United States Patent

Watson

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[54] STACKER WITH A LABELING MACHINE

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[73] Assignee: **Xerox Corporation,** Rochester, N.Y.

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[21] Appl. No.: **2,222**

[52] **U.S. Cl.** **156/568,** 271/88, 156/521, 156/528

[51] **Int. Cl.** **B32b 31/20,** B65h 31/12

[58] **Field of Search** 156/566, 567, 568, 521, 528; 271/88

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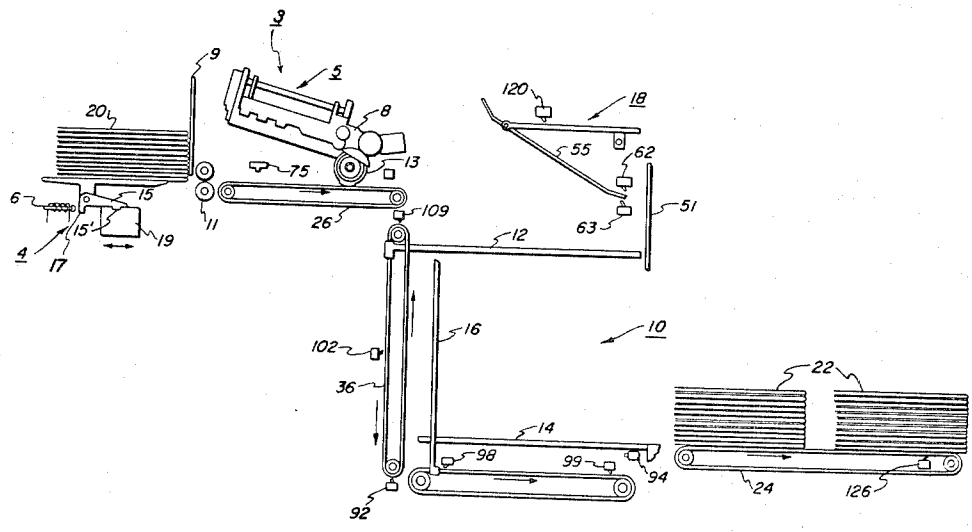
[57] **ABSTRACT**

An article stacker labeler combination including a movable elevator upon which articles may be stacked from a labeler, stack transfer means adapted following predetermined descent of the elevator to intercept and remove a completed stack from the elevator to enable the completed stack to be ejected from the stacker and the elevator reset for the next stack, stack ejector means adapted when actuated to move the completed stack along the stack transfer means and out of the stacker, and control means for the elevator and the ejector means adapted to lower the elevator as a stack builds up thereon, and, following transfer of the completed stack from the elevator to the transfer means, to actuate the ejector means to remove the completed stack, the control means including means to quickly return the elevator to the stack-start position following ejection of the completed stack from the stacker.

2 Claims, 6 Drawing Figures



Patented April 4, 1972 3,654,040

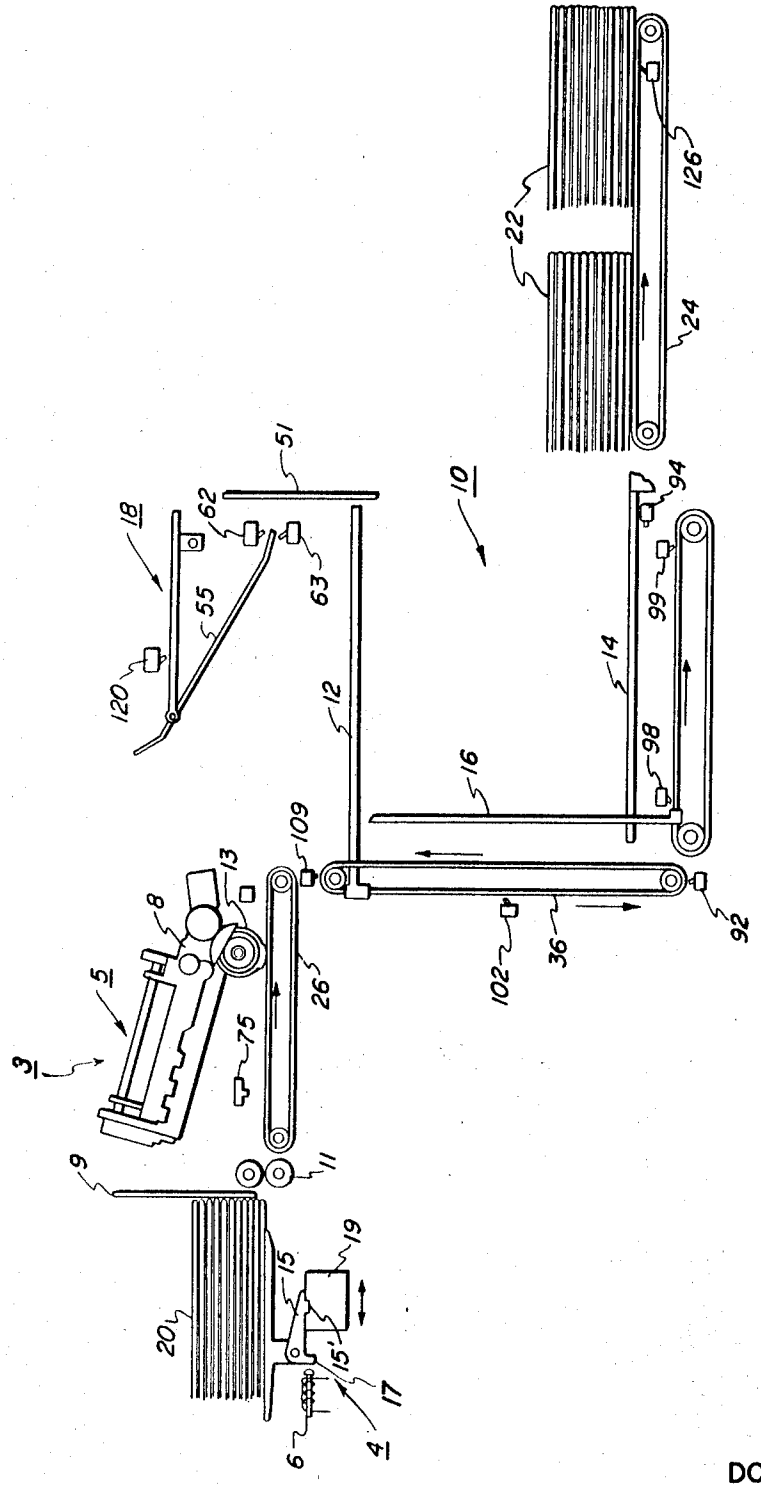


FIG. 1

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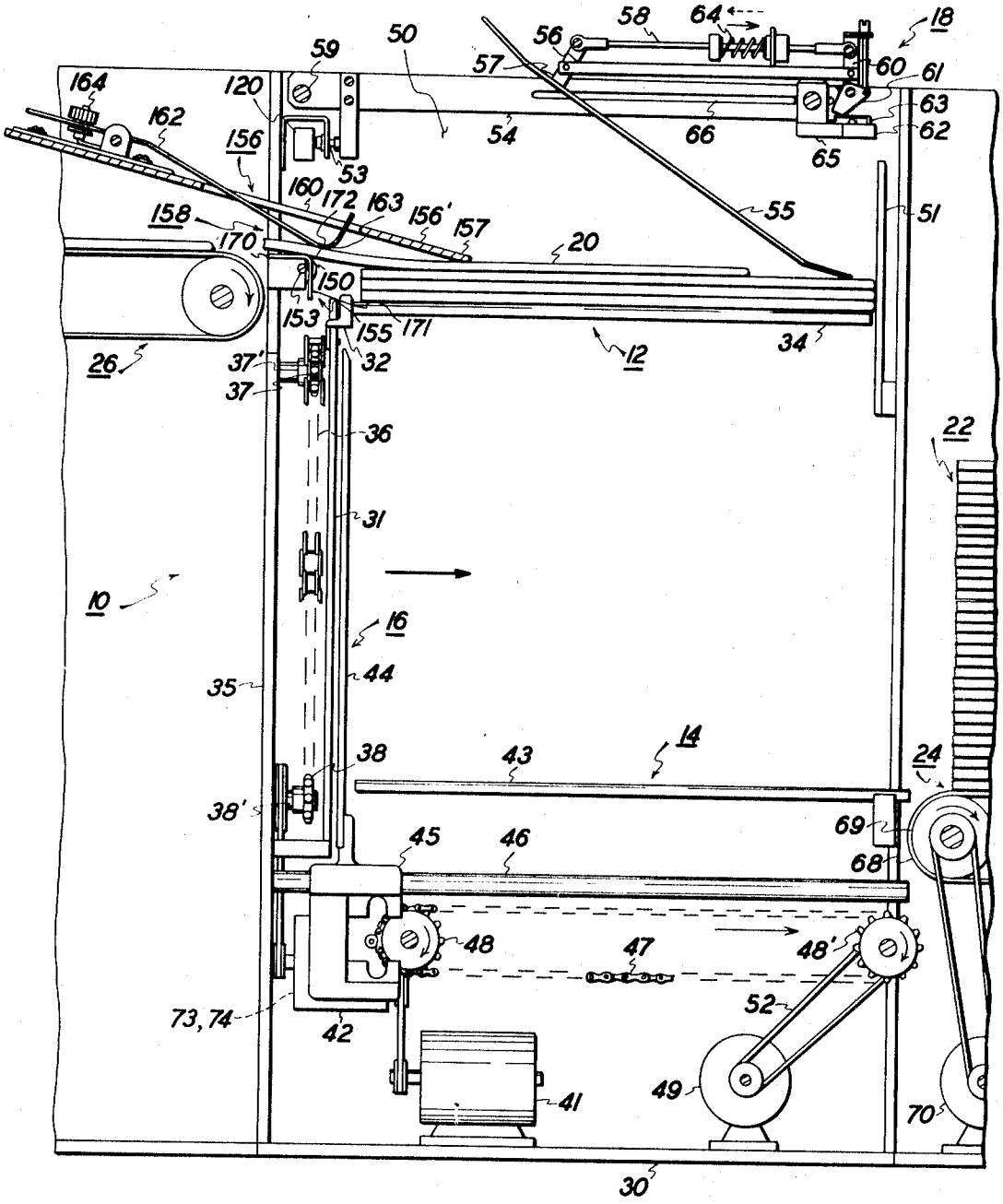
58
64
18
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164
120
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163
156'
157
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51
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150
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155
171
34
26
37'
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12
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36
22
31
10
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44
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14
24
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38'
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69
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47
48'
73, 74
42
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41
49
70
30

FIG. 2

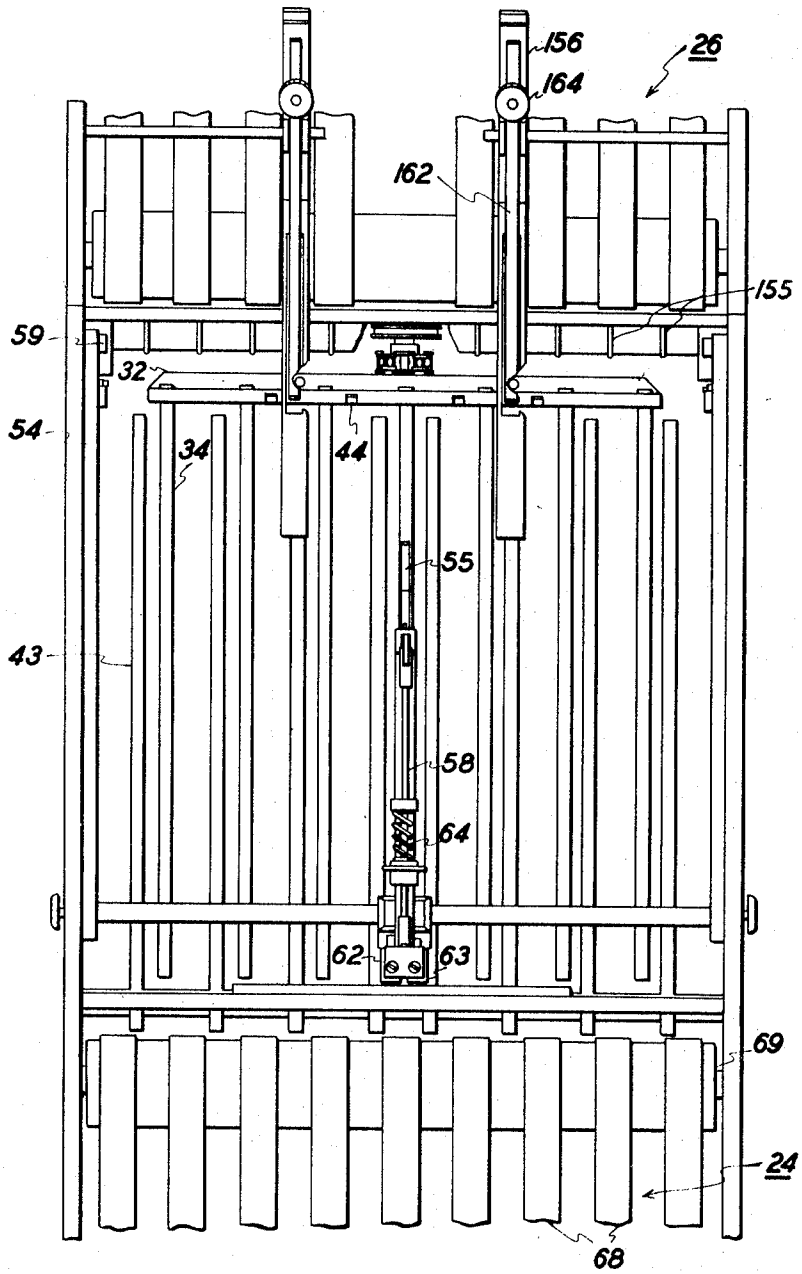


FIG. 3

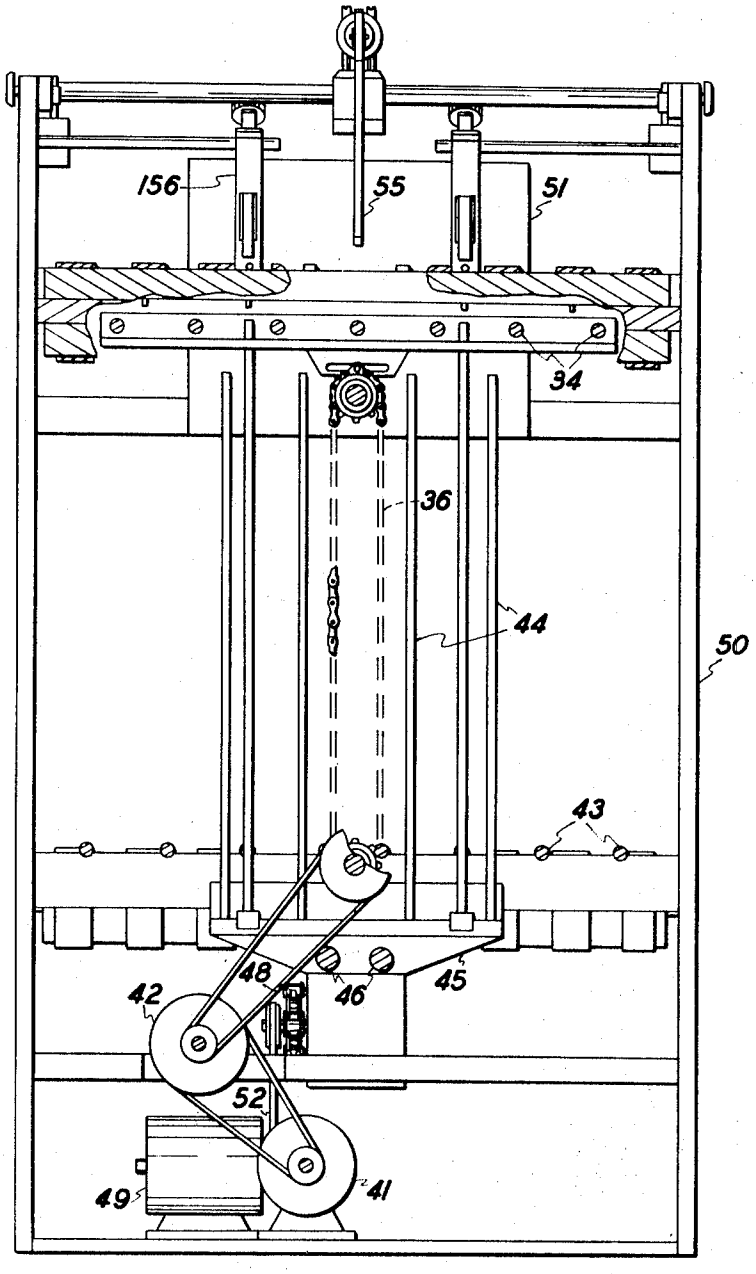
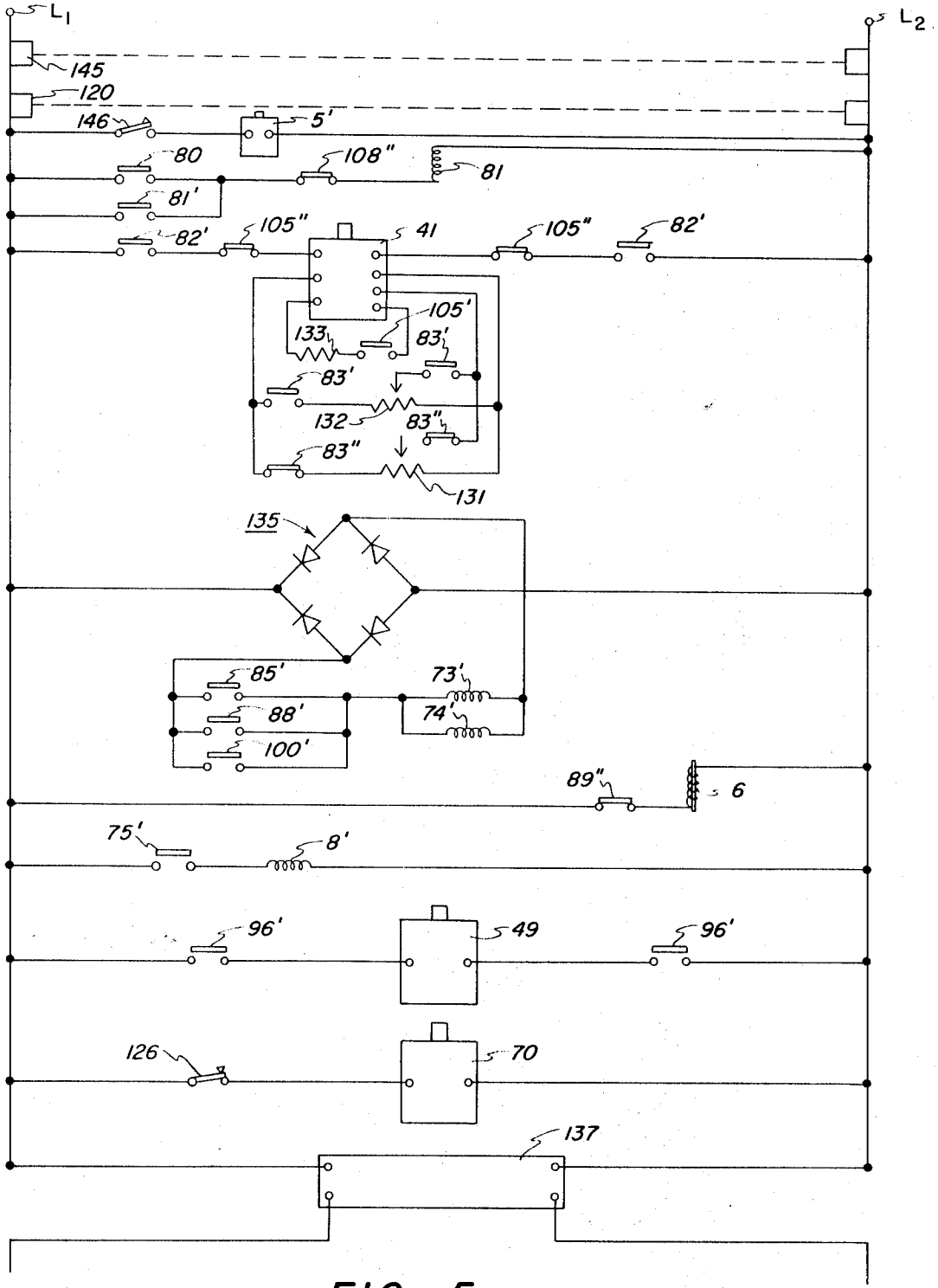


FIG. 4


L1
L2
145
120
146
5'
80
108"
81
81'
82'
105"
41
105"
82'
105'
133
83'
83'
132
83"
83"
131
135
85'
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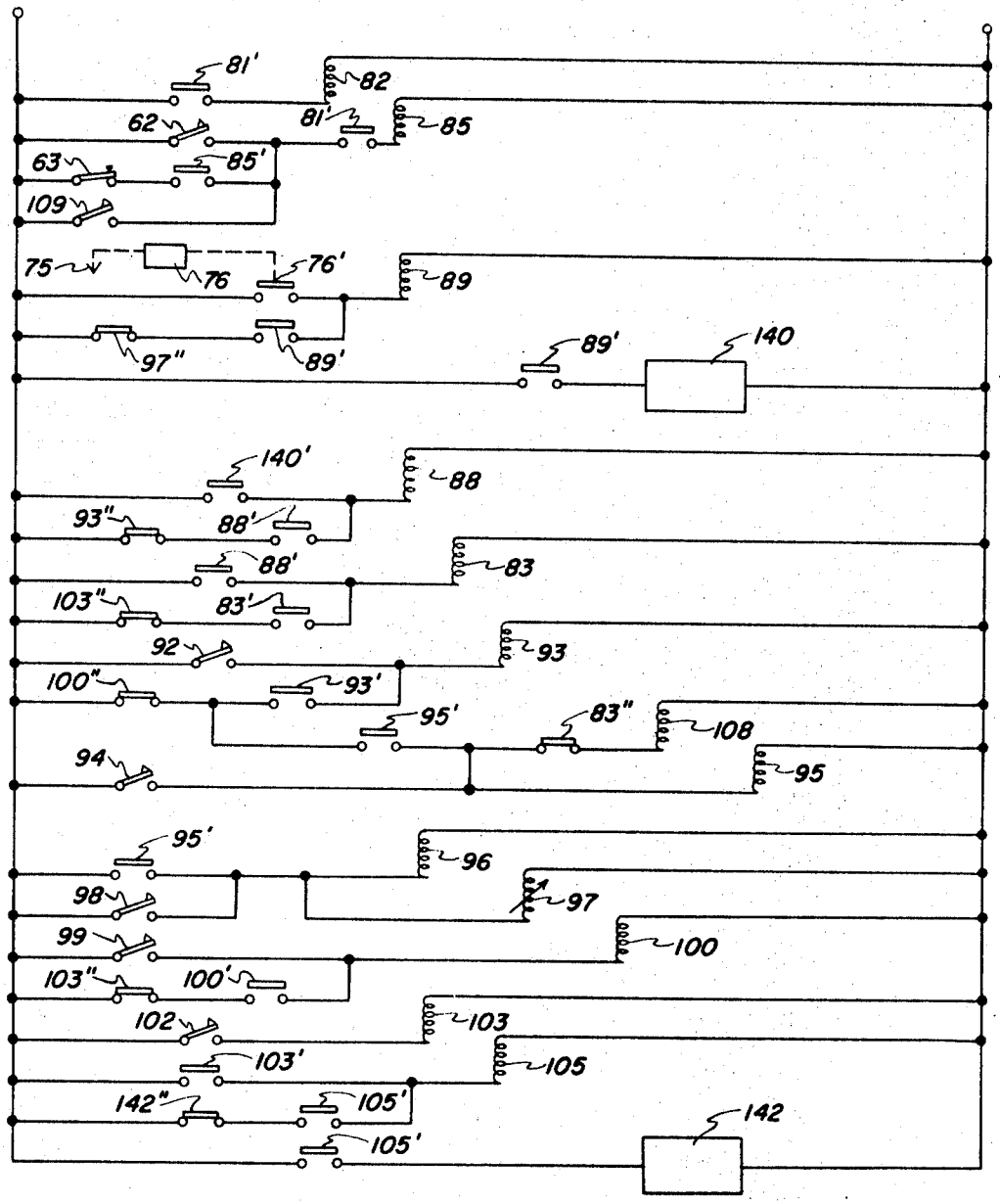
100'
89"
6
75'
8'
96'
49
96'
126
70
137

FIG. 5a


81'
82
62
81'
85
63
85'
109
75
76
76'
89
97"
89'
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140
140'
88
93"
88'
88'
83
103"
83'
92
93
100"
93'
95'
83"
108
94
95
95'
96
98
97
99
100
103"
100'
102
103
103'
105
142"
105'
105'
142

FIG. 5b

STACKER WITH A LABELING MACHINE

This invention relates to an article stacker, and more particularly, to an improved article stacker incorporating a multiple speed stacking elevator with cooperating stack transfer and ejecting means.

In handling articles such as newspapers, magazines, envelopes, and the like, it is frequently desirable to form the articles into stacks. This may occur for example in article labeling or addressing systems, where addressed articles having common Zip Code designations must be bundled together for group mailing in accordance with Post Office regulations. While the articles may of course be manually stacked, or stacked through manual stopping and starting of a stacker in accordance with the number of articles in each Zip Code group, such manual stacking or manual stacker is expensive in terms of labor costs and inefficiency in high volume article addressing systems.

In designing article stackers, a principle objective seems to be to build a stacker where no loss of or interruption in article input is sustained during the period while the finished stack is being ejected from the stacker and the stacking elevator reset for the next stack. The prior art affords numerous teachings of stacker designs and constructions aimed at fulfilling this objective; for example, there are numerous stacker designs where, during the stack ejecting and elevator reset cycles, a temporary stack support or elevator is interposed in the article flow path. Following ejecting of the completed stack and clearing of the main elevator, the main elevator is reset to the stack-start position. The temporary elevator is then removed and the partially completed stack formed thereon transferred to the main stacking elevator. While stackers of this type do not require that the article input be interrupted during the reset cycle, they unfortunately suffer from excessive cost and extreme complexity.

It is a principal object of the present invention to provide a new and improved article stacking apparatus.

It is a further object of the present invention to provide an improved article stacking apparatus incorporating means to interrupt the article supply while the finished stack is removed.

It is an object of the present invention to provide a relatively simple, low cost article stacker having a high article throughput speed.

It is an object of the present invention to provide an article stacking system having means to delay clearing and resetting of the stacker pending arrival of the last article thereto.

This invention relates to an article processing system comprising, in combination, article addressing means including a labeling head for transferring address information to articles; means for supplying articles to be addressed to the addressing means; an article stacker for arranging addressed articles from the addressing means into stacks including a stacking elevator operatively disposed adjacent the discharge side of the addressing means to support addressed articles discharged by the addressing means; means to lower the elevator as the stack of articles thereon builds up; stacker reset means adapted when actuated to clear the article stack from the elevator and raise the cleared elevator into position for the next article stack; and control means for stopping the articles supplying means to interrupt the flow of articles to the stacker while the stacker is being reset.

Other objects and advantages will be apparent from the ensuing description and drawings in which:

FIG. 1 is a schematic representation of an article addressing system incorporating the article stacker of the present invention with the elevator drive chain displaced through 90° from a true position to facilitate explanation;

FIG. 2 is a side view partially in section of the article stacker shown in FIG. 1;

FIG. 3 is a top plan view of the article stacker shown in FIG. 1;

FIG. 4 is an end view with parts broken away of the article stacker shown in FIG. 1; and

FIGS. 5*a*, 5*b* are a circuit diagram of the control means for the article stacker shown in FIG. 1.

Referring particularly to FIG. 1 of the drawings, an article stacker **10** is thereshown incorporated into an article addressing or labeling system **3**. Labeling system **3** includes an article feeder **4** of the type shown in copending application, Ser. No. 774,956, **filed Nov.** 12, 1968 in the name of D. W. Watson et al., for supplying articles **20**, such as magazines, newspapers, envelopes, and the like in seriatim to an addressing machine **5**. Articles discharged by feeder **4** pass through a suitable article control means, such as gate **9** and pinch roller pair **11** onto article transport **26** of addressing machine **5**. To control the feed of articles **20** to addressing machine **5**, article feeder **4** incorporates a solenoid operated disconnect **6** adapted when actuated to move forward into the path of movement of depending drive latch arm **17** causing latch **15** to pivot upwardly and withdraw drive lug **15'** thereof from driving slider **19**. Slider **19** is conveniently driven through suitable eccentric means (not shown) from addressing machine drive motor **5'**.

Addressing machine **5** comprises any suitable article labeling or addressing machine such as that described in copending application, Ser. No. 653,144, filed July 13, 1967 in the name of R. C. Sheriff. Addressing machine **5** includes a labeling head portion **8** with rotatable label transfer wheel **13** for transferring individual labels or the label information thereon to the articles **20** moving therebelow on article transport **26**. Labeling head **8** including transfer wheel **13** is driven by suitable drive means through a suitable electromagnetically controlled clutch (not shown). As will appear, the operating coil **8'** for the labeling head drive clutch is controlled by article sensor **75** arranged above transport **26** to sense the feed of articles to transfer wheel **13**. On interruption in the feed of articles to transfer wheel **13**, sensor **75** stops head **8** to prevent loss or mutilation of the address labels.

The addressed articles are carried by transport **26** to stacker **10** where, as will appear, the articles are automatically stacked into stacks of predetermined size or quantity. Completed stacks **22** from stacker **10** are ejected therefrom by ejector **16** onto stack discharge conveyor **24** for removal from the system **3**. As will appear, a suitable article counter **76**, (shown in FIG. **5**) is provided to count the articles processed. Conveniently, article sensor **75** is utilized to provide the input signal to counter **76**.

Referring particularly to FIG. **2** of the drawings, article stacker **10** includes stacking elevator **12**, stack interceptor **14**, stack ejector **16**, and stack height control **18**. As will appear more fully herein, stacker **10** is adapted to form articles **20**, which may comprise envelopes, newspapers and the like, into stacks **22** of predetermined height and/or quantity. The completed stacks **22** are removed by means of stack discharge conveyor **24**.

Article stacker **10** includes a base **30** having upstanding bearing bars **31** upon which carriage **32** of elevator **12** is journaled for vertical movement. Elevator carriage **32** carries a plurality of horizontally extending, spaced apart bars **34** thereon which cooperate to form the base or floor upon which articles **20** being stacked rest.

Elevator carriage **32** is secured to vertical driving chain **36** carried by upper and lower sprockets **37**, **38**. Sprocket shafts **37'**, **38'** are journaled on rear frame member **35**. Sprocket shaft **38'** is suitably driven by two speed motor **41** through transmission **42**. Transmission **42** includes a suitable electromagnetically operated clutch **73** effective when engaged to couple chain **36** with motor **41** and an electromagnetically controlled brake **74** effective when engaged to hold elevator **12** against movement. As will appear, clutch **73** is normally disengaged while brake **74** is normally engaged so that energization of clutch and brake operating coils **73'**, **74'** engages clutch **73** and releases brake **74**.

As will appear, elevator **12** is lowered at low speed during stacking and is reset to the stack-start position of FIG. **1** at high speed. Elevator control switches **92**, **94**, **102**, **109** are arranged along the path of movement of elevator **12**.

Stacker **10** has upstanding sides **50** supported on base **30** to prevent the articles **20** from falling off elevator **12** during stacking. A suitable stop **51** is provided to limit forward movement of articles **20**.

Stack height control **18** includes a control ski **55** pivotally suspended above elevator **12** on arm **56**. Arm **56** is in turn secured to switch base **65** suitably supported in side members **54**. Side members **54** are carried on rotatable cross-shaft **59** journaled in the upstanding stacker sides **50**. An abutment **53** limits downward swinging movement of the height control **18** about cross-shaft **59**. Preferably, side members **54** have a longitudinally extending slot-like opening **66** therein to enable the position of height control **18** to be adjusted in correspondence with the length of the articles **20** being handled.

A switch control arm **60** is pivotally attached to the opposite end of arm **56** above elevator start and stop switches **62, 63** on base **65**. A suitable switch operating cam **61** is mounted on the lower end of control arm **60** in operative relation with switches **62, 63**.

A control link **58** is pinned between the upstanding support base **57** of ski **55** and switch control arm **60** such that swinging movement of ski **55** results in corresponding swinging movement of control arm **60**. A suitable biasing spring **64** is provided to bias control link **58** in the direction shown by the solid line arrow and ski **55** in a counter-clockwise direction. Suitable stop means (not shown) are provided to limit swinging movement of ski **55**.

As can be understood, the weight of height control **18** normally serves to maintain the control **18** in the position shown against abutment **53**. Where a malfunction in labeling system **3** results in an unwarranted increase in the height of articles **20** on elevator **12**, height control **18** is forced upwardly in a counter-clockwise direction about cross-shaft **59**. To protect the labeling system **3** against malfunctions of this type, stop switch **120** is provided. Switch **120** is arranged so that preset raising movement of stack height control **18** actuates switch **120** and shuts down labeling system **3** as will appear.

As can be appreciated, articles **20** discharged onto elevator **12** by article transport **26** slide or skid across the surface of bars **34**, or the topmost article resting thereon, under ski **55** and into abutment with article stop **51**. As the height of the article stack on elevator **20** rises, ski **55** is turned in a counter-clockwise direction is displace control link **58** in the direction shown by the dotted-line arrow in FIG. **2**. On predetermined movement of control link **58**, switch control cam **61** closes elevator start switch **62** to engage clutch **73** and release brake **74** to move elevator **12** downwardly at low speed. As elevator **12** descends and the effective height of the article stack thereon decreases, ski **55** pivots in a clockwise direction with concurrent movement of control link **58** in the direction shown by the solid line arrow. Following predetermined displacement of control link **58**, cam **61** opens switch **63** to disengage clutch **73** while engaging brake **74**.

To remove the completed stack of articles on elevator **12**, stack interceptor **14** and ejector **16** are provided. Interceptor **14** comprises a plurality of stationary, spaced horizontal support bars **43** arranged in the path of movement of elevator **12** at a level substantially the same as or slightly above the operating surface of stack discharge conveyor **24**. The relative spacing between elevator bars **34** and interceptor bars **43** is such that bars **34** are able to pass between bars **43** to enable elevator **12** to descend below interceptor **14** and transfer the stack of articles on elevator **12** onto interceptor **14**. Stack interceptor bars **43** are suitably supported by stacker base **30**.

It is understood that suitable adjusting means (not shown) may be provided to permit the height of stack interceptor **34** to be varied to match the height of discharge conveyor **24**.

Stack ejector **16** comprises a plurality of spaced, upstanding bars **44** supported on carriage **45**. Ejector carriage **45** is carried by a pair of spaced, horizontal journals **46** for movement toward and away from discharge conveyor **24**. Ejector bars **44** are offset relative to elevator bars **34** and interceptor bars **43** to permit relative movement of elevator **12** and ejector **16** between each other and interceptor **14**.

Ejector carriage **45** is attached to drive chain **47**. Chain **47** is carried by sprockets **48** suitably journaled on frame **30**. Ejector drive motor **49** is connected to sprocket **48'** by belt **52**. Ejector control switches **98, 99** are arranged along the path of movement of carriage **45** for actuation thereby, switch **98** being operated by ejector carriage **45** when ejector **16** is in the ready or start position shown in the drawings.

Stack discharge conveyor **24** comprises one or more endless belts **68** stretched across suitable support rollers **69**. Conveyor **24**, which is driven by motor **70**, is disposed at substantially the same operative level or slightly below that of stack interceptor **14**. As will appear, conveyor **24** is normally operated continuously, control switch **126** serving to stop conveyor **24** on failure of the operator to remove a completed stack therefrom.

Referring to the circuit diagram of FIG. **5**, a suitable source of electrical energy, represented by leads L_1, L_2, is provided. Suitable start-stop switch means **145** may be provided. System stop switch **120** is provided across leads L_1, L_2, stop switch **120** serving when actuated to interrupt power to the addressing system components in the event of an article jam as will appear.

Drive motor **5'** of addressing machine **5** is connected through suitable control switch means **146** across leads L_1, L_2.

Stacker control relay **81** is connected through start switch **80** and normally closed overstack safety relay contact **180''** across leads L_1, L_2. Holding contact **81'** of relay **81** parallels start switch **80**. Elevator drive motor **41** is connected through elevator motor relay contacts **82'** and normally closed motor brake relay contacts **105''** across leads L_1, L_2. Elevator drive motor **41** includes internal low and high speed control windings (not shown) controlled through low and high speed rheostats **131, 132** respectively. Rheostats **131, 132** are electrically connected to the control windings of motor **41** through contacts **83'', 83'** of speed control relay **83**, relay contacts **83''** being normally closed so that motor **41** operates at low speed as long as control relay **83** is deenergized.

Motor **41** includes an internal braking mechanism, the dissipating resistor **133** of which is connected through brake relay contact **105'** across the motor winding in a manner known to those skilled in the art. As will appear, the internal motor brake is used to slow elevator **12** following high speed return of elevator **12** to the stack-start position.

The input terminals of a suitable rectifier **135** are connected across leads L_1, L_2. Elevator clutch and brake operating coils **73', 74'** are connected in parallel relationship through elevator stack relay contact **85'** across the output terminals of rectifier **135**. Reset motor relay contact **88'** and return relay contact **100'** parallel stack relay contact **85'**.

Disconnect solenoid **6** is connected through the normally closed feeder control relay contact **89''** across leads L_1, L_2. The clutch coil **8'** of labeling head **8** is connected through article sensor contact **75'** across leads L_1, L_2. As will appear more fully, opening of contacts **89'', 75'** stops article feeder **4** and labeling head **8**.

Ejector drive motor **49** is connected through ejector motor relay contacts **96'** across leads L_1, L_2. Discharge conveyor motor **70** is connected through normally closed safety switch **126** across leads L_1, L_2.

A suitable direct current power supply **137** is provided, the input terminals of which are connected across leads L_1, L_2. Elevator motor relay **82** is connected through control relay contact **81'** across the output terminals of power supply **137**.

Elevator stack relay **85** is connected through elevator start switch **62** and control relay contact **81'** across power supply **137**. Normally closed elevator stop switch **63** and stack relay holding contact **85'** parallel start switch **62**. Control transfer switch **109** parallels start switch **62**.

Article feeder control relay **89** is connected through counter contact **76'** across power supply **137**. Article counter **76** comprises any suitable adjustable counting device adapted, following a predetermined count, to temporarily close contact **76'** thereof. In the arrangement shown, sensor **75** is used to

provide the pulse-like input signal to counter **76** in response to movement of articles **20** therepast on conveyor **26**. It is understood that counter **76** may be pre-set for various article counts automatically. Relay holding contact **89'** and normally closed feeder re-start relay contact **97''** parallel counter contact **76'**.

A suitable timer **140** is provided to delay initiation of the elevator reset and stack ejecting cycles following stopping of article feeder **4** to give articles already in process on article transport **26** time to reach stacker **10**. Timer **140** is controlled by contact **89'** of relay **89**.

Elevator reset relay **88** is connected through timer contact **140'** across the output of power supply **137**. Holding contact **88''** and normally closed stop relay contact **93''** parallel contact **140'**.

Elevator motor speed control relay **83** is connected through elevator reset contact **88'** across power supply **137**. Holding contact **83'** and normally closed elevator slowdown relay contact **103''** parallel contact **88'**.

Elevator stop relay **93** is connected through lower elevator stop switch **92** across power supply **137**. Holding contact **93'** and normally closed elevator reset-start relay contact **100''** parallel switch **92**. Ejector motor control relay **95** is connected through ejector start switch **94** across power supply **137**. Holding contact **95'** is in series with the normally closed reset-start relay contact **100''**. Overstack safety relay **108** is connected through normally closed speed control relay contact **83''** in parallel relationship with relay **95**.

Ejector motor control relay **96** and feeder re-start relay **97** are connected in parallel with one another through ejector reset switch **98**. Re-start relay **97** comprises any suitable timing relay adapted, on a preset interval following actuation, to open contact **97''** thereof to deenergize feeder control relay **89** and restart article feeder **4** as will appear. Contact **95'** of ejector motor control relay **95** parallels switch **98**.

Elevator reset-start relay **100** is connected through elevator reset switch **99** across power supply **137**. Holding contact **100'** and normally closed elevator slowdown relay contact **103''** parallel switch **99**. Slowdown relay **103** is connected through upper elevator control switch **102** across supply **137**.

Elevator motor brake relay **105** is connected through elevator slowdown relay contact **103'** across power supply **137**. Holding contact **105'** and normally closed timer contact **142''** parallel contact **103'**. Timer contact **142''** is controlled by a suitable timer mechanism **142** connected through brake relay contact **105'** to the power supply output side.

OPERATION

With the operating components of labeling system **3** in the position shown in the drawings, actuation of start-stop switch means **145** and control switch means **146** completes energizing circuits to feeder solenoid **6** and addressing machine drive motor **5'**. Actuation of solenoid **6** couples feeder **4** with slider **19** to initiate feed of articles **20** to addressing machine **5**. As the first article approaches labeling head **8**, sensor **75** responds to close contact **75'** thereof to complete an energizing circuit to clutch coil **8'** to start labeling head **8**.

With actuation of start-stop switch means **145**, an energizing circuit is completed through safety switch **126** to motor **70** to start discharge conveyor **24**.

Start-up of the article labeling system **3** closes switch **80** to complete a circuit to stacker control relay **81**. Contacts **81'** or relay **81** close to complete a holding circuit to relay **81** and a circuit to elevator motor relay **82**. Relay contacts **82'** close to energize, through contacts **105''**, elevator drive motor **41**. Inasmuch as motor speed control relay **83** is de-energized, motor **41** operates at low speed through the normally closed contacts **83''** or relay **83**. At this point, elevator drive clutch **73** remains disengaged. Elevator brake **74** holds elevator **12** stationary.

As may be understood, article feeder **4** feeds articles **20** to be addressed forward one at a time through gate **9** and pinch roller pair **11** onto article transport **26** of addressing machine **5**. Transport **26** brings the unaddressed articles to label transfer wheel **13** where individual addresses are transferred to each article. The addressed articles leaving transfer wheel **13** on transport **26** are discharged one by one onto elevator **12** of stacker **10**, the articles sliding underneath ski **55** and coming to rest with their leading edges against article stop **51**.

As the stack of articles **20** on elevator **12** builds up, contact of each succeeding article with ski **55** causes ski **55** to swing in a counter-clockwise direction against the bias of spring **64**. Following predetermined swinging movement of ski **55**, representing a predetermined stack height, switch control cam **61** thereof closes elevator start switch **62** to complete through control relay contact **81'** a circuit to stack control relay **85**. Holding contact **85'** of stack relay **85** closes to maintain relay **85** energized on subsequent opening of start switch **62** as elevator **12** descends and ski **55** swings backward in a clockwise direction. At the same time, a second contact **85'** of relay **85** closes to energize clutch and brake operating coils **73'**, **74'** respectively and engage elevator clutch **73** and release elevator brake **74**.

On engagement, clutch **73** couples elevator drive motor **41** with chain drive sprocket **38** to move elevator **12** downwardly at low speed.

As elevator **12** descends, the level of stack of articles thereon falls, the rate of feed of articles **20** to stacker **10** by transport **26** being less than the speed at which elevator **20** descends. Ski **55**, under the influence of spring **64**, accordingly swings back in a clockwise direction. Following predetermined movement of ski **55** in a clockwise direction, switch cam **61** opens elevator stop switch **63** to interrupt the energizing circuit to stack control relay **85**. The circuit to clutch and brake coils **73'**, **74'** respectively is therefore interrupted to disengage clutch **73** and apply brake. Elevator **12** is accordingly stopped and held in a stationary position. It is understood that the continued feed of labeled articles **20** onto elevator **12** with resulting increase in article stack size results in intermittent lowering of elevator **12** under the control of ski **55** in the manner described.

Counter **76** serves to control labeling system **3** including stacker **10** in accordance with the program setting thereof to provide stacks each comprised of a predetermined number of articles. On reaching the predetermined article count, counter **76** closes contact **76'** thereof to actuate article feeder control relay **89**. Relay contact **89''** is opened to interrupt the circuit to feeder disconnect solenoid **6**. With de-energization the armature of solenoid **6** is interposed in the path of movement of depending latch arm **17** to uncouple latch **15** from slider **19** and stop feeder **4**. At the same time, a second contact **89'** of relay **89** closes to start timer **140** to delay initiation of the stacker ejecting cycle until articles left on transport **26** following stopping of article feeder **4** reach stacker **10**.

It is understood that, following stopping of article feeder **4**, sensor **75** responds to the interruption in the flow of articles to addressing machine **5**, contact **75'** opening to de-energize clutch coil **8'** and stop labeling head **8**.

Following the requisite delay, timer **140** closes contact **140'** thereof to actuate elevator reset relay **88**. Contact **88'** of relay **88** completes a circuit to speed control relay **83** to close high speed motor contacts **83'** thereof while opening low speed contacts **83''**. Elevator drive motor **41** is accordingly switched from low to high speed.

At the same time, a second contact **88'** of reset relay **88** completes a circuit to elevator clutch and brake coils **73'**, **74'** to engage clutch **73** and release brake **74**. Elevator **12** therefore descends at high speed.

As elevator **12** descends, elevator support bars **34** pass between and through bars **43** of stack interceptor **14** and the stack **22** of addressed articles on elevator **12** is transferred from elevator **12** onto interceptor **14**. As elevator **12** nears the bottom of stacker **10**, the elevator carriage **32** closes lower stop switch **92** to energize stop relay **93**. Contact **93''** of relay **93** is opened to interrupt the circuit to reset relay **88** and de-

energize clutch and brake coils 73', 74' respectively. Clutch 73 is accordingly disengaged to uncouple elevator 12 from motor 41 while elevator brake 74 is applied. At the same time, holding contact 93' of stop relay 93 closes.

As elevator 12 moves through interceptor 14, carriage 32 momentarily closes ejector start switch 94 to energize ejector control relay 95. Relay contact 95' closes to energize ejector motor control relay 96. Relay contacts 96' complete a circuit to ejector drive motor 49. At the same time, relay contact 95' energizes feeder restart relay 97. Following a preset interval, relay 97 opens contact 97'' thereof, to de-energize feeder control relay 89 and close relay contact 89''. Closure of contact 89'' energizes solenoid 6 to re-engage drive latch 15 and restart article feeder 4.

Ejector motor 49 drives ejector 16 forward (in the direction of the solid line arrow), to bring the upstanding bars 44 thereof into contact with the rear of the article stack resting on interceptor 14 to slide the stack along interceptor bars 43 and onto discharge conveyor 24. Conveyor 24 carries the finished stack away.

With initial movement of ejector 16 forward, ejector reset switch 89 closes to maintain ejector motor control relay 96 energized following de-energization of ejector control relay 95 as will appear hereinafter. As ejector 16 nears article discharge conveyor 24, the ejector carriage 45 momentarily closes elevator reset switch 99 to energize elevator reset relay 100. Relay contact 100' completes a holding circuit through the normally closed elevator slowdown relay contact 103'' to relay 100. A second relay contact 100' completes a circuit to clutch and brake coils 86', 87' to engage clutch 86 and release brake 87 whereby elevator 12 moves upwardly at high speed. At the same time, the normally closed relay contact 100'' is opened to de-energize stop relay 93 and ejector control relay 95.

Ejector drive motor 49, which remains energized through reset switch 98, carries the ejector 16 back toward the ejector start position shown in the drawings. As ejector 16 reaches the ejector start position, the ejector carriage 45 opens ejector reset switch 98 to interrupt the circuit to ejector motor control relay 96. Contacts 96' of relay 96 are therefore opened to stop ejector motor 49. At the same time, opening of switch 98 resets feeder restart relay 97.

As elevator 12 means the top of stacker 10, carriage 32 thereof momentarily closes transfer switch 109 to complete a circuit to elevator stack relay 85. The several contacts 85' of relay 85 close to hold relay 85 and clutch and brake coils 73', 74' respectively energized.

It is understood that elevator 12 raises to a maximum height and thereafter begins to descend. As elevator 12 descends, carriage 32 thereof closes upper elevator control switch 102 to complete a circuit to elevator slowdown relay 103. Relay contact 103' closes to complete a circuit to motor brake relay 105. Normally closed relay contacts 105'' are opened to interrupt the circuit to elevator drive motor 41 while contact 105'' thereof closes to connect dissipating resistor 133.

At the same time, relay contact 105'' closes to start braking timer 142 and following a predetermined interval during which the internal brake of motor 41 slows elevator 12, timer 142 opens contact 142' thereof to interrupt the holding circuit to motor brake relay 105. Contacts 105'' of relay 105 accordingly close to restart elevator motor 41.

It is understood that the inertia of elevator 12 sustains additional movement of elevator 12 following de-energization of motor 41 and actuation of the internal motor brake. Accordingly, reset stop switch 102 is only held closed momentarily by the moving elevator carriage 32.

With energization of slowdown relay 103 through closure of control switch 102 by elevator 12, contact 103'' thereof is opened to interrupt the holding circuit to motor speed control relay 83 so that high speed motor contacts 83' open while low speed contacts 83'' close. Elevator motor 41 is accordingly switched to low speed and, on restarting of motor 41 following the braking interval imposed by timer 142, motor 41 drives elevator 12 at low speed. With restart of motor 41, elevator 12 descends until elevator stop switch 63, which is controlled by the position of ski 55, opens to break the holding circuit to stack relay 85. With de-energization of relay 85, contact 85' opens to interrupt the circuit to clutch and brake coil 73', 74' and stop elevator 12. Stacker 10 is now ready for the next stacking cycle.

Where during the operation of stacker 10, the input of articles 20 thereto is such that elevator 12, under the control of ski 55, descends to a point where elevator 12 closes ejector start switch 94 before the predetermined article count is reached, an energizing circuit is completed through the normally closed speed control relay contact 83'' to over-stack safety relay 108. Relay 108 opens contact 108'' thereof to de-energize stacker control relay 81 and shutdown stacker 10. It is understood that although elevator 12, during the stack ejecting portion of the stacker operating cycle, momentarily closes ejector start switch 94 to initiate operation of stack ejector 16, the prior actuation of speed control relay 83 to switch elevator drive motor 41 from low to high speed opens contact 83'' thereof to preclude switch 94 from energizing over-stack safety relay 108 at that time.

Should an article jam occur on elevator 12, the rapid buildup in the article level height would overcome the normal low speed descent of elevator 12 under the control of stack height responsive ski 55 as described heretofore, and the supply of articles to elevator 12 would swing the entire stack height control assembly 18 upwardly in a counter-clockwise direction about cross shaft 59. As control assembly 18 lifts, system stop switch 120 is opened to interrupt power to the system control circuit to thereby shutdown the various operating components of addressing system 3 pending removal of the article jam.

It is also understood that in the event of a stacker malfunction, for example, failure of elevator 12 to descend in accordance with the buildup of stack height or premature ascent of elevator 12 with articles stacked thereon, will also trip stop switch 120 as described above to shutdown addressing system 3.

While the invention has been described with reference to the structure disclosed herein, it is not confined to the details set forth; but is intended to cover such modifications or changes as may come within the scope of the following claims.

What is claimed is:

1. In an article processing system, the combination of:
article addressing means including a labeling head for transferring address information to articles;
means for supplying articles to be addressed to said addressing means;
an article stacker for arranging addressed articles from said addressing means into stacks including
a stacking elevator operatively disposed adjacent the discharge side of said addressing means to support addressed articles discharged by said addressing means;
means to lower said elevator as the stack of articles thereon builds up;
stacker reset means adapted when actuated to clear the article stack from said elevator and raise the cleared elevator into position for the next article stack; and
control means for stopping said article supplying means to interrupt the flow of articles to said stacker while said stacker is being reset including means to delay actuation of said stacker reset means to give articles enroute to said stacker following stopping of said articles supplying means time to reach said stacker.

2. In an article processing system, the combination of:
article addressing means including a labeling head for transferring address information to articles;
means for supplying articles to be addressed to said addressing means;
an article stacker for arranging addressed articles from said addressing means into stacks including a stacking elevator operatively disposed adjacent the discharge side of said addressing means to support addressed articles

discharged by said addressing means; means to lower said elevator as the stack of articles thereon builds up; stacker reset means adapted when actuated to clear the article stack from said elevator and raise the cleared elevator into position for the next article stack; and

control means for stopping said article supplying means to interrupt the flow of articles to said stacker while said stacker is being reset;

said article addressing means including article transport means for bringing articles to be addressed from said article supply means into transfer relationship with said labeling head and thereafter to said stacker;

said control means including means to stop said labeling head following addressing of the last article fed by said article supplying means prior to stopping thereof while maintaining said article transport means operative whereby to bring said last article to said stacker to complete the stack, and means to restart said article supplying means and said addressing means labeling head before resetting of said stacker is completed in order to have the first article addressed following restart of said article supplying means and said labeling head ready for stacking as resetting of said stacker is completed.

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