June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 1

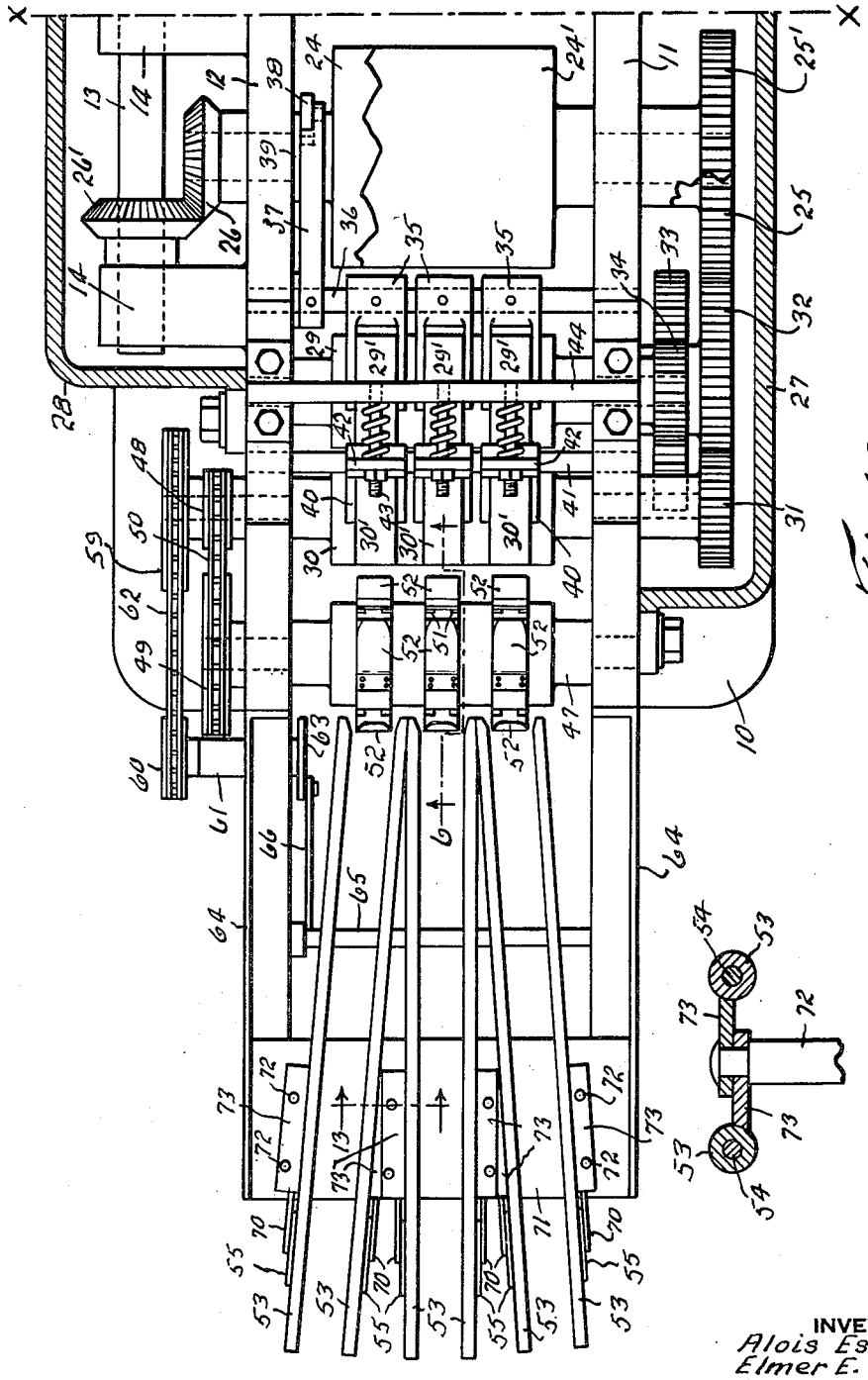


Fig. 1A

Fig. 1B

INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg

By Victor W. Bond-ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 2

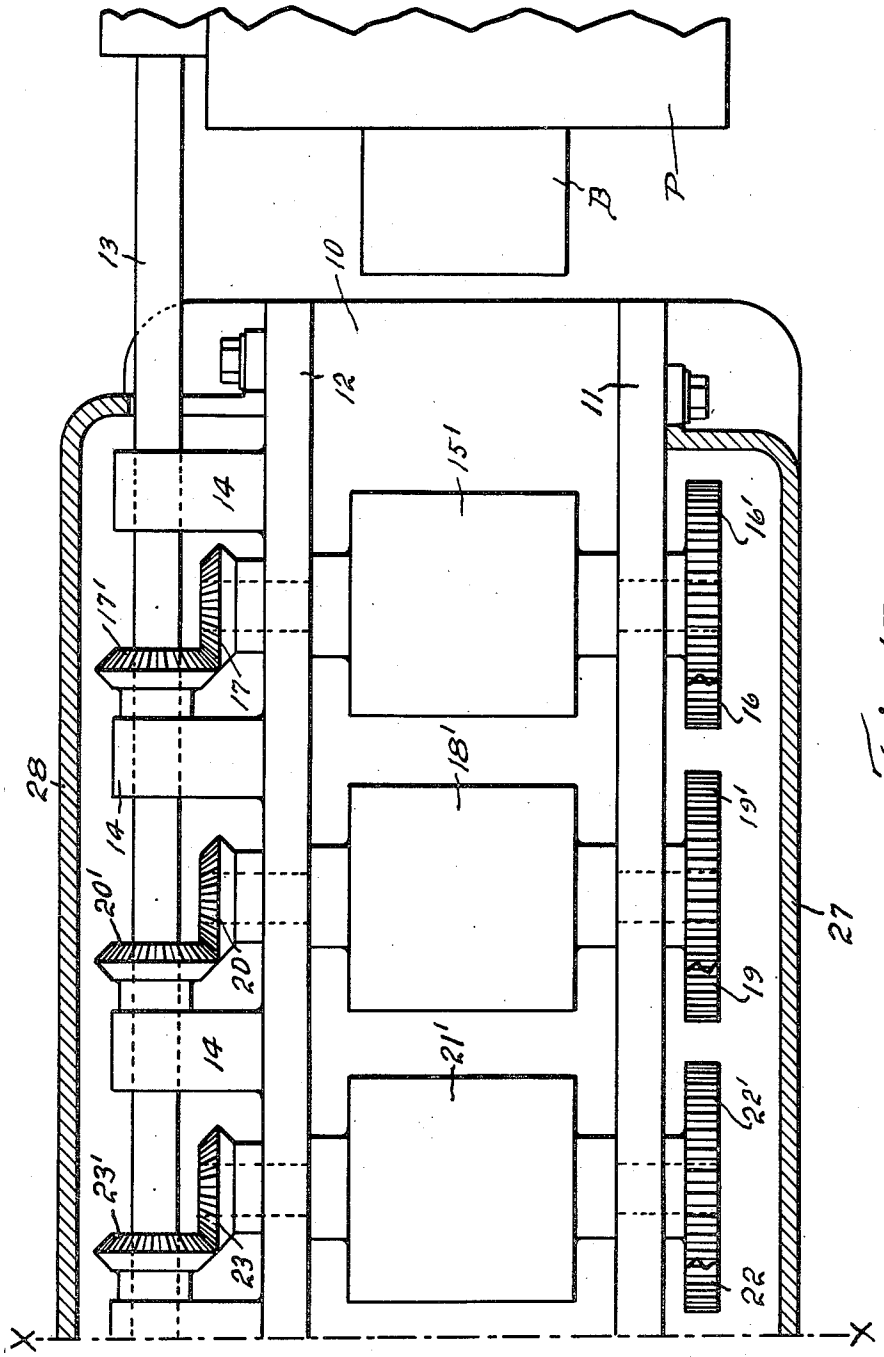


Fig. 1B

INVENTORS
Alois Essex
Elmer E Garrett
& John Kallenberg

By Victor N. Borst ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 3

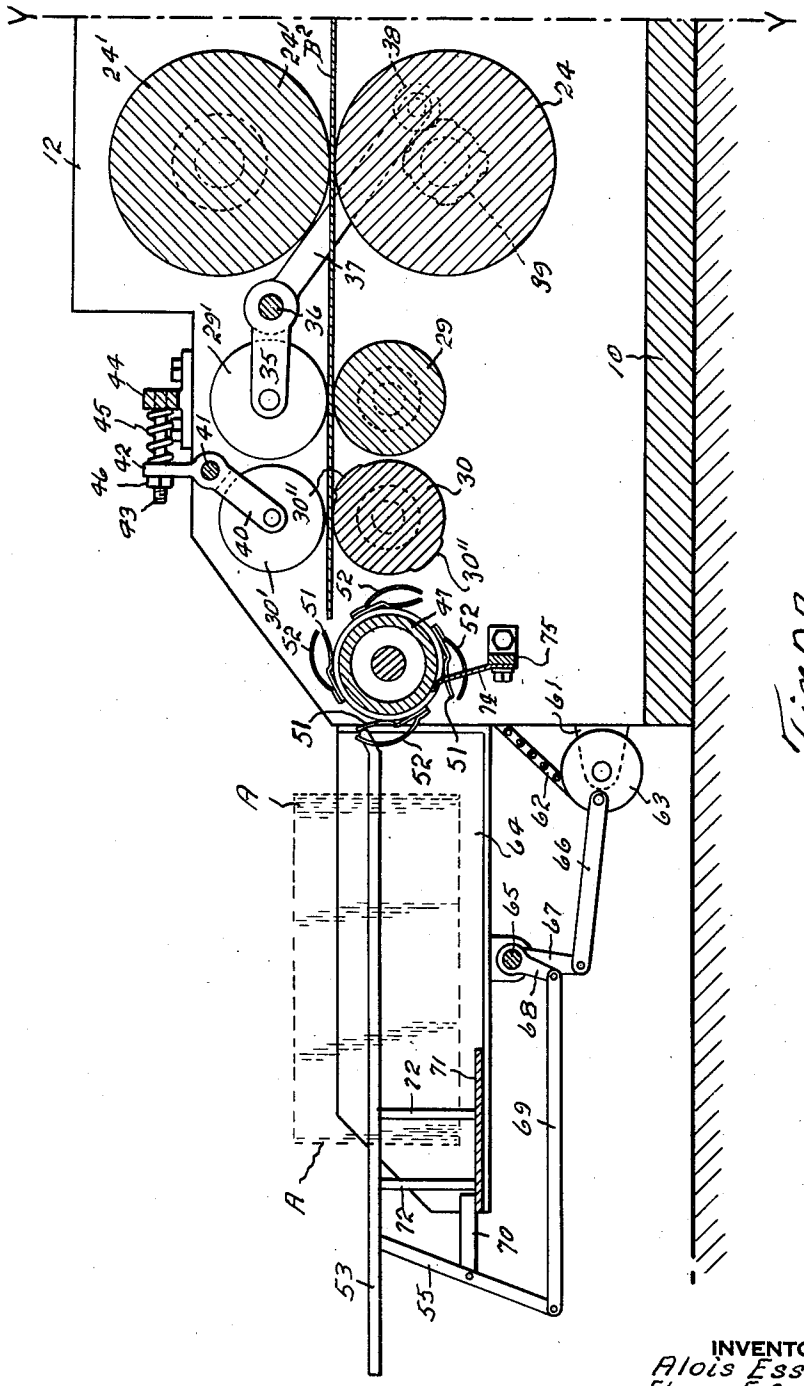


Fig. 2A

INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg

By Victor N. Bond ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 4

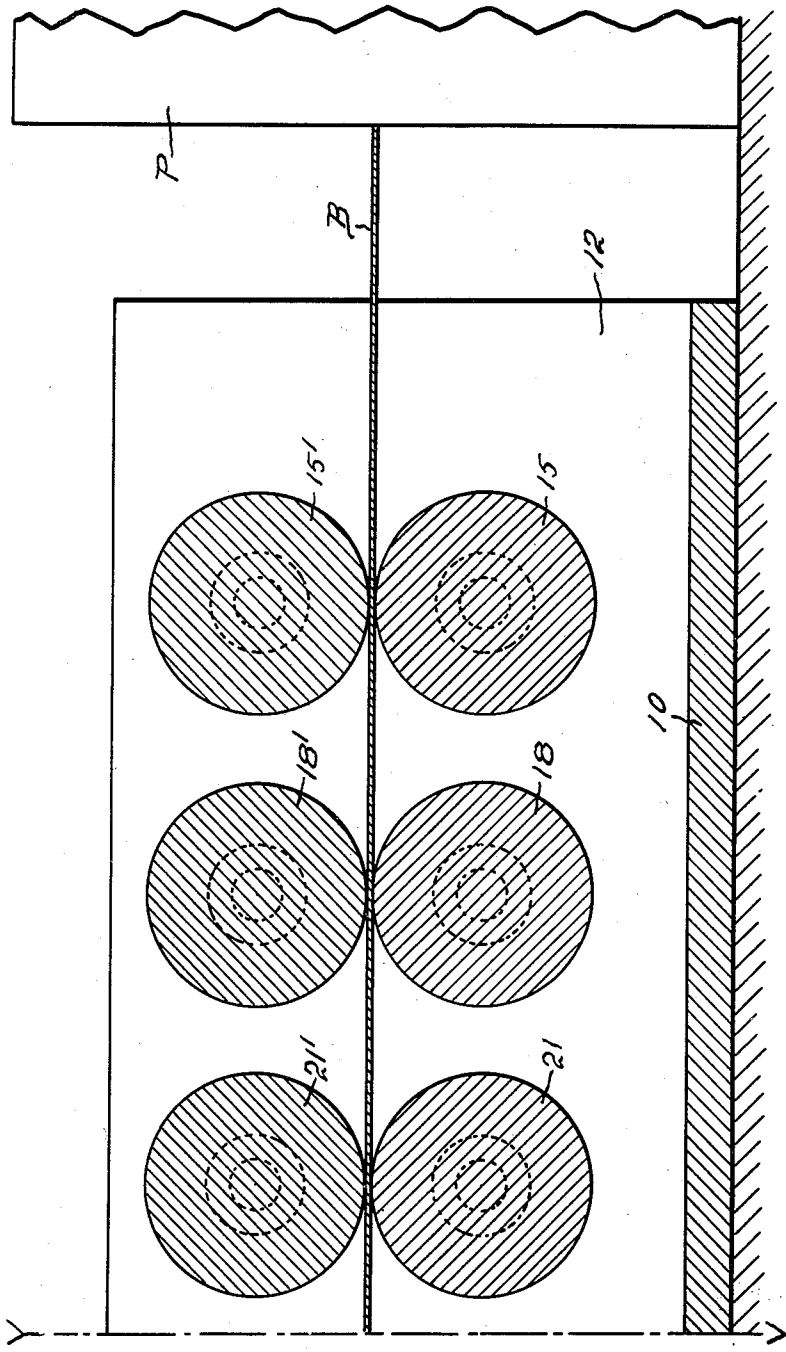


Fig. 2B

INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg
By Victor N. Sorsi ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 5

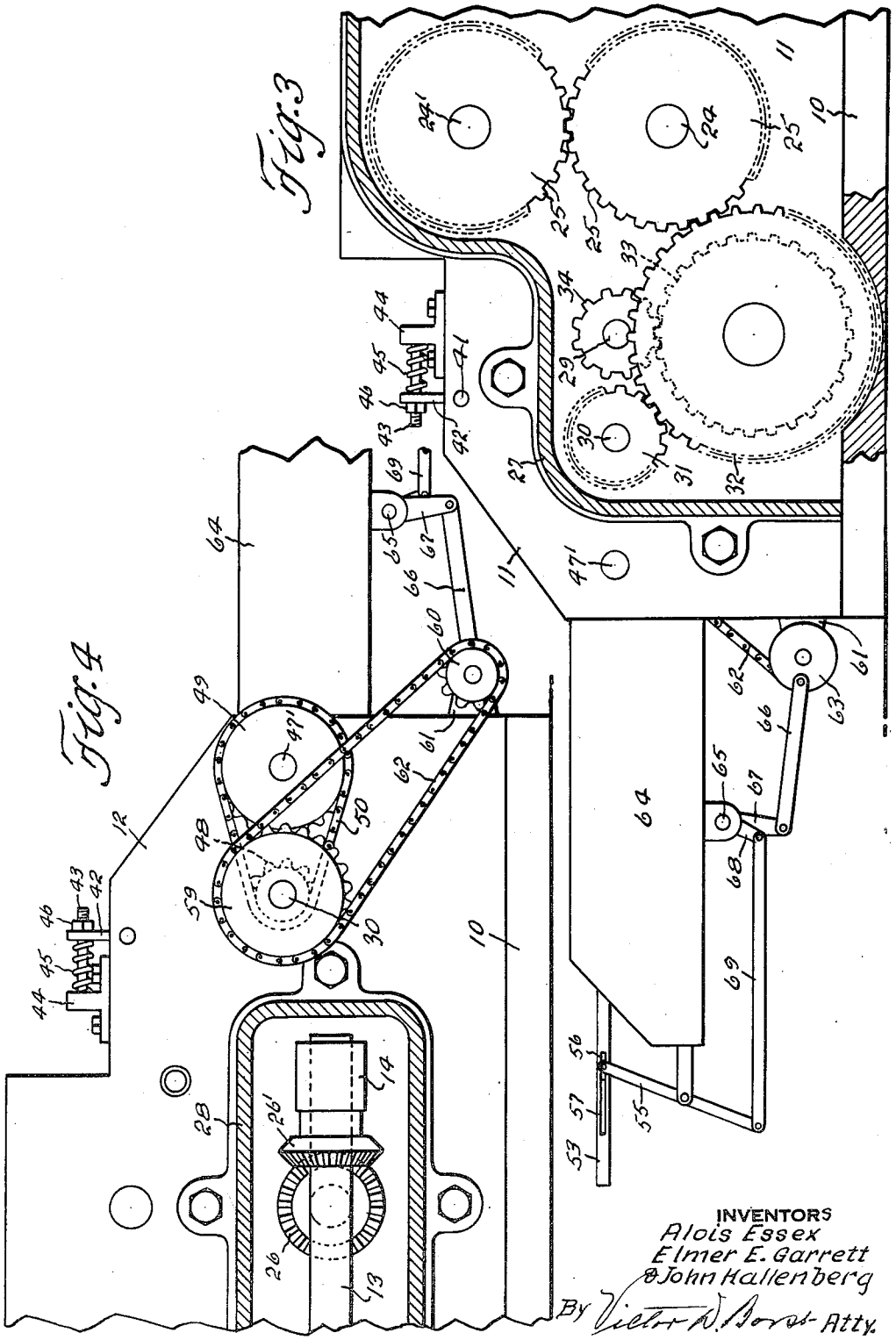


Fig. 3

Fig. 4

INVENTORS
Alois Essex
Elmer E. Garrett
& John Hallenberg
By Victor W. Borst Atty.

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 6

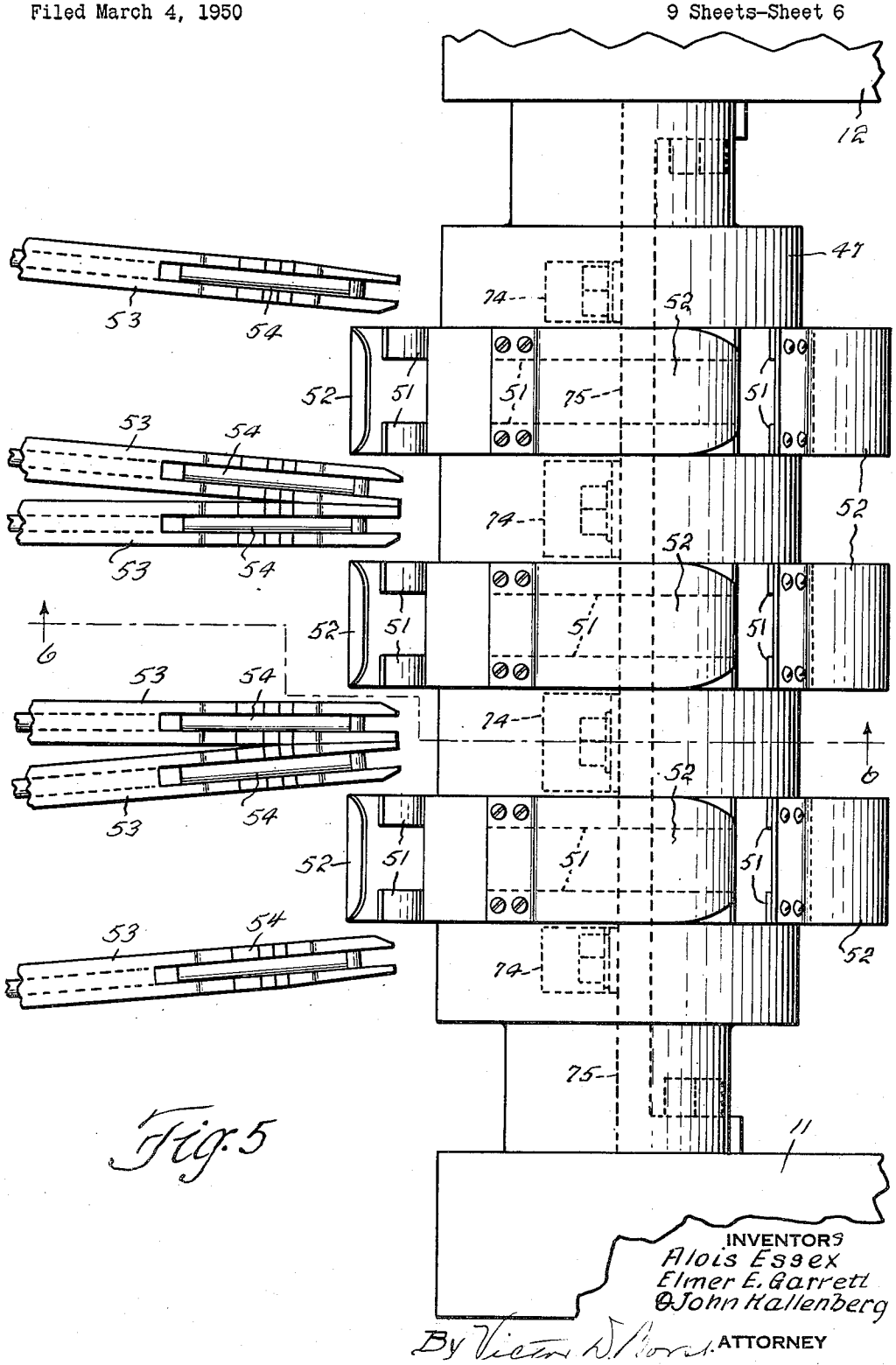


Fig. 5

INVENTORS
Alois Essex
Elmer E. Garrett
& John Hallenberg
By Victor J. Evans ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 7

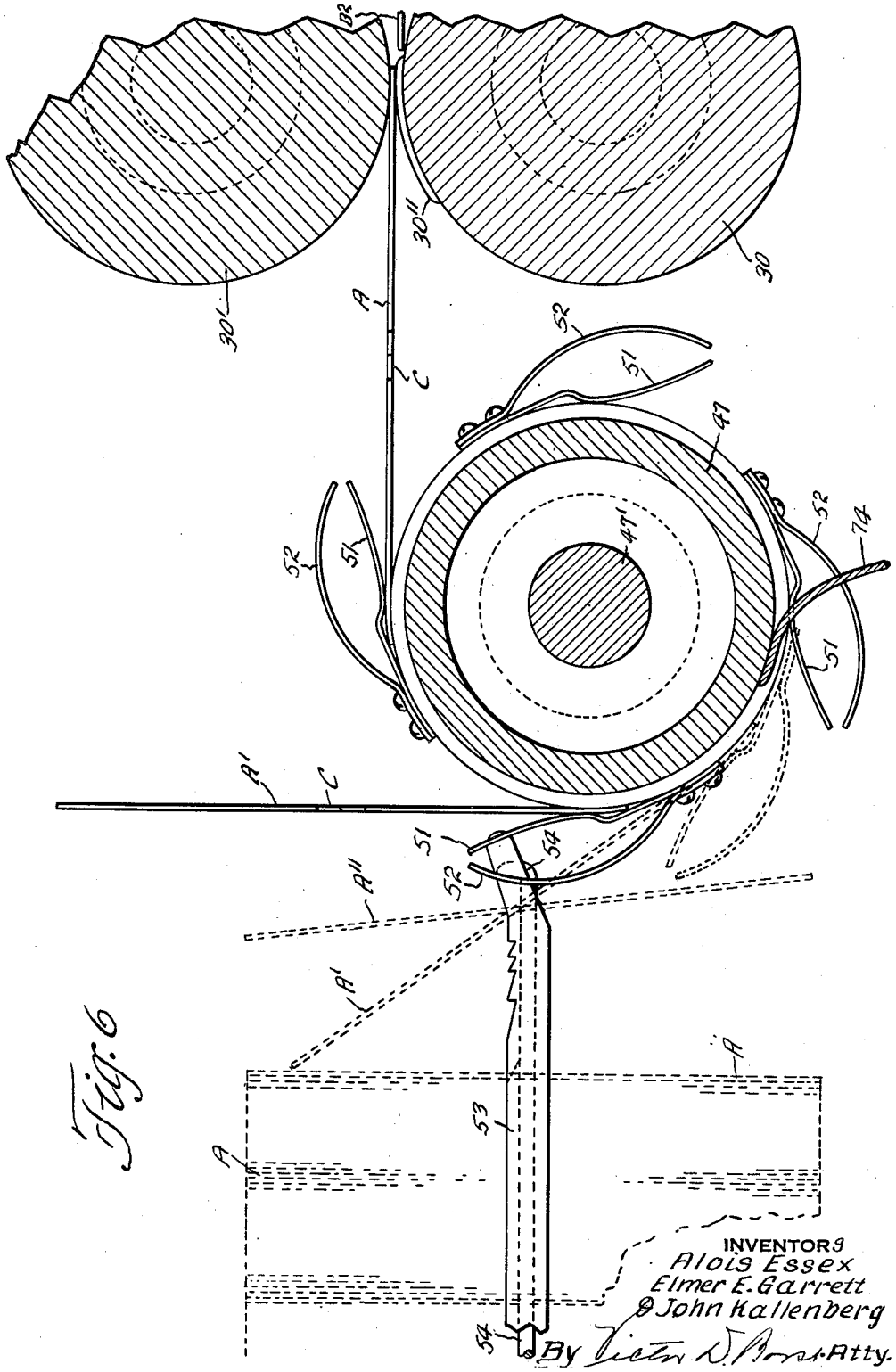


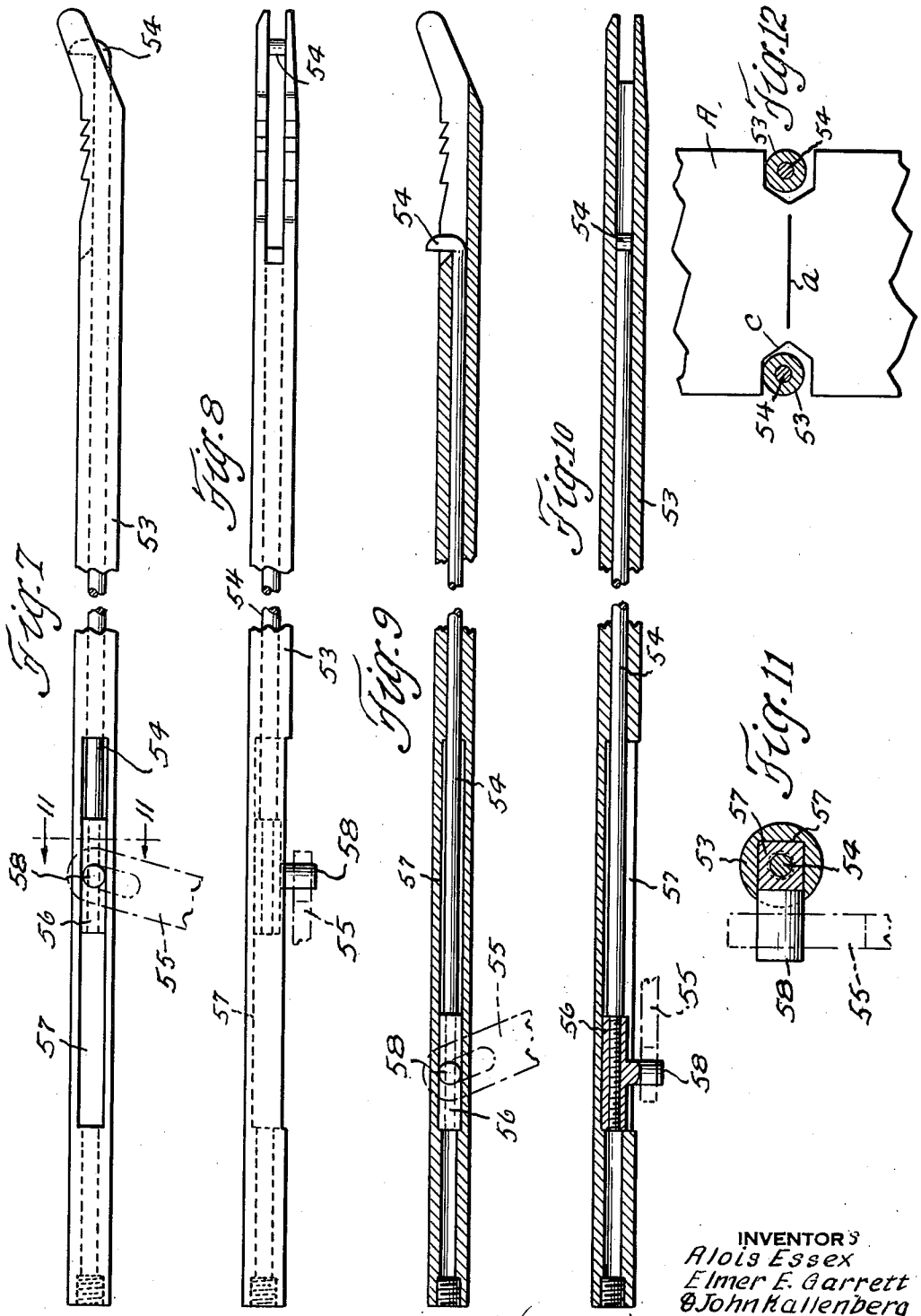
Fig. 6

INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg
By Victor J. Bond Atty.

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 8



INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg

By Victor J. Bono ATTORNEY

June 3, 1952 A. ESSEX ET AL 2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Filed March 4, 1950 9 Sheets-Sheet 9

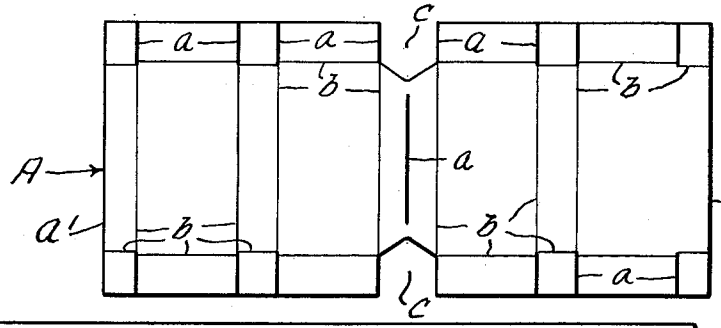


Fig. 14

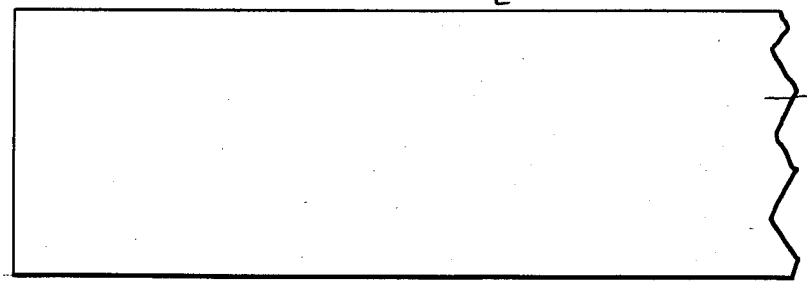


Fig. 15

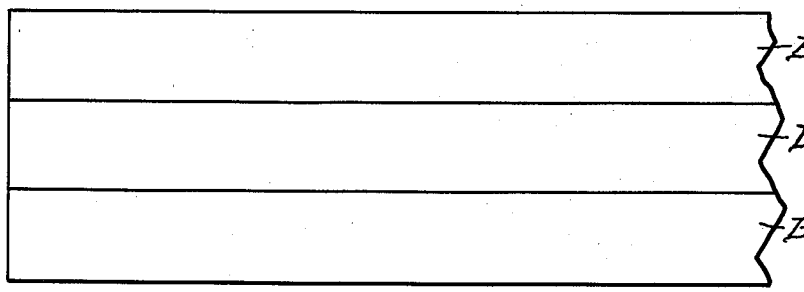


Fig. 16

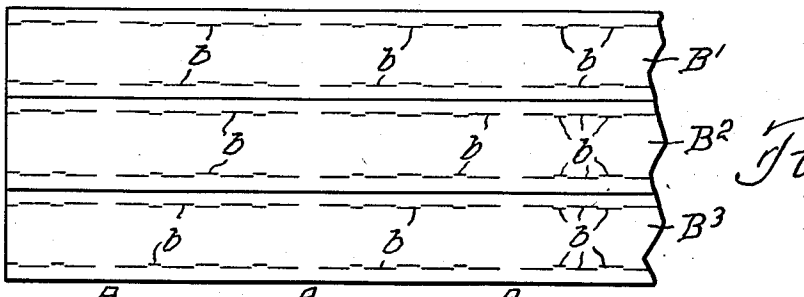


Fig. 17

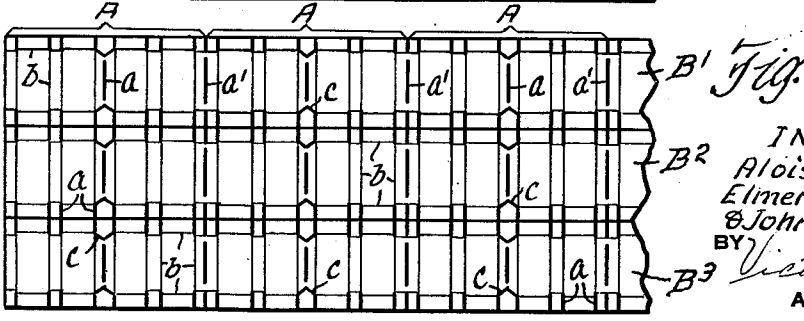


Fig. 18

INVENTORS
Alois Essex
Elmer E. Garrett
& John Kallenberg
BY Victor J. Bono
ATTORNEY

Patented June 3, 1952 2,599,442

UNITED STATES PATENT OFFICE

2,599,442

APPARATUS FOR STACKING CARTON BLANKS

Alois Essex, Glendale, Elmer E. Garrett, Freeport, and John Kallenberg, Stewart Manor, N. Y., assignors to The Sperry Corporation, a corporation of Delaware

Application March 4, 1950, Serial No. 147,646

6 Claims. (Cl. 271—71)

1

This invention is designed primarily for the convenient assemblage or stacking of carbon blanks as they come from the forming stage, preliminary to such final treatment as their particular requirements call for to prepare them for their ultimate use.

The invention is especially adapted and is primarily intended for edge or upright stacking of the blanks as they come from the forming mechanism, the stack building up horizontally with the blanks vertical, although it is capable of employment to assemble the blanks in a vertical stack, feeding either to the top or bottom of the stack.

While the invention is applicable to blanks of any conventional size, it has especial utility with relatively small size blanks, as for packages which may be carried in a vest pocket and which, therefore, are discharged in great rapidity from a continuous forming mechanism.

The invention contemplates, as an incident of the operation, the weakening of a traveling strip or web of card board or other suitable material from which paper cartons are made, at regularly spaced intervals along its length, as by transverse slits which partially sever the material and provide tearing lines, and at the same time the formation of two opposed lateral notches intermediate the weakened or tearing lines, and the repetitious sudden acceleration of the end section in advance of the foremost slit, thus tearing off that advanced section, and the gripping of the successive separated blank sections and moving them to a position where they are stacked with their notches upon a pair of rods.

The grippers rotate about an axis parallel with the plane of the traveling strip and the rods are so disposed that their ends enter into the notches at a selected point in the movement of the blanks and strip the blanks from the grippers. Preferably this is done after a rotation of about 90°, thus causing the blanks to assume an erect position and to build up the stack horizontally. A reciprocating hook operated in properly timed relation to the delivery of the blanks on to the rods, forces each blank up against the stack and thus advances the stack each time the thickness of a blank.

The embodiment of the invention selected for the purpose of illustration and shown in the accompanying drawings will now be described, after which the invention will be pointed out in claims.

Figs. 1A and 1B together constitutes a plan of a complete machine embodying the invention.

2

Figs. 2A and 2B together constitute a longitudinal sectional elevation of the machine.

Fig. 3 is a side elevation of the front portion of the machine with the gear case in section.

Fig. 4 is an opposite side elevation of substantially the same portion of the machine as is shown in Fig. 3 with the gear case in section.

Fig. 5 is a plan on enlarged scale of the gripper roll and of the adjacent ends of the stripper and guide rods and of the reciprocating hooks.

Fig. 6 is a sectional elevation on the scale of Fig. 5 on the line 6—6 in Figs. 1A and 5.

Fig. 7 is a detail in side elevation of a guide rod and reciprocating hook combination.

Fig. 8 is a plan of the same.

Fig. 9 is a longitudinal sectional elevation of the same, showing the hook retracted.

Fig. 10 is a sectional plan of the same.

Fig. 11 is a transverse section of the same, on line 11—11 of Fig. 7.

Fig. 12 is a transverse section through a stack showing the manner of stacking on the rods.

Fig. 13 is a transverse section on the line 13—13 of Fig. 1A.

Fig. 14 is an enlarged face view of a blank section such as the apparatus forms and stacks.

Fig. 15 is a plan of a web as it enters the apparatus.

Figs. 16, 17 and 18 show the web in successive stages of the operation.

As shown, the blanking mechanism is connected directly on to a printer and is driven by the same power shaft as is the printer. In order to understand the purpose and operation of the mechanism, it will be well to refer to the product drawings constituting Figs. 14 to 18. The final product which is formed and stacked by this mechanism is shown in Fig. 14 and is, in reality, a duplex blank, that is, two individual final blanks connected together, which is designated generally by the letter A. This blank has been scored and cut so as to form foldable tabs and notches and a transverse tearing line. The light lines represent the scoring and the heavy lines represent the cuts. In this particular blank cuts *a* and score lines *b* have been formed in each individual half of the duplex blank, making two small square tabs and two oblong tabs on each edge of each half and transverse and longitudinal lines *b* on which it may be folded. Also on each edge between the two individual blanks is formed a notch *c*, and a transverse slit *a* forms a tearing line joining the middle of the notches.

This duplex blank shown in Fig. 14 is one of the blank sections torn from the traveling strip

and caught by the grippers and stacked. It therefore had a weakened line at each end which is designated *a'*. Since the strip is torn off in sections on the lines *a'*, it will be appreciated that the intermediate tearing line *a* is merely incidental and plays no part in the steps which constitute this invention. In a subsequent operation not disclosed herein and forming no part of this invention, the pair of individual blanks are torn apart on the line *a* which intersects the notches, and the individual blanks are properly folded into cartons and are delivered to a filling machine. By severing the blanks in pairs, the notches *c* are obtained which serve a function in stacking.

The printed sheet or web B emerges from the printer P and in practice is wide enough to make several rows of blanks. For this purpose the sheet is cut into a plurality of strips, shown as three in the drawings but in practice considerably exceeding that number. Fig. 16 shows the sheet cut into the three strips B1, B2 and B3. As will be shown, this is done by dies on a first pair of rolls as the sheet travels. The next pair of rolls puts in the longitudinal creases, converting the strips to the condition shown in Fig. 17. A third pair of rolls make the transverse cuts and creases and also make the cuts in the bottoms of the notches *c*, leaving the strips as shown in Fig. 18. As the strips pass through a fourth pair of rolls, the small pieces cut out to form the notches are knocked out. The continuous strips are then ready to be torn into their sections which constitute the blank units that are stacked, and this is done by means of succeeding rolls, as will be seen.

Figs. 1B and 2B show the first part of the mechanism in the order of operation which prepares the sheet in the form shown in Fig. 18, the final portion which separates the sheet into blanks and stacks the blank being shown in Figs. 1A and 2A, it being understood that the dot and dash lines X—X and Y—Y are the lines on which the figures having the same caption letters are to be joined.

The frame of the mechanism consists of the bed plate 10 and the two side plates 11 and 12. Bearing in the side plates are four pairs of similar size rolls arranged in tandem, all driven from a shaft 13 which runs along the outer side of plate 12 continuing from the printer and bears in brackets 14 on the outer face of the plate.

The rolls are solid metal rolls having two reductions in diameter and on one end each pair is geared together in a one-to-one ratio and on the other end the lower roll of the pair is connected by bevel gears to be driven from the shaft 13.

The first pair of rolls to act on the sheet B as it comes from the printer are the rolls 15 and 15' which are centered between the side plates of the frame by reduced end portions of the rolls that are continued as further reduced hubs bearing in the side plates. Gears 16 and 16' on the outer ends of the hubs outside of the plate 11 are in mesh, and bevel gear 17 on the outer end of the hub of roll 15 outside the plate 12 meshes with bevel gear 17' on shaft 13 and is driven thereby. Thus the shaft 13 drives rolls 15 and 15' at the same angular and peripheral speed. These rolls have dies which cut the sheet B into a plurality of longitudinal strips, shown as three in Fig. 16.

From thence the sheet in strip form passes through the next pair of rolls which have dies to do the longitudinal scoring or creasing as shown in Fig. 17. These rolls are numbered 18

and 18' and except for the dies are similar in all respects to rolls 15 and 15', being geared together by gears 19 and 19' and roll 18 being driven from shaft 13 by bevel gears 20 and 20'.

From this second pair of rolls the sheet passes through the third pair still shown on Fig. 1B. This pair consists of rolls 21 and 21' which have dies that do the transverse scoring and cutting and cut the bottom of the notches *c*, leaving the strips as shown in Fig. 18. The rolls are geared together by gears 22 and 22' and roll 21 is driven from shaft 13 by bevel gears 23 and 23'.

From rolls 21, 21' the strips continue through the fourth pair of rolls which are the first and relatively large rolls shown on Fig. 2A. These rolls 24 and 24' are geared together by gears 25 and 25', and roll 24 has a drive connection with shaft 13 through bevel gears 26 and 26'. Dies on this pair of rolls are fashioned to knock out the loose, cut-out pieces from the strips.

A gear case cover 27 encloses the gears outside the side plate 11 and a cover 28 encloses the shaft 13 and the bevel gears and bearing brackets outside the plate 12.

The four pairs of rolls which have been described all act as feed rolls for the web material and have substantially the same peripheral speed. From the rolls 24 and 24' the strips proceed through two smaller roll pairs, as will be seen in Fig. 2A, for example, and the strips are torn into blank sections on the lines *a'* in a manner that will now be described. In this case, however, the upper rolls are not unitary, full length rolls but instead in each case comprise a plurality of separate coaxial rolls corresponding in number to the number of strips. Hence in the illustrated construction we will see that there are three upper rolls for each roll pair. The two roll pairs are arranged in close tandem with their bites on the strips spaced less than the distance between two successive tearing lines *a'*.

The lower rolls of these two roll pairs are driven from the shaft of roll 24 and the three part upper roll of each pair is not positively driven. The two lower rolls are numbered, respectively, 29 and 30, these rolls being also solid metal rolls with reduced centering ends and further reduced hub portions that bear in side plates 11 and 12. The rolls are substantially half the size of roll 24 and since they have substantially the same peripheral speed as roll 24, they are driven at substantially double the R. P. M. of roll 24.

The gear drive is shown in Figs. 1A and 3. On the projecting end of the hub of roll 30 outside plate 11 is a gear 31 which is one-half the pitch diameter of gear 25 on roll 24. These two gears are connected through an idler gear 32 on a stub shaft that bears in side plate 11. On the same stub shaft is gear 33 that meshes with a gear 34 on the hub of roll 29, the ratio between gears 33 and 34 being such that roll 29 is driven at the same R. P. M. as is roll 30 and at double the R. P. M. of roll 24.

The three upper rolls for roll 29 are each numbered 29' and the three upper rolls for roll 30 are each numbered 30'. Each of the three rolls 29' has its axis bearing in a bifurcated support 35 that is secured at its rear end on to a rock shaft 36 that extends transversely across the machine and bears in plates 11 and 12. This rock shaft has a lever arm 37 secured on it just inside plate 12 and having a roller 38 on its free end which rides on a four lobe cam 39 on the reduced end of roll 24. The rolls 29' rest of their own

weight on roll 29 or the web between them, and periodically when the rolls 30 and 30' are tearing off the end blank sections, the rolls 29' are pressed down with added force toward roll 29 by the action of the cam 39 on the bell-crank lever support for rolls 29', thus gripping the running strips as a sudden pull is exerted on their end sections. As a matter of fact the roll 29 is given a slight overdrive to keep the web under tension for the action of the dies on the knock-out rolls 24 and 24', and web tensioning means (not shown) are provided for a similar purpose in front and rear of each of the rolls 18 and 21.

The three upper rolls 30' each have their axes bearing in bifurcated hangers 40 similar to the lever arms 35. These hanger arms 40 bear at their rear ends on a transverse rod 41 and have an upward extension 42 that, for the purpose of adjustment, has near its free end a hole in which is entered a screw stud 43 extending forwardly from a bracket 44 bolted on top of the plates 11 and 12. A coil spring 45 on the stud back of the extension 42 urges the extension 42 forward against an adjustable stop 46.

The roll 30 has two peripheral raised portions 30'' which are disposed 180° apart. Since the roll 30 has the same angular speed as roll 29 and except for the raised portions is of the same diameter as roll 29, it is apparent that the peripheral speed of portions 30'' will be somewhat greater than the peripheral speed of roll 29. Therefore, when the portions 30'' engage the web, it instantaneously accelerates the end portion of its strip and tears the end blank section off at the first line a', the web being gripped at that instant by the engagement of rolls 29 and 29' through the properly timed action of cam 39. The bite of rolls 30 and 30' during the period of acceleration is just ahead of line a' and back of the leading line a, and the bite of the rolls 29 and 29' at that instant is back of the leading line a' and ahead of the second line a. Hence the tear is bound to occur on the line a' between the bites.

The stop 46 is set so that the rolls 30' are free of the web except during the passage of the portions 30'' past the plane intersecting the axes of rolls 30 and 30', as a result of which the web strips pass freely over roll 30 except for the periods when the portions 30'' are operating. As the blank sections are torn off, they are fed forward at the accelerated rate into grippers, the construction and operation of which will now be described.

In front of the roll 30 is a gripper roll 47. This roll is hollow and has its ends reduced similar to the preceding rolls within which is secured an axle member 47' which bears in the side plates 11 and 12. The roll 47 has three gripper bearing portions in line with the respective rolls 30' and between the gripper bearing portions are circumferential grooves within which operate stripper fingers as will later appear.

The gripper roll 47 is of the same diameter as the unraised portion of roll 30 and is driven by roll 30 at one-half the R. P. M. of roll 30. In other words, since rolls 30 and 30' deliver two blanks during each rotation of the roll 30, the gripper roll will receive four blanks during its rotation for each blank strip, that is, for each roll 30'. Consequently in the construction shown, the gripper roll will receive twelve blanks during each rotation. Therefore, as will later be explained in detail, each gripper bearing portion of the gripper roll has four grippers spaced 90° apart.

The drive for the gripper roll is shown in Figs. 1A and 4, and consists of a sprocket wheel 48 on the end of the hub of roll 30 outside the plate 12, a sprocket wheel 49 on the end of the axle 47' and a sprocket chain 50 on these two sprockets. The sprocket 49 is twice the size of sprocket 48 and hence roll 47 turns at half the speed of roll 30.

The individual grippers consist each of two flat spring members 51 with their free ends extending rearwardly with relation to the direction of rotation which is counterclockwise as shown in Fig. 6. These gripper fingers are provided with a reverse bend so as to have a resilient line contact with the roll surface some distance from the fixed end, and then they extend out more or less tangentially to form a guide for the blanks underneath the fingers and into the nip of the grippers.

The cooperative action of the tearing and gripping rolls will be apparent from Figs. 2A and 6. In Fig. 2A the central blank strip B2 is being fed toward the left by rolls 24 and 24' and by rolls 29 and 29', the feed being toward the left. The lobe of cam 39 is just about to raise roller 38 and cause roll 29' to exert a squeeze on the web. Also the raised portion 30'' of roll 30 is just about to engage the web and tear off the leading blank section.

In the position shown in Fig. 6, these actions have occurred. The leading blank, marked A, is torn from the strip B2 and the length of portion 30'' is such as to propel the severed blank underneath the slower moving gripper fingers 51. The continuous repetition of this action and the rotation of the gripper roll causes the blanks to be delivered and stacked in a manner now to be described. Associated with and overlying each pair of gripper fingers is a bowed wiper strip 52 having its convex side out. The function of the wiper is to promote the correct movement of the blank ahead in case it gets stuck or is sluggish about assuming its correct position.

The stack holders for the blanks of each strip consist of two parallel guide and supporting rods 53, the ends of which operate as pick-off fingers. The construction of thees rods is shown in detail in Figs. 7 to 12, inclusive. They consist of elongated, tubular members, slotted on the upper side of their receiving or pick-off ends and having their extreme pick-off ends extending upwardly at an oblique angle and hence slotted through so as to be bifurcated. The top edges of the slotted end are provided with teeth shaped to allow the blanks to pass over them freely in the direction toward the stack but having abrupt edges in the opposite direction to prevent the return of the blanks.

Slidable in the slot of each rod is a hook member 54. This hook member consists of a round rod or wire with a bent-up end that reciprocates in the slotted end of the guide rod. The hook rod extends into the axial bore of the guide rod and is reciprocated therein by a pivoted lever or pitman 55 actuated through mechanism presently to be described. As shown, the hook rod has its inner end screw threaded and screws into a block 56 which is square in cross section and slides in a square slot 57 in the rod 53, having a lateral pin 58 which extends out of the slot and serves as a wrist pin for the pitman.

The hook 54 is reciprocated four times for each rotation of the gripper roll, that is, once for the passage of each gripper and also once for the movement of each raised portion 30'' on roll 30 through operative center, since roll 30 turns at double the angular speed of roll 47. The drive

for the pitman 55 is taken off from the roll 30, as shown especially in Fig. 4. A sprocket 59 on the hub of roll 30 outside sprocket 48 drives sprocket 60 which bears in a bracket 61 on the lower part of plate 12, by means of chain 62 that run over the two sprockets. The lower sprocket is half the size of the upper sprocket, and therefore a crank disc 63 on the inner end of the hub of sprocket 60 is rotated at twice the angular speed of roll 30 and hence at four times the angular speed of the gripper roll 47.

Attached to the front or delivery end of the machine frame are two angle members 64 which have each a side plate and a narow horizontal flange on its bottom and together constitute a stacker frame which is open at its outer end. A rock shaft 65 bears in brackets on the under side of stacker frame members 64 and this rock shaft is actuated by crank disc 63 through link 66 and lever 67. This rock shaft 65 actuates the several pitmans 55 through lever 68 and link 69, one for each stacker rod 53, the pitmans having a substantially central fulcrum, being pivoted to outstanding arms 70 that are attached to a plate 71 that extends across the outer end of the stacker frame.

The stacker rods 53 are supported from plate 71 through bracket means shown in Fig. 2A and somewhat more in detail in Fig. 13. Upstanding from the plate 71 are two supporting pins 72, the upper ends of which are entered in holes in a short tangential bracket plate 73 on each rod 53. In the case of the two outer stacking rods these plates 73 extend outwardly, and in the case of the four intermediate rods the plates of adjacent rods extend toward each other and overlap, the two overlapped plates being supported by a common pair of pins 72. As will be seen in Figs. 1A and 5, the pairs of rods diverge or fan out toward their delivery ends so that individual stacks become segregated as they build up.

The way the blanks are delivered to the stack is best illustrated in Fig. 6. As there shown, blank A has just been torn from strip B2 and delivered to the grippers that are up at that instant. The preceding blank A' has been carried around by its grippers through an arc of 90° and is therefore vertical. The blank ahead of A', namely, blank A'', has been picked off by the upturned fingers or pick-off ends of rods 53, the parts being so located that the pick-off fingers enter the notches c of the blanks and strip the blanks from the grippers. To illustrate this, the blank A' is shown in dotted lines in Fig. 6 in the position which it occupies when its grippers have turned to the position in which they are shown in dotted lines. In the sweep of blank A' from the full line to the dotted line position, the notches c pass over the ends of the pick-off fingers. At that instant the hook 54 is timed to move to the left and pull the blank up against the stack which is indicated by dotted lines in Fig. 6.

It may happen, particularly when running slowly, that the blank will not be given enough momentum to slide down the inclined pick-off end of rods 53 to a position in front of the hooks 54. In that case the wipers 52 associated with the immediately following grippers will wipe the delinquent blank and push it down into the range of the hook.

If accidentally the notches c should not register with and pass over the ends of the pick-off fingers, the blank will of course be carried on around. To take care of such errant blanks,

stripper fingers 74 are provided which ride in the grooves in roll 47 between and outside the gripper bearing portions of the roll. These stripper fingers are disposed about 180° opposite the receiving grippers, as shown in Fig. 6, and are attached to and supported by a transverse bar 75 underneath the roll 47 and attached at its ends to the plates 11 and 12. In case a blank escapes the pick-off fingers, the appropriate stripper fingers 74 will strip it out of its grippers and cause it to fall out of the way.

While a specific embodiment of the invention has been shown for the purpose of illustration, it will be understood that the invention is not limited to that particular embodiment but is to include modifications thereof within the scope of the invention as defined in the following claims.

What is claimed is:

1. Means for stacking blanks having lateral notches intermediate their ends comprising a gripper roll having at least one gripper on its periphery, means to rotate the roll, delivery means operating in timed relation to the roll to insert a blank in the gripper on each rotation of the roll, a pair of parallel rods disposed with one end in the path of the notches in a blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in time relation to the passage of the gripper across the rod ends.

2. Means for stacking blanks having lateral notches intermediate their ends comprising a gripper roll having attached to its periphery at least one tangential spring gripper, means to rotate the gripper roll in a direction with the free end of the gripper trailing, delivery means operating in timed relation to the roll to feed a blank tangentially toward and at a speed in excess of that of the roll periphery and insert the blank under the gripper on each rotation of the roll, a pair of parallel rods disposed with one end in the path of the notches in the blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in timed relation to the passage of the gripper across the rod ends.

3. Means for stacking blanks having lateral notches intermediate their ends comprising a gripper roll having attached to its periphery at least one tangential spring gripper, means to rotate the gripper roll in a direction with the free end of the gripper trailing, feeding means for the blanks including a pair of feed rolls disposed to deliver blanks tangentially to the gripper roll, means to rotate the feed rolls at a peripheral speed in excess of that of the gripper roll, a pair of parallel rods disposed with one end in the path of the notches in the blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in timed relation to the passage of the gripper across the rod ends.

4. Means for stacking blanks having lateral notches intermediate their ends comprising a gripper roll having attached to its periphery at least one tangential spring gripper, means to rotate the gripper roll in a direction with the free end of the gripper trailing, a feed roll for the blanks disposed to feed blanks tangentially

to the gripper roll and having on its surface at least one blank propeller operative to advance a blank on each passage of the propeller through the plane of gripper roll tangency, means to rotate the feed roll at a peripheral speed double that of the gripper roll, a pair of parallel rods disposed with one end in the path of the notches in the blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in timed relation to the passage of the gripper across the rod ends.

5. Means for stacking blanks having lateral notches intermediate their ends comprising a gripper roll having attached to its periphery a plurality of equally spaced tangential spring grippers, means to rotate the gripper roll in a direction with the free ends of the grippers trailing, a pair of feed rolls having their axes in a common vertical plane and disposed to feed blanks tangentially to the gripper roll, the feed rolls being spaced with their peripheries out of contact and the lower roll having on its periphery equally spaced raised portions less in number than the grippers and of a height to cooperate with the upper roll to feed a blank, means to rotate the lower feed roll at an angular speed such that its peripheral speed exceeds that of the gripper roll by the same ratio that the grippers exceed the raised portions in number, a pair of parallel rods disposed with one end in the path of the notches in the blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in timed relation to the passage of the gripper across the rod ends.

6. Means for stacking blanks having lateral notches intermediate their ends comprising a

gripper roll having attached to its periphery a plurality of equally spaced tangential spring grippers, means to rotate the gripper roll in a direction with the free ends of the grippers trailing, a pair of feed rolls having their axes in a common vertical plane and disposed to feed blanks tangentially to the gripper roll, the feed rolls being spaced with their peripheries out of contact and the lower roll having on its periphery equally spaced raised portions in number one-half the grippers and of a height to cooperate with the upper roll to feed a blank, means to rotate the lower feed roll at an angular speed such that its peripheral speed is double that of the gripper roll, a pair of parallel rods disposed with one end in the path of the notches in the blank carried by the gripper and operative to strip the blank from the gripper, a reciprocative hook associated with each rod operative to advance the stripped blank along the rods, and means for reciprocating the hooks in timed relation to the passage of the gripper across the rod ends.

ALOIS ESSEX.
ELMER E. GARRETT.
JOHN KALLENBERG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
858,948	Burnside	July 2, 1907
865,523	Peters	Sept. 10, 1907
972,300	Vavra	Oct. 11, 1910
977,418	McEachron et al.	Nov. 29, 1910
1,669,999	Olsen	May 15, 1928
1,713,054	Schroeder et al.	May 14, 1929
2,251,221	Cleven	July 29, 1941
2,294,718	Carroll	Sept. 1, 1942
2,355,690	Zent	Aug. 15, 1944