially extending flat sections to joggle the items being advanced thereby.

12. A method of successively feeding elongate thin planar work items including the steps of arranging a supply of work items in broadband juxtaposed relation in a horizontal group of work items and with each item being continuously supported vertically edgewise and longitudinally horizontal, advancing the group of work items broadband along a horizontal path, having a guide means along one side thereof and urging the advancing work items toward said guide means, and successively shifting the leading work item edgewise endwise generally along a stationary vertical plane intersecting the path of movement of the group of work items; and joggling the advancing work items while simultaneously advancing said group.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,647,203 Dated March 7, 1972

Inventor(s) John R. DeHart

It is certified that error appears in the above-identified patent
and that said Letters Patent are hereby corrected as shown below:

Col. 5, line 73, after the word "having" insert
--generally flat inner and outer reach
surfaces, vacuum generating means,
stationary port means communicating--

Signed and sealed this 1st day of July 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

G. MARSHALL DANN
Commissioner of Patents
and Trademarks