June 28, 1960 O. E. HEARTSTEDT 2,942,739

STRIP STACKER

Filed Aug. 2, 1957 4 Sheets-Sheet 1

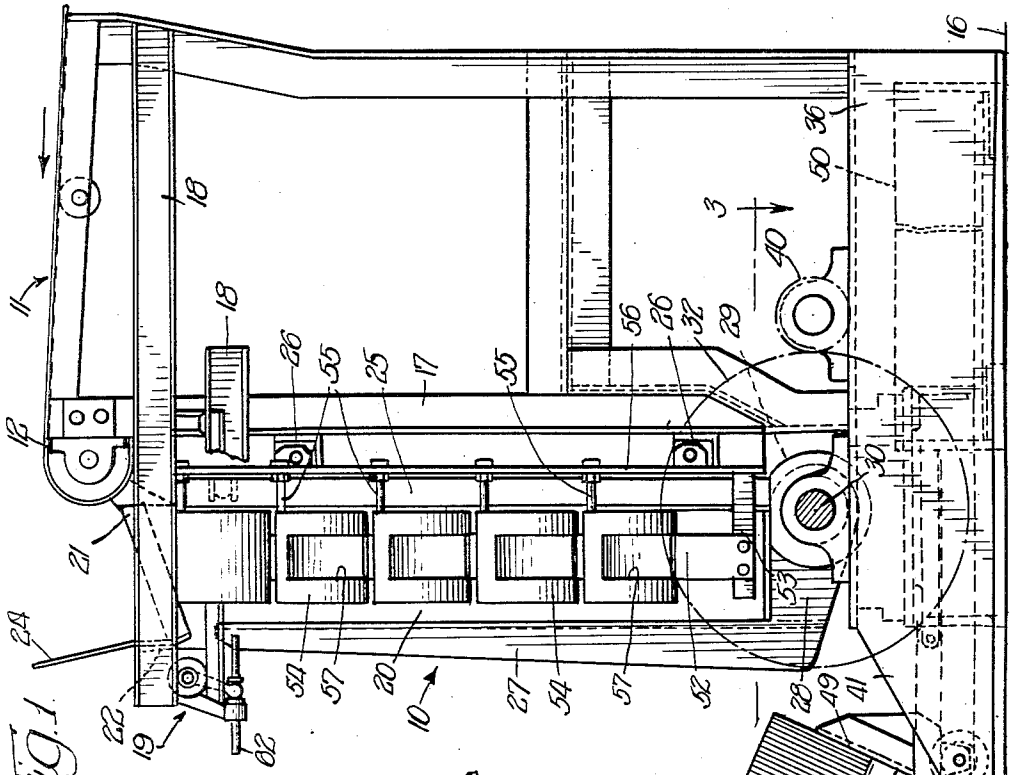


Fig. 1

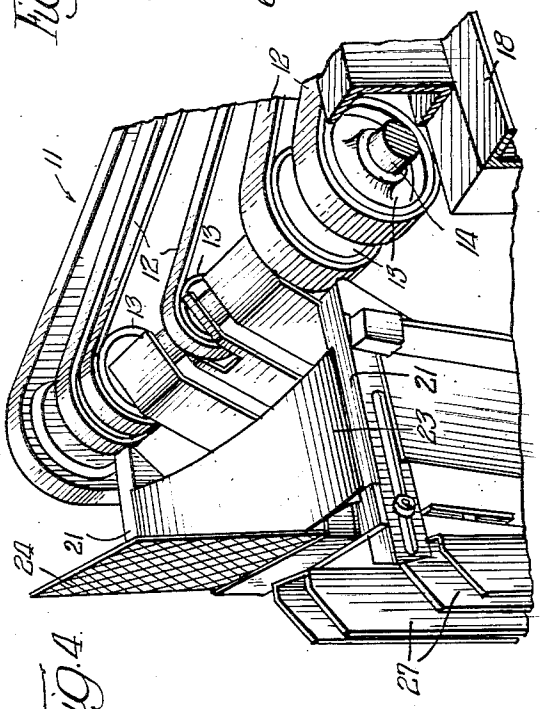


Fig. 4

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STRIP STACKER

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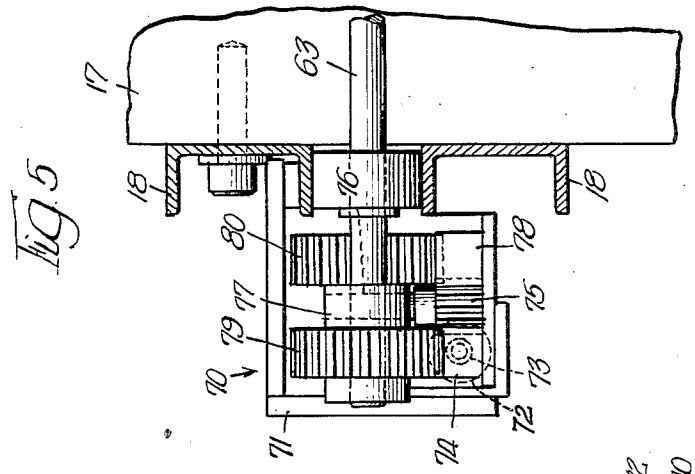


Fig. 5

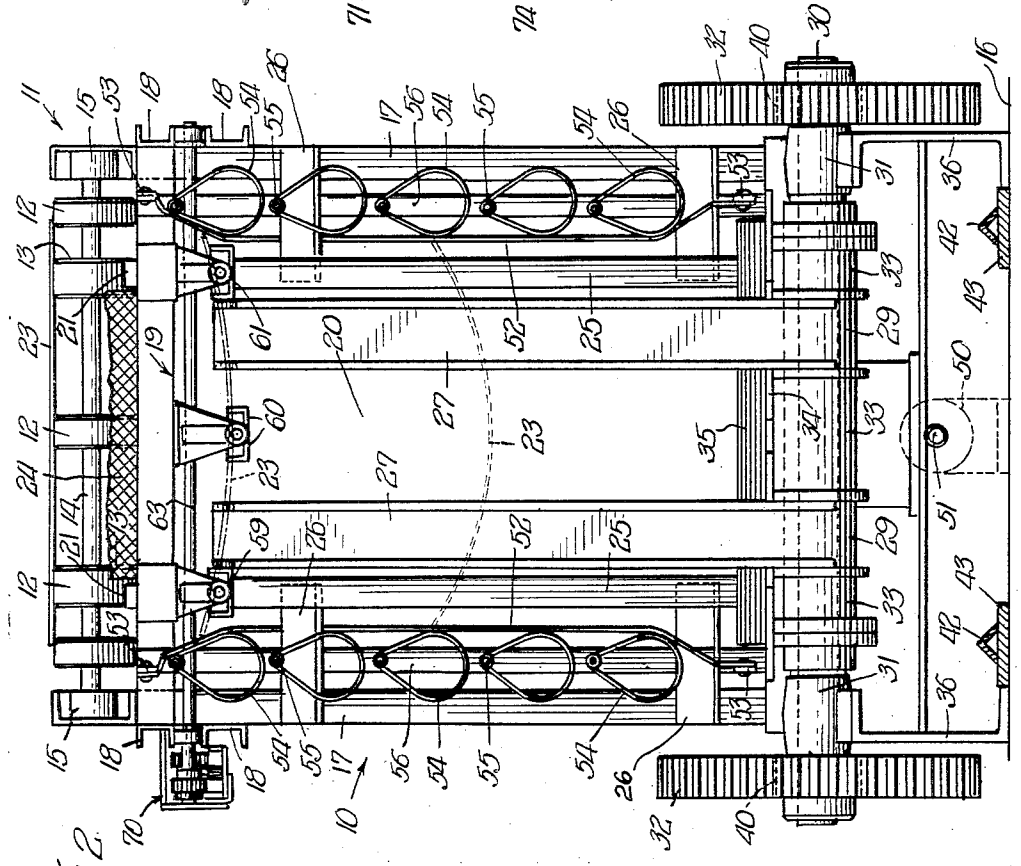


Fig. 2

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STRIP STACKER

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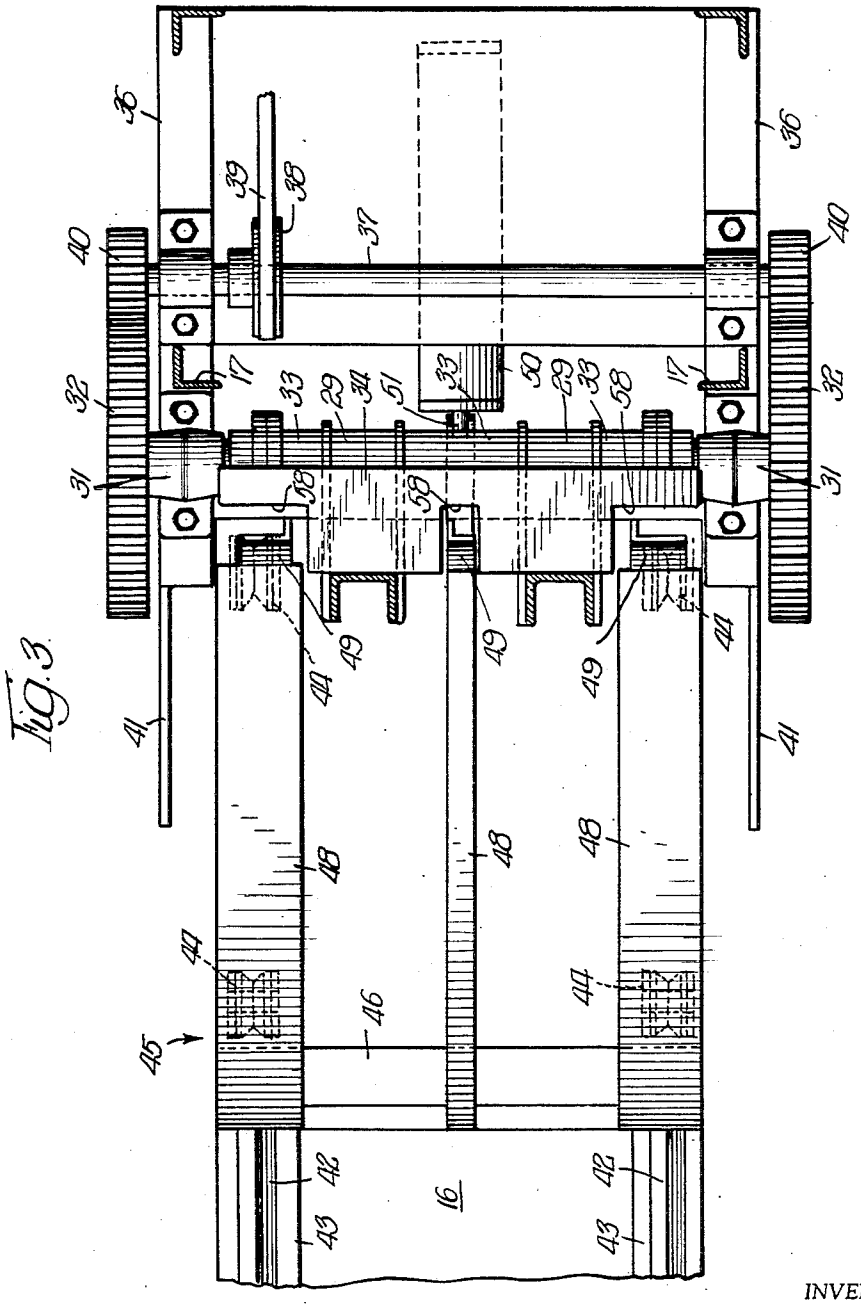


Fig. 3

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Filed Aug. 2, 1957 4 Sheets-Sheet 4

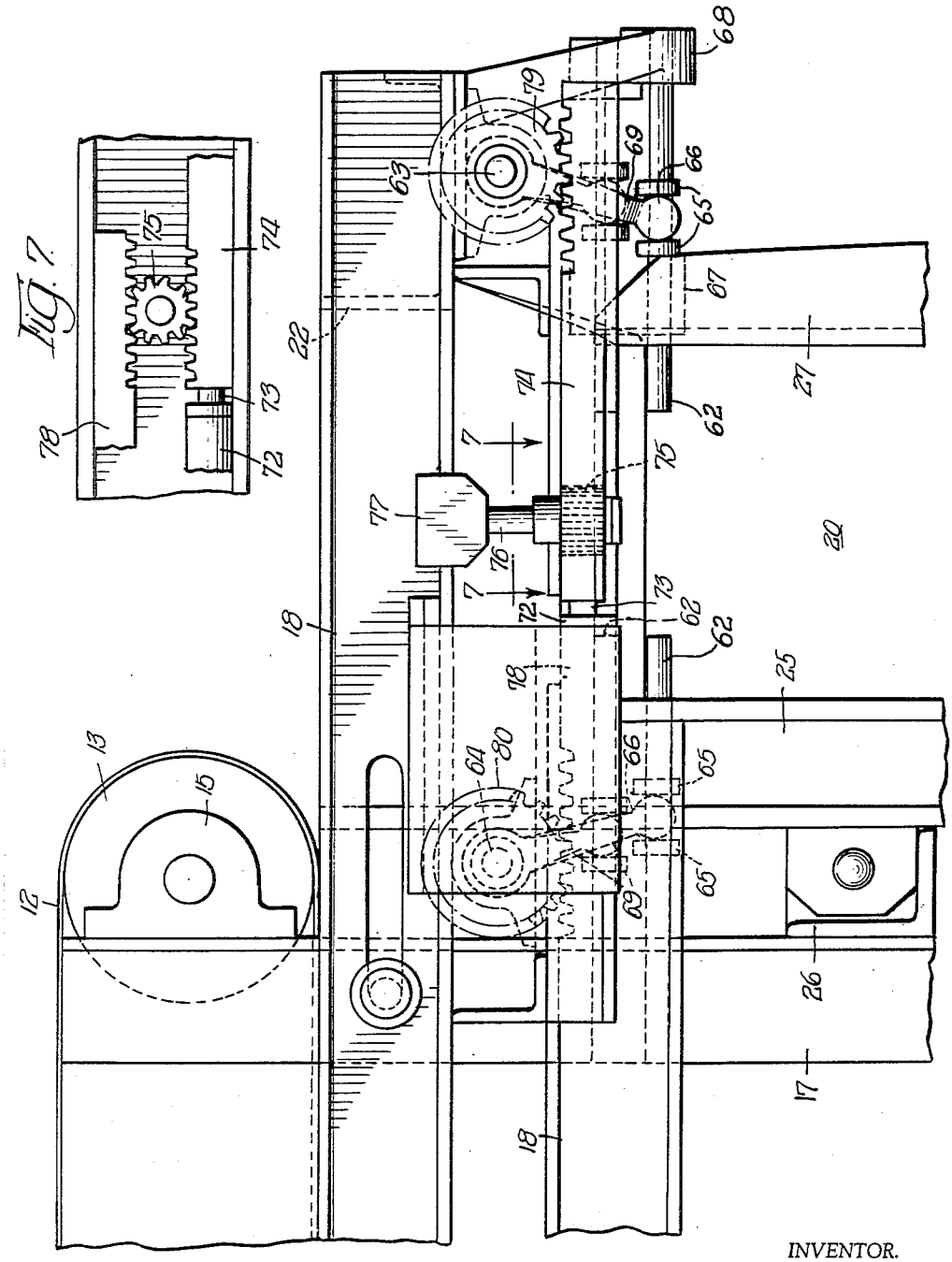


Fig. 6

Fig. 7

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2,942,739

STRIP STACKER

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Filed Aug. 2, 1957, Ser. No. 675,965

11 Claims. (Cl. 214—6)

The present invention is directed to a new and improved automatic stacking apparatus particularly adapted for use in accumulating relatively thin sheets of flexible material in stacked relation, the sheets or strips being delivered to the stacker by a continuously operating conveyor which automatically deposits successive strips in the stacker, the stacker controlling movement of the strips therethrough into neatly accumulated stacked position.

It is an object of the present invention to provide a new and improved form of automatic stacker for use in accumulating strips of flexible material in neatly piled condition, the strips being automatically conveyed to the stacker and delivered thereinto by a strip conveying means, the stacker controlling movement of each successive strip through the stacking area thereof to provide for neat accumulation of the same without damage thereto.

A further object is to provide a new and improved stacking apparatus particularly adapted for use in accumulating strips of flexible material, the stacker operating substantially in a vertical plane and defining a stacking area at the top portion of which the successive strips are received for controlled dropping movement downwardly through the stacking area into accumulated stack formation, the stacking apparatus including means providing for initial bowing of each successive strip and further means for maintaining the bowing thereof during the dropping movement within the stacking area to prevent inversion or position changing of the strips during their downward movement which might otherwise result in the imperfect accumulation of the strips as well as an unwanted degree of damage thereto.

Another object taken in conjunction with the foregoing is to provide a new and improved stacking apparatus of the type described wherein the stack formation and unloading functions of the stacker are fully automatic making it unnecessary for the operator to manipulate or otherwise control the positioning or movement of each successive strip during the stacking or unloading thereof, the apparatus further including automatically operated strip accumulation means which function during unloading to accumulate newly delivered successive strips in such a manner as to prevent interference with the unloading of a completed stack of the same, the utilization of the strip accumulation means also eliminating the necessity of interrupted operation of the conveyor or strip forming apparatus from which the strips are received by the stacker.

Other objects not specifically set forth will become apparent from the following detailed description made in conjunction with the drawings wherein:

Fig. 1 is a side elevation of the strip stacker of the present invention;

Fig. 2 is a front elevation of the strip stacking portion of the apparatus;

Fig. 3 is a sectional plan view taken generally along line 3—3 in Fig. 1;

Fig. 4 is a fragmentary perspective of the top portion of the stacker;

Fig. 5 is an enlarged fragmentary end elevation of a portion of the operating means of the strip accumulation means forming a part of the apparatus of the present invention;

Fig. 6 is an enlarged fragmentary side elevation of the top portion of the stacking apparatus illustrating in particular the strip accumulation means as viewed toward the right in Fig. 2; and

Fig. 7 is a fragmentary plan view of a portion of the strip accumulation operating means taken generally along line 7—7 in Fig. 6.

In Figs. 1 and 2 a strip stacker **10** incorporating the principles of the present invention is shown mounted in its operative position at the end of a conveyor structure **11**. The conveyor is of known structural arrangement including a plurality of endless belts **12** advanced in the direction of the arrow in Fig. 1 toward the stacker **10** by a series of rollers **13** carried by a shaft **14** journalled at its ends in bearings **15**. The conveyor **11** is raised substantially from the floor surface **16** by a supporting framework which includes vertically directed end frame beams **17** to which certain elements of the stacker **10** are attached. A horizontally extending framework defined by spaced pairs of beams **18** extends from the conveyor supporting structure outwardly of the end thereof in supporting engagement with the elements of a strip accumulation mechanism **19** which forms a part of the stacker **10**. In Fig. 1 the outermost end portion of the lowermost beam **18** is broken away to better illustrate the location of the mechanism **19**.

The stacker **10** includes a vertically extending stacking area **20** which is defined at the top thereof by a pair of laterally spaced, inclined strip striking members **21** which are suitably attached at their uppermost ends to the framework of the conveyor **11**. The lowermost or outermost ends of the rail-like members **21** are supported by a transverse beam **22** which is attached at its ends to the transversely spaced, uppermost side beams **18**. The top surface of each of the members **21** functions as a striking surface for contact with an end portion of a flexible strip **23** when the strip is delivered by the conveyor **11** from the end thereof into position over the top of the stacking area **20** in a manner to be described. The cross member **22** additionally carries an upwardly directed screen **24** which extends above the top horizontal side frame members **18** near the outermost ends of the strip striking members **21** to contain each strip **23** in stacking area alignment for end portion contact with the top surfaces of the members **21**.

The strip stacking area **20** is of generally rectangular cross section and is partially defined by transversely spaced posts **25** each of which is suitably attached to its adjacent vertical frame member **17** by angle iron connecting elements **26**. The posts **25** define the rear surface of the stacking area **20** and the front surface thereof is defined by a pair of laterally spaced, vertically directed arms **27**. The arms **27** each having integrally formed therewith at the lower end thereof a mounting portion **28** which is horizontally directed and which includes sleeves **29** suitably keyed to a shaft **30** which extends through fixed bearings **31** near opposite ends thereof and into fixed engagement with transversely spaced gears **32**. The shaft **30** further carries intermediate the bearings **31** and sleeves **29**, additional sleeve-like portions **33** which have attached thereto a horizontal plate **34** which defines a stacking surface on which a stack **35** (see Fig. 2) of strips **23** is accumulated. The sleeves **33** are fixed to the shaft **30** for pivotal movement therewith along with the vertical members **27** for stacker unloading purposes in a manner to be described.

The entire shaft assembly is supported by channel beams or plates **36** mounted on the floor **16** and estab-

lishing an enclosed supporting base for the stacker **10**. As shown in Fig. 3, the base plates **36** carry bearings for supporting a shaft **37** provided with a fixed pulley **38** operated by a belt **39** driven by a suitable drive means such as a reversible electric motor. The ends of the rotatable shaft **37** carry driving gears **40** which mesh with the gears **32** to rotate the shaft **30** and pivot the stacking plate **34** and arms **27** toward and away from the stacking area **20** in comformance with the unloading sequence of operation. The outermost ends of the base plates **36** carry outwardly projecting guard plates **41** which receive therebetween transversely spaced rails **42** suitably mounted on supporting strips **43** carried by the floor surface **16**. As particularly shown in Fig. 2, the rails are of an inverted V-shape for receiving in V-shaped grooves formed in the wheels **44** of a movable stock supporting truck or pallet **45**.

The pallet **45**, as shown in Figs. 1 and 3, is formed from a horizontally directed frame **46** directly supported by the wheels **44** and carrying vertically extending ramp supporting members **47**. Three transversely spaced, inclined ramps **48** are attached to the top ends of the vertical supports **47** and are inclined downwardly in a direction toward the stacker **10**. The bottom end of each ramp **48** is provided with an upwardly inclined stack holding plate **49** which is suitably attached to and carried by the pallet frame **46**. The ramps **48** and stack supporting plates **49** define therebetween a plurality of laterally spaced, inclined L-shaped structures between which the arms **27** are received during unloading of the stacker for the purpose of transferring a stack **35** onto the pallet **45** in the manner to be described.

The stacker supporting base defined by the side plates **36** houses a double acting cylinder **50** having a reciprocating piston rod **51** extending therefrom into connection with the forward end of the frame **46** of the pallet **45**. The cylinder **50** is operated by air pressure or any other suitable arrangement to move the pallet into close association with the bottom portion of the stacker **10** as shown in Fig. 3 or move the pallet away from the stacker **10** in spaced relation thereto as shown in Fig. 1. The end of the piston rod **51** is arranged for detachable interconnection with the pallet **45** to provide for the use of a plurality of pallets **45** where it is desired to move a loaded pallet to a separate finishing machine which further operates on each flexible strip **23** taken from the stack carried by the pallet **45**.

The stacker **10** of the present invention is particularly adapted for use during metallic closure cap formation in connection with an intermediate step of the cap formation procedure. Metallic closure caps are normally laid out by printing on continuous sheets of flexible metallic material to commence the cap-forming operation. The top panel of each cap portion usually carries printed material and the continuous metallic sheet is provided with a series of closely spaced printed areas which eventually define the top panels of a plurality of separate caps. The surrounding depending skirt portion of each cap is also laid out in outline form surrounding each printed area and one of the final steps of the process includes the stamping out of each cap from the metallic strips with the skirt portion area being drawn downwardly from the top panel portion to take the shape of the final form of the cap. This is a standard procedure followed in closure cap formation operation and the stacker is used at a point intermediate the various metal working operations to provide for a transfer of strips of the metallic material having the cap outlines printed thereon from the strip cutting machines to the cap forming machines. The original metallic sheet on which the cap outlines are printed along with the product advertising indicia is divided into segments by suitable metal cutting machinery to form a plurality of strips **23** which are rectangular in shape and which are substantially greater in length than in width. The metal used is light gauge and quite flexible and it is necessary to form stacks of these strips at the end of the strip forming apparatus for transfer to the cap forming apparatus. Thus a continuous supply of strips **23** is delivered from the end of the conveyor **11** into the top opening of the stacking area **20** of the stacker **10**. For efficient operation of the cap forming machinery, it is preferable to accumulate the strips **23** in neat stacks without damaging the same, each separate strip being subsequently automatically fed from a stack into the cap forming machinery.

Referring particularly to Figs. 2 and 4, each successive strip **23** is delivered from the conveyor **11** into end portion engagement with the top striking surfaces of the inclined members **21** carried at the top of the stacker **10**. As shown in Fig. 4, each strip contacts the striking surfaces and, due to the flexibility of the material thereof, bows centrally thereof in a downwardly direction and eventually falls downwardly into and through the stacking area **20** toward the bottom stacking plate **34** thereof. Gravity action causes each strip **23** to move downwardly in the stacking area **20** and the strip is only momentarily delayed during dropping by the inclined members **21**. This slight delay is sufficient to cause each strip **23** to take an arcuate shape providing a concave upper surface and a convex lower surface to an extent that with the central bowing of the strip, the ends thereof are drawn inwardly enough to eventually clear the inner surfaces of the inclined strip striking members **21**. The provision of the bow to each strip **23** is important in order to provide for controlled downward movement of the strip within the stacking area **20** and ultimately into contact with an accumulation of similar strips supported by the plate **34**. The controlled bowing of each strip prevents inversion or tipping of the same during downward movement thus assuring the formation of a neat stack at the bottom portion of the stacking area and, in addition, preventing any damage to the successive strips **23** as they move downwardly into stacked relation.

In order to retain the bow in each strip **23** as it moves downwardly in the stacking area **20**, the side or end margins of the stacking area **20** are defined by transversely spaced, flexible metallic tapes **52** which are suitably attached at their top and bottom ends to horizontally extending bars **53** forming a part of the frame structure of the stacker **10** and extending outwardly from vertical members **56**. The opposite ends of each strip **23** continously engages the inner surfaces of the tapes **52** during downward movement within the stacking area **20**. The transverse spacing of the tapes **52** is less than the total length of each strip **23** in its flat condition so as to retain the central bow in each strip at all times while the same is in downwardly moving contact with the tapes **52**.

As shown in Fig. 2, the tapes are provided with a substantial degree of slack and are resiliently urged inwardly of the sides of the stacking area **20** by a plurality of hoop-like pivotal band members **54** of tear-drop shape which swing on pins **55** attached to the vertically extending members **56**. The pivotal mounting of each band **54** at the top thereof and the engaging of each band along the side thereof with a tape **52** positions each band **54** to urge the tape **52** inwardly toward the center of the stacking area **20**. Preferably the tapes **52** are drawn tightly enough in a vertical direction to pivot each band **54** slightly outwardly upon initial installation thus causing each band, due to the weight of the material of the same and the tendency of the same to hang centrally relative to its pivot point, to back up and urge the tape **52** in association therewith in a direction toward the center of the stacking area **20**. Thus, upon movement of each strip **23** in a downwardly direction, the tendency of the strip to straighten itself acts upon the tapes **52** and the bands **54** to move them to a slight degree in a direction away from the center of the stacking area **20** and slightly expand the side margins thereof. The bands **54** are pivoted to a slightly greater degree outwardly away from

their dead center hanging position and the tendency of each band **54** to return to its dead center hanging position is increased thus resisting sufficient straightening of each strip **23** to an extent that the central bow of the same will be retained. The slight "give" supplied by each yieldable side margin of the stacker **10** is sufficient to prevent development of undue frictional interference between the ends of each strip **23** and the inner surfaces of the tapes **52** during downward movement of the strips **23** within the stacking area **20**. This slight expansive action of the side margins, however, is insufficient to allow complete end-to-end flattening of each strip **23** resulting in the eliminating of the central bow thereof, this bow being essential to prevent displacement or inversion of the strip during downward movement of the same.

As shown in Fig. 1, a number of the bands **54** may have their outer surface portions centrally cut out to define openings **57** therein to reduce the weight of each band **54** to an extent that the tape confining action of the same is inadequate to interfere with relatively free downward movement of a strip **23**. Total weight reduction of this nature may be found necessary depending upon the gauge of the metal used in forming the bands **54** as it is necessary to provide each band with an uninterrupted inner surface portion for engagement with a tape **52**. Preferably the width of the inner surface portion of each band **54** is almost equal to the width of each strip **23** to provide for adequately controlled downward movement of the same. Thus, if it is found preferable to reduce the weight of each band **54** and decrease the magnitude of tape confining action thereof, sections of the outermost portions of each band may be removed as illustrated to reduce this tape confining action to the extent desired.

As described, each successive strip **23** is automatically delivered into the top of the stacking area **20**, the strips being centrally bowed by momentary striking engagement with the inclined members **21**. The bowed condition of the strips is maintained during downward movement of the same within the stacking area by the contact with the transversely movable tapes **52**. Each strip **23** ultimately contacts the top strip of the pile **35** supported by the plate **34** and in this manner a neat accumulation of strips **23** in undamaged condition automatically occurs. In order to unload an accumulated stack **35** of strips **23**, suitable operating means are energized to rotate the shaft **37** through the belt and pulley arrangement and ultimately rotate the shaft **30** through the meshed gears **40** and **32**. Upon proper rotation of the shaft **30**, the stack confining members **27** are pivoted outwardly and downwardly toward the pallet **45** which is moved on the rails **42** into close association with the stacker **10** as shown in Fig. 3.

With outward and downward pivotal movement of the members **27**, the accumulated stack **35** carried by the stack supporting plate **34** is tilted therewith by reason of the plate **34** being fixed for movement with the shaft **30**. The stack **35** is pivoted out of the stacking area **20** into engagement with the top surfaces of the inclined ramps **48** between which the arms **27** move in a downward direction. As shown in Fig. 1, a stack **35** is transferred to the pallet **45** in inclined supported position between the cooperating surfaces of the ramps **48** and stack holding end plates **49**. Continued downward movement of the arms **27** along an arc eventually clears the stack **35** from the inner surfaces of the arms **27** and the top surface of the supporting plate **34**. As shown in Fig. 3, the forward edge of the plate **34** is provided with cut out portions **58** which allow the plate **34** to clear the inclined stack supporting plates **49** of the pallet **45**. The stack **35** is thus fully transferred from the stacker **10** to the pallet **45** without displacement or damage of any of the strips forming a part thereof.

The cylinder **50** is actuated by air pressure or any other suitable means and the piston rod **51** is moved outwardly therefrom pushing the pallet **45** away from the front face of the stacker **10** to an extent that the outermost ends of the arms **27** clear the innermost end of the pallet **45** to allow return pivoting of the arms **27** in an upwardly direction into their operative stacking area defining position as shown in Fig. 1. The pallet **45** may then be disconnected from the end of the piston rod **51** and removed from the rails **42** for transfer to the closure cap forming machinery with an empty pallet **45** of similar construction being connected with the piston rod **51** and moved thereby back into cooperative relation with the stacker **10**.

During unloading of the stacker **10**, the strip accumulation apparatus **19** is operated to prevent interruption of continuous feeding of strips **23** to the stacker **10**. The apparatus **19** as particularly illustrated in Figs. 2 and 6 comprises three pairs of reciprocating pin structures **59**, **60** and **61**. Each pair is defined by oppositely positioned, reciprocating pins **62** which move toward and away from one another into and out of the stacking area **20**. The pins **62** are operated on each side of the stacking area **20** by spaced shafts **63** and **64**. As particularly shown in Fig. 6, each of the pins **62** carry spaced radially projecting shoulders **65** between which is received the bifurcated end **66** of a circular arm **69**, the bifurcated portions of which receive therebetween the portion of the rod **62** intermediate the shoulders **65**. The innermost end portion of each pin **62** is slidable in a sleeve **67** carried by the frame members forming a part of the structure of the stacker **10** and the outermost end is slidable in a fixed sleeve **68** also carried by the structural framework of the stacker **10**. Each pin **62** is arranged for reciprocating movement relative to its sleeves **67** and **68** by actuation of a rocker arm **69** having formed integrally therewith the bifurcated end **66**. Each arm **69** is fixed to one of the shafts **63** and **64** for oscillating movement therewith upon actuation of the strip accumulation mechanism **19**. With the arrangement described, each pin **62** is operated in exactly the same manner.

Rocking of the shafts **63** and **64** is accomplished by an operating mechanism **70** carried in a housing **71** supported by the horizontal side frame members **18** at the uppermost portion of the stacker **10**. As particularly shown in Figs. 5 and 6, the strip accumulation mechanism **19** is operated by an air cylinder **72** which includes a reciprocating piston rod **73** attached to one end of a rack **74** having a series of gear teeth engaged with a rotatable gear or pinion **75** carried by a depending stub shaft **76** which is suitably mounted in a housing **77** carried by the uppermost horizontal frame member **18** adjacent thereto. The pinion **75** is rotatably mounted on the stub shaft **76** for rotation in a horizontal plane and is oppositely engaged with a series of teeth carried on the inner surface of a second rack **78** slidable in the housing **71**. The outermost end of the rack **74** is provided on the top with a series of teeth engaged with a gear **79** fixedly carried by the shaft **63**. The innermost end of the rack **78** carries a series of teeth thereon which are engaged with a gear **80** fixedly carried by the shaft **64**.

As shown in Fig. 6, the pins **62** are projecting into the stacking area **20** for accumulation of the strips **23** during unloading of the stacker **10**. With operation of the air cylinder **72**, the piston rod **73** is moved outwardly thereof to move the rack **74** to the right as shown in Figs. 6 and 7 and this movement rotates the shaft **63** through the gear **79** in a counterclockwise direction moving the three rocker arms **69** carried thereby toward the right as viewed and causing the pins **62** associated therewith to be moved out of the stacking area **20**. The pinion **75** rotates to provide for opposite movement of the rack **78** and opposite rotation of the shaft **64** with resulting opposite movement of the pins **62** positioned on the other side of the stacking area **20**. Operation of the air cylinder **72** from the

position shown in Fig. 6 will retract the pins **62** to completely remove the same from the stacking area **20**. Reverse operation of the cylinder **72** to withdraw the piston rod **73** thereinto causes reverse operation of the elements described and movement of the pins **62** into projecting relation within the stacking area **20**.

In considering Figs. 2 and 6, projection of the pins **62** into the stacking area **20** as illustrated in Fig. 6 will result in the accumulation of the continuous supply of strips **23** on the pins **62** in supported relation thereby. Each pair of pins **62** functions to sufficiently close off the top portion of the stacking area **20** to intercept successive strips **23** delivered thereinto from the conveyor **11**. The strips are caught in their bowed condition by the pins **62** and are accumulated thereon during unloading of the stacker **10** in the manner previously described. Upon completion of the unloading operation and the return of the members **27** into their vertical position, the pins **62** are withdrawn by operation of the mechanism **70** and the pile of strips accumulated thereby is allowed to drop through the stacking area **20** into contact with the stacking plate **34**. The strips delivered from this point on will fall directly from the conveyor **11** onto the top of the new stack **35** accumulated on the plate **34** without interference from the pins **62** which are in their retracted and inoperative positions.

As previously described, the provision of a central bow to each strip **23** and the continued existence of this bow during dropping of the strip through the stacking area **20** is of considerable importance. The bow is formed by the inclined members **21** and it is essential to retain this bow duirng accumulation of the strips by the apparatus **19** for subsequent controlled dropping of the accumulated strips through the stacking area **20** into stacked relation at the bottom thereof. In order to retain the bow in each accumulated strip supported by the apparatus **19** during unloading of the stacker **10**, the central pair of strip supporting elements **60** is vertically downwardly offset relative to the remaining pairs **59** and **61**. This arrangement is particularly shown in Fig. 2 wherein a bowed strip **23** is illustrated in broken lines as held in its bowed condition by the strip accumulation mechanism **19**. Thus, all of the strips **23** accumulated on the projecting pins **62** remain centrally bowed for subsequent controlled dropping through the stacking area **20** when the unloading operation is completed and the strip accumulation pins **62** are retracted out of the stacking area **20**.

While the strip stacking mechanism of the present invention has been described in connection with its use in the manufacture of metallic closure members such as bottle caps, it will be appreciated that where strips of flexible material must be stacked between product forming operations, the stacking mechanism of the present invention is readily adapted for use. The various stacker operating means, such as the driving means for the unloading mechanism and the air pressure supply means for positioning movement of the pallet and operation of the strip accumulating mechanism, can readily be sequentially or simultaneously operated, as the case may be, by any known type of automatic control means. Thus, upon the accumulation of strips to a predetermined extent within the stacker, the various drive mechanisms may be automatically placed into operation to carry out the sequential steps of unloading and strip accumulation during unloading. The apparatus described is particularly adapted for automatic operation, it being unnecessary to interrupt continuous operation of the conveyor **11** in supplying successive strips **23** and thus interrupt operation of the strip forming machinery. The strips are accumulated and automatically unloaded in neat piles without damage thereto resulting in substantial time and material savings.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A strip stacker for receiving readily flexible metallic strips from the end of a conveyor and stacking the same, said stacker including a vertically directed stacking area, the top of said area being located relative to the end of said conveyor to receive thereinto said strips in a consecutive manner and in flat condition, said top being defined by transversely spaced strip striking surfaces which are contacted by the end portions of each strip upon leaving the conveyor, said strip striking surfaces being spaced from one another a distance which is less than the flat length of said strips, said strips being sufficiently flexible to bow centrally thereof upon contact with said striking surfaces for controlled dropping movement downwardly within said stacking area, and yieldable strip contacting means forming the side margins of said stacking area which are also spaced from one another a distance which is less than the flat length of said strips to be in engagement with the ends of each strip during the dropping thereof to maintain the central bow therein.

2. A strip stacker for receiving readily flexible metallic strips from the end of a conveyor and stacking the same, said stacker including a vertically directed stacking area the outer portion of which is defined by spaced upright stack confining arms, the top of said area being located relative to the end of said conveyor to receive thereinto said strips in a consecutive manner and in flat condition, said top being defined by transversely spaced strip striking surfaces which are contacted by the end portions of each strip upon leaving the conveyor, said strips being sufficiently flexible to bow centrally thereof upon contact with said striking surfaces for controlled dropping movement downwardly within said stacking area, and yieldable side margins forming a part of said stacking area which are in engagement with the ends of each strip during the dropping thereof to maintain the central bow therein, said arms being pivotally mounted at the bottoms thereof for movement away from said stacking area toward a horizontal plane, the bottom of said stacking area being defined by a stack supporting surface which is mounted for tliting movement with said arms to tilt an accumulated stack of said strips out of said area for unloading.

3. A strip stacker for receiving readily flexible metallic strips from the end of a conveyor and stacking the same, said stacker including a vertically directed stacking area, the top of said area being located relative to the end of said conveyor to receive thereinto said strips in a consecutive manner and in flat condition, said top being defined by transversely spaced strip striking surfaces which are contacted by the end portions of each strip upon leaving the conveyor, said strips being sufficiently flexible to bow centrally thereof upon contact with said striking surfaces for controlled dropping movement downwardly within said stacking area, yieldable side margins forming a part of said stacking area which are in engagement with the ends of each strip during the dropping thereof to maintain the central bow therein, and strip accumulation means forming a part of said stacker near the top thereof, said accumulation means including reciprocating surfaces which move into said stacking area to intercept consecutive strips delivered from said conveyor and temporarily stack the same during unloading of said stacking area.

4. A strip stacker for receiving readily flexible metallic strips from the end of a conveyor and stacking the same, said stacker including a vertically directed stacking area the outer portion of which is defined by spaced upright stack confining arms, the top of said area being located relative to the end of said conveyor to receive theretinto said strips in a consecutive manner and in flat condition, said top being defined by transversely spaced strip striking surfaces which are contacted by the end portions of each strip upon leaving the conveyor, said strips being

sufficiently flexible to bow centrally thereof upon contact with said striking surfaces for controlled dropping movement downwardly within said stacking area, yieldable side margins forming a part of said stacking area which are in engagement with the ends of each strip during the dropping thereof to maintain the central bow therein, said arms being pivotally mounted at the bottoms thereof for movement away from said stacking area toward a horizontal plane, the bottom of said stacking area being defined by a stack supporting surface which is mounted for tilting movement with said arms to tilt an accumulated stack of said strips out of said area for unloading, and strip accumulation means forming a part of said stacker near the top thereof, said accumulation means including spaced reciprocating surfaces which move into said stacking area to intercept consecutive strips delivered from said conveyor and temporarily stack the same during unloading of said stacking area, said reciprocating surfaces being vertically staggered to retain the central bow in each strip during temporary stacking thereof.

5. The stacker of claim 4 which further includes stacker operating means interconnected with said arms, said reciprocating means and said strip accumulation means to simultaneously operate the same during unloading of the stacker.

6. The stacker of claim 1 wherein said yieldable side margins of said stacking area are each defined by a plurality of vertically arranged lightweight bands of teardrop shape each of which is pivotally mounted for movement into and out of centered relation during downward movement of succesive strips, the inner surfaces of said bands being in positioning engagement with a vertically directed continuous band-like tape along which an edge of each strip slides during downward movement thereof, said bands resiliently backing up said tapes to maintain the central bow in each strip.

7. The stacker of claim 4 wherein said yieldable side margins of said stacking area are each defined by a plurality of vertically arranged lightweight bands of teardrop shape each of which is pivotally mounted for movement into and out of centered relation during downward movement of successive strips, the inner surfaces of said bands being in positioning engagement with a vertically directed continuous band-like tape along which an edge of each strip slides during downward movement thereof, said bands resiliently backing up said tapes to maintain the central bow in each strip.

8. The stacker of claim 3 wherein the reciprocating surfaces of said strip accumulation means are pin-like members arranged in transversely spaced pairs in each

of which the pin-like members reciprocate toward and away from one another on opposite sides of said stacking area, a central pair being vertically downwardly offset relative to the remaining pairs to retain the central bow in each strip during temporary stacking thereby.

9. The stacker of claim 2 wherein a movable pallet is operatively connected therewith by reciprocating means to receive a stack of strips during unloading of said stacker, said pallet having inclined spaced stack supporting ramps between which said arms are received to transfer a stack from said arms onto said ramps, the travel of said reciprocating means being adequate to move said pallet away from said stacker to an extent to clear said arms relative to a transferred stack to allow pivotal return of said arms into stacking area defining position.

10. The stacker of claim 2 wherein a movable pallet is operatively connected therewith by reciprocating means to receive a stack of strips during unloading of said stacker, said pallet having inclined spaced stack supporting ramps between which said arms are received to transfer a stack from said arms onto said ramps, the lowermost ends of said ramps having a stack holding surface positioned at substantially right angles thereto, the travel of said reciprocating means being adequate to move said pallet away from said stacker to an extent to clear said arms relative to a transferred stack to allow pivotal return of said arms into stacking area defining position.

11. The stacker of claim 4 wherein a movable pallet is operatively connected therewith by reciprocating means to receive a stack of strips during unloading of said stacker, said pallet having inclined spaced stack supporting ramps between which said arms are received to transfer a stack from said arms onto said ramps, the lowermost ends of said ramps having a stack holding surface positioned at substantially right angles thereto, the travel of said reciprocating means being adequate to move said pallet away from said stacker to an extent to clear said arms relative to a transferred stack to allow pivotal return of said arms into stacking area defining position.

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