March 26, 1929. W. L. WRIGHT 1,707,107

METHOD OF AND APPARATUS FOR PRODUCING PAPER MATERIAL CLOSURE DISKS

Filed Sept. 24, 1927 4 Sheets-Sheet 1

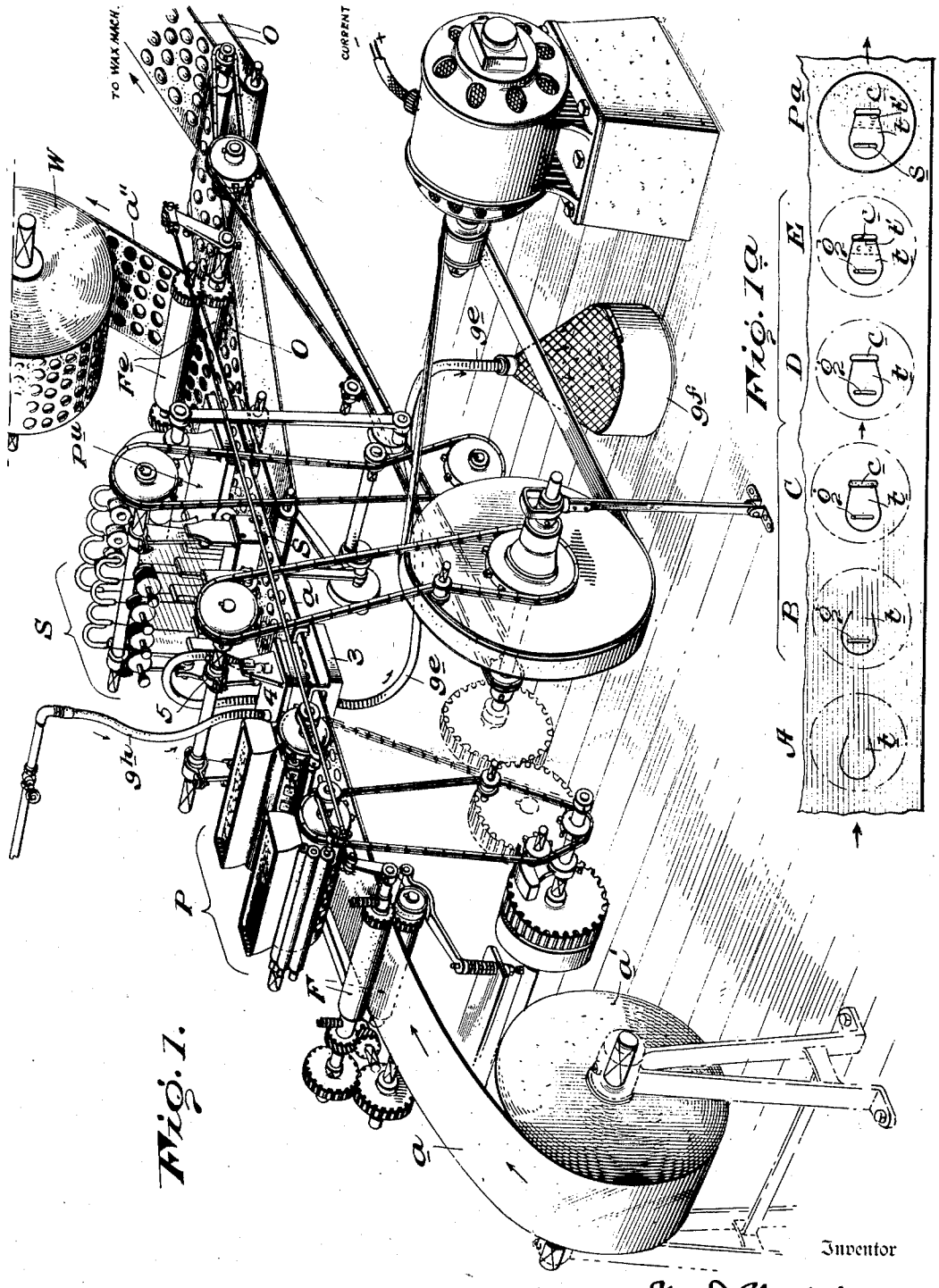


Fig. 1.

Fig. 1a.

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METHOD OF AND APPARATUS FOR PRODUCING PAPER MATERIAL CLOSURE DISKS

Filed Sept. 24, 1927 4 Sheets-Sheet 2

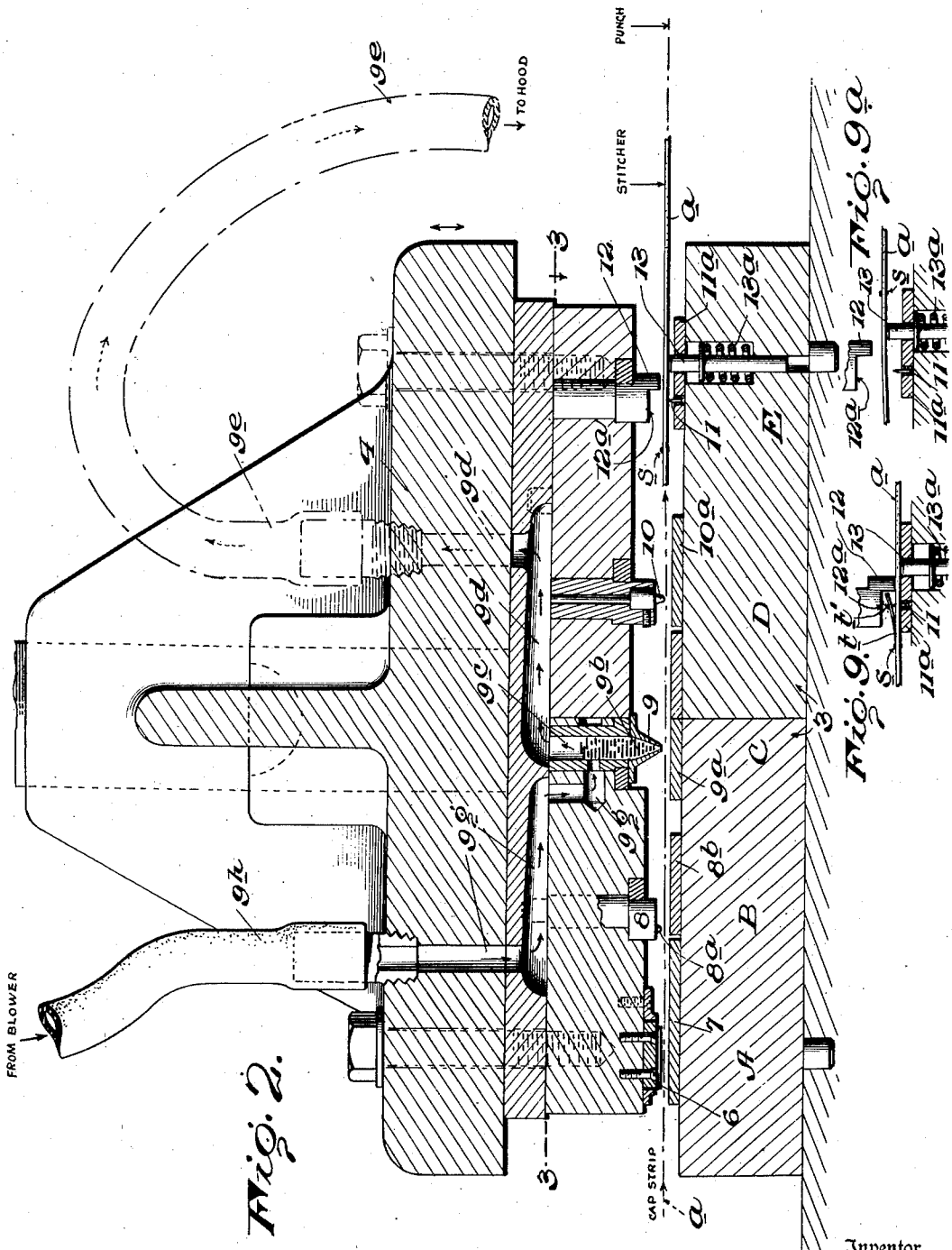


Fig. 2.

Fig. 9a

Fig. 9b

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METHOD OF AND APPARATUS FOR PRODUCING PAPER MATERIAL CLOSURE DISKS

Filed Sept. 24, 1927 4 Sheets-Sheet 3

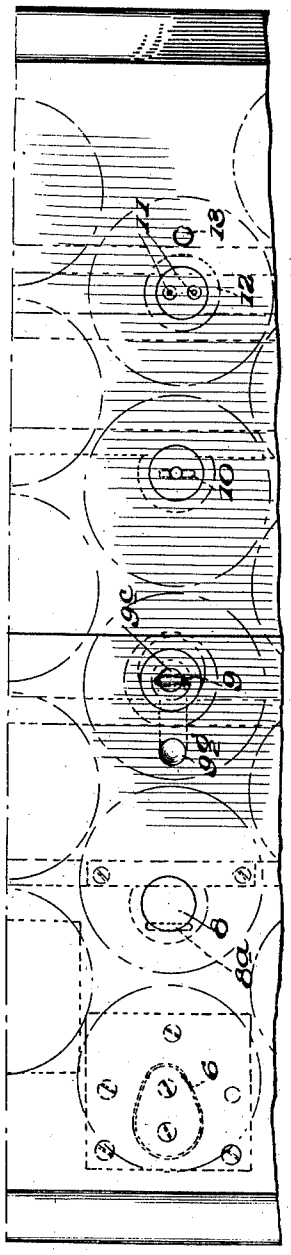


Fig. 3.

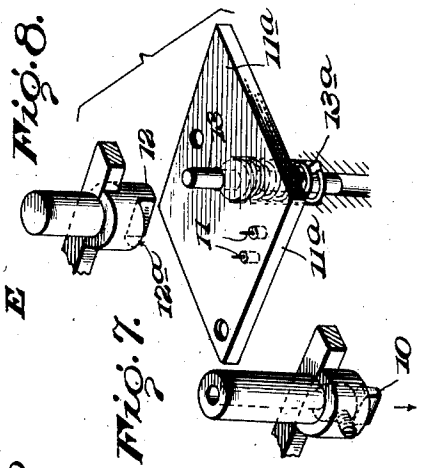


Fig. 8.

Fig. 7.

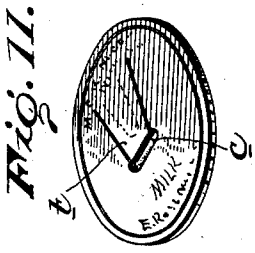


Fig. 11.

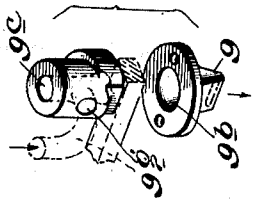


Fig. 6.

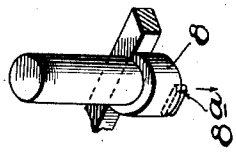


Fig. 5.

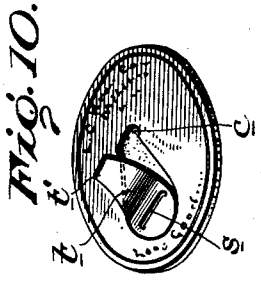


Fig. 10.

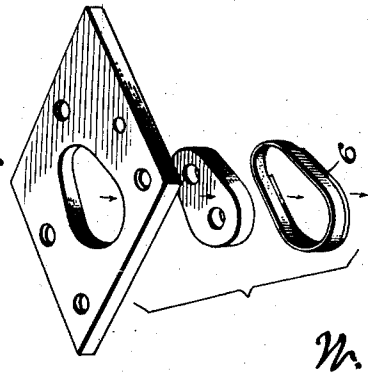


Fig. 4.

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METHOD OF AND APPARATUS FOR PRODUCING PAPER MATERIAL CLOSURE DISKS

Filed Sept. 24, 1927 4 Sheets-Sheet 4

Fig. 12.

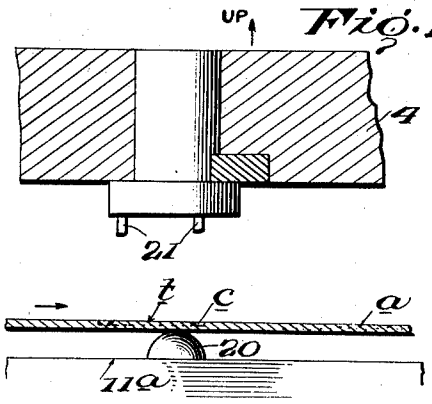


Fig. 13.

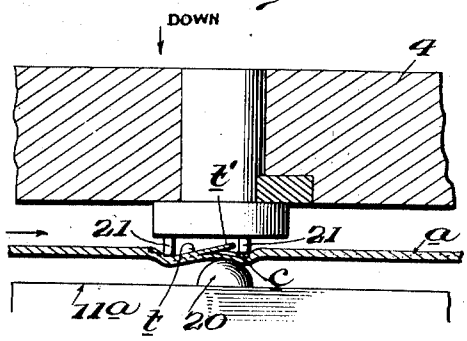


Fig. 14.

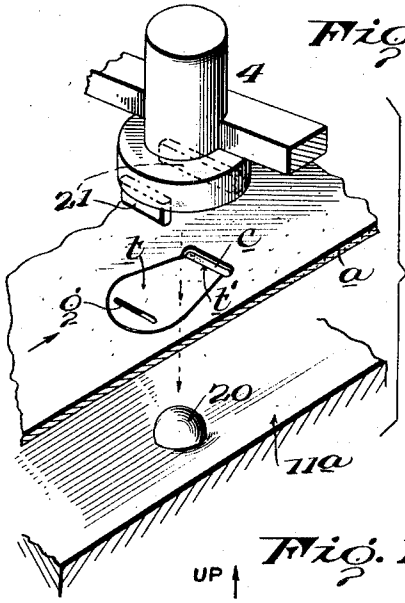


Fig. 17.

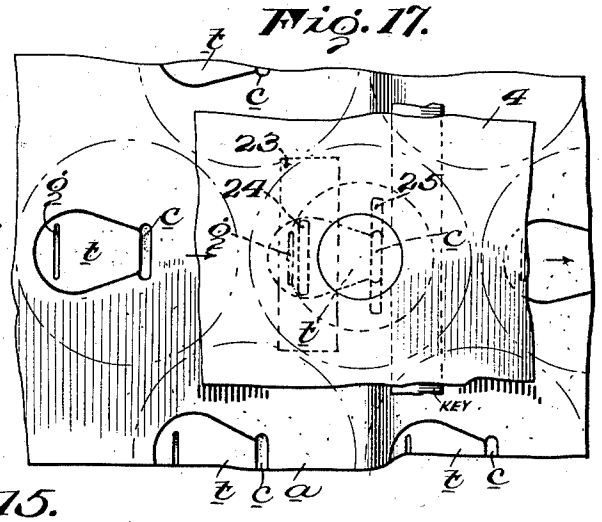


Fig. 15.

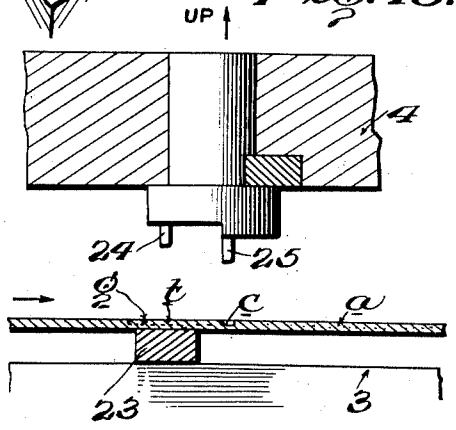
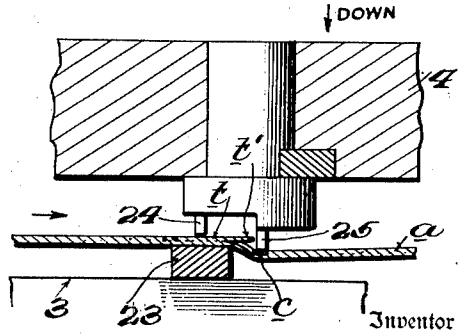


Fig. 16.



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Patented Mar. 26, 1929. 1,707,107

UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR PRODUCING PAPER-MATERIAL CLOSURE DISKS.

Application filed September 24, 1927. Serial No. 221,744.

This invention relates to the production of paper closures, such as so-called bottle caps, that are formed with pull tabs composed of and intended to be split up from the paper board or material of the caps, and the invention involves a novel method and apparatus for carrying out such method; and those skilled in the art will readily understand the object and nature of the invention in the light of the following explanation of the accompanying drawings illustrating what I now believe to be the preferred mechanical expression of my invention and that can be employed to carry out my method, from among other forms, combinations, arrangements, and steps within the spirit and scope of the invention.

An object of the invention is to provide a simple and efficient method for the production of closure disks that are incised for the splitting and elevation of portions thereof to form pull tabs to be grasped by the fingers for extracting the caps from the mouths of the containers closed by such caps, and, as to certain types of disks, with respect to the partial or initial splitting or separation of such pull tabs during the process of making the caps.

A further object of the invention is to provide a method of and means for providing the pull tabs of such caps with readily accessible pick up edges exposed by adjacent top recesses or depressions.

A further object of the invention is to provide efficient apparatus for the automatic quantity production of closure disks incised for splitting to produce pull tabs.

With these and other objects in view my invention consists in certain combinations and novel arrangements and features and in a novel method, as more fully and particularly described and specified hereinafter.

Referring to the accompanying drawings forming a part hereof:

Fig. 1 is a diagrammatical perspective of apparatus that can be employed for carrying on my method and that embodies my invention.

Fig. 1ª shows in plan a ribbon of paper stock, illustrating more or less diagrammatically the various steps or operations in the production of a certain closure disk formation, performed by the apparatus of Fig. 1.

Fig. 2 is a detail vertical section on an enlarged scale taken longitudinally of a portion of the apparatus of Fig. 1, showing the head on its return or upward stroke.

Fig. 3 is a detail somewhat diagrammatical plan view of the assemblage of Fig. 2, with parts above the dotted line 3—3, removed, certain hidden parts being indicated by dotted lines.

Figs. 4, 5, 6, 7, and 8, are detail perspective views of certain operating parts included in the structure illustrated by Figs. 2 and 3.

Fig. 9, is a detail vertical sectional view taken longitudinally of the web of paper stock, which is shown exaggerated in thickness, to illustrate the action of the pins in elevating or separating the pick up end of a pull tab from the body of stock, the elevated portion of the tab being exaggerated in length and possibly in elevation.

Fig. 9ª, is a detail vertical section of the operative parts and paper stock of Fig. 9, showing the stock elevated by the spring plunger to clear the needles, when the presser heel is elevated clear of the stack.

Fig. 10 is a perspective of a closure disk produced by the apparatus of Fig. 1, and according to the steps illustrated by Fig. 1ª, but with the pull tab stripped and swung up as when in use to extract the disk from a bottle mouth.

Fig. 11 shows another form of closure disk that can be produced by the apparatus disclosed by rendering certain features inoperative or removing them.

Fig. 12 is a detail view in vertical longitudinal section showing different means for partially splitting the tabs from the paper stock, that can be substituted in the apparatus of Fig. 1, for the puncturing needle mechanism of Figs. 2, 3, 8, 9 and 9ª; the reciprocating head being shown elevated and the paper web at rest in position to be operated on by said head.

Fig. 13 is a detail vertical longitudinal section showing the structure of Fig. 12 with said head at its limit of downward operative stroke, illustrating its action on the paper web or stock.

Fig. 14 is a detail perspective view of the paper web and parts of Figs. 12 and 13.

Figs. 15, 16 and 17 are detail longitudinal vertical sections and a top plan, illustrating another construction and arrangement for splitting up the pick up end of the tab.

In Fig. 1 of the drawings, I show appara-

tus for producing closure disks of the general type disclosed by my Patent No. 1,595,848 dated August 10, 1926.

In this apparatus, the stock or paper board is fed in the form of a ribbon *a*, from a roll *a'*, through the apparatus step by step by suitable feed devices, such as F, F*e*; and by printing apparatus such as P, areas of the stock or ribbon *a*, that are to be ultimately punched or cut from the stock in the form of disks are imprinted with the desired indicia. The vertically reciprocating punch gang P*u*, cuts or punches the closure caps from the ribbon *a*, and the closure disks or caps are deposited on offbearing belts *o*, for packing and if need be for waxing or other waterproofing processing. The waste stock *a''*, that is the ribbon *a*, after the caps or disks have been cut therefrom, is usually wound into a roll W.

Apparatus of the general type so far described is well known in the art.

I have introduced into this apparatus means to incise and otherwise perform operations on the areas of the ribbon of stock that are to be ultimately punched out in the form of closure disks, to produce a flat disk that embodies a portion capable of being split up from the body of the disk to form a pull tab.

For instance, referring to Fig. 1ª, of the drawings, I have provided this apparatus with mechanisms to incise the paper ribbon through its top surface, partially throughout the thickness of the paper for the purpose of outlining in whole or in part a pull tab *t*, on the top face of the paper web, as per A; and to then impress a transverse groove *g*, in the top face of this tab *t*, step B, to later receive a staple; and to then cut out and remove a paper plug to form the tab end and provide the recess *c*, see step C; and then, see D, to flatten and depress the floor of this recess *c*; and then, see E, to separate or strip the pick up end portion *t'*, of the tab *t*; and then to drive the staple *s*, through the ribbon *a*, and clinch the same at the under side thereof with the cross portion of the staple fitted down in the groove *g*. In the specific example illustrated, the staple, or so-called stitching, is applied, and on the next step the gang punch P*u*, descends and cuts or punches out the completed cap or disk; these two steps being indicated at P*a*.

In this apparatus, the paper stock ribbon is fed forward step by step and remains at rest between the forward movements, and while the ribbon is at rest after each forward movement, the various operations A, B, C, D, E, and stapling and punching are performed, that is, these various operations are performed simultaneously on various parts of the ribbon while the ribbon is at rest.

The apparatus can be constructed to operate on a narrow ribbon of stock to produce one completed closure disk at each stroke, or it can be constructed to operate on a ribbon of any suitable width with gangs of operating devices and punches, as illustrated, to produce a number of completed disks at each stroke.

If so desired the printing mechanism can be omitted or thrown out of action.

Also, where a closure disk having top and bottom non-alined incisions, see my Patent No. 1,403,532, January 17, 1922, is to be produced with a top recess formed by cutting out and removing a plug of the disk to expose the pick up end of the tab, and wherein the tab is not stitched or stapled, and is not stripped at its pick-up end during manufacture, I can remove or throw out of action the mechanisms that perform steps B, E, and the stitching or stapling operation so that the apparatus on step A will form the top and bottom incisions, and on the next step will remove the paper plug to form the recess *c*, and on the next step will flatten and compress the floor of the recess *c*, and on the next step will bring punches P*u*, into operation to cut out and remove the completed disks.

In the particular embodiment illustrated, the mechanisms for carrying out the steps A, to E, both inclusive, embody a fixed bed 3, over which the stock ribbon *a*, travels, and a vertically reciprocatory horizontally disposed head 4, under which the paper ribbon *a*, travels, arranged above the bed 3, and provided with any suitable operating mechanism, such as 5, actuated in timed relation with respect to the ribbon feed and the other mechanisms such as P, S, and P*u*, as herein set forth.

This vertically reciprocatory cross head 4, at the under side of its working face, carries the thin vertical depending incising blade 6, of any suitable and desirable form and construction, to cooperate with the die plate 7, on the bed 3, and incise the paper stock *a*, say about half way through its thickness to in whole or in part form or outline the tab *t*, step A, Fig. 1ª. If the closure disk of my Patent 1,403,532 is to be formed by the apparatus, the die plate 7 will be provided with an upstanding smaller non-alined incising blade to enter the stock ribbon *a*, from below, and incise the paper stock about half way through from the bottom.

To perform the next operation, step B, Fig. 1ª, die member 8, depends from the under or working side of the head 4, and at its under face provides a projecting presser or die rib 8ª, to cooperate with a die plate 8ᵇ, on the bed 3, and depress the groove *g*, in the tab panel *t*. This member 8, can be removed if the closure disk is not to be stapled.

To perform the step C, Fig. 1ª, the cross head 4, is formed with a vertical hollow cutting punch 9, depending from its under or working face to cooperate with the die plate 9ª, carried by the bed 3, in cutting and removing the plug of paper from the web *a*,

to form the top recess *c*, extending down about half way through the web.

The cutting edge of the punch 9, is transversely elongated or oblong in form and this punch is hollow with a tapered upwardly enlarging bore 9^b, which is so formed and arranged that the plugs of paper cut from the ribbon *a*, by the depending annular cutting edge of the punch will be lifted with the punch on its upward stroke, from the ribbon *a*, and so that the column of contacting paper plugs will be forced upwardly in the bore of the punch. The upward enlargement of this bore or passage of the punch permits the paper plugs to assemble loosely therein and to feed freely upwardly, and I have devised means for and a method of automatically removing and discharging these loosely assembled paper plugs from the bore or interior of the punch by an airblast or by suction.

To this end, the cross head 4, is formed or provided with a tubular box or chamber 9^c, in upward continuation of the bore 9^b, of the punch 9, to receive the collection of paper plugs from said bore. At its upper end this chamber 9^c, opens or discharges into an offtake air duct 9^d, that can communicate through flexible pipe connection 9^e, with a suitable air-vented paper plug collection receptacle 9^f, (Fig. 1). The cross head 4, is also formed or provided with a compressed air duct 9^g, coupled with a suitable blower (not shown) through pressure air flexible pipe connection 9^h. This compressed air duct 9^g, discharges laterally into paper plug collection chamber 9^c, at a point between the punch and offtake duct 9^d, with the result that the paper plugs are agitated and sucked and blown from the chamber and discharged with the air blast into receptacle 9^f. In a rapidly operating quantity production machine, the removal and disposal of the paper plugs is a serious problem, which has been successfully solved by the utilization of the hollow punch and the removal thereof by air currents generated by pressure differential either by a suction or a blower fan or pump.

Inasmuch as the floor of the top recess *c*, formed by the action of punch 9, may be left in a rough uneven condition, I usually prefer to level, smooth and depress said floor, by a separate operation, after the particular cap forming area of the ribbon *a*, has moved on its next step forward from the punch 9, (at step C) and has come to rest at step D, at which point the vertically movable cross head is provided with a depending presser foot 10. This foot 10, has a flat bottom face and approximates the shape and dimensions of the recess *c*, to enter the same, on the downward stroke of cross head 4, while the ribbon *a*, is at rest, and exert more or less heavy downward pressure against the floor of recess *c*, backed by die plate 10^a, to thereby smooth out and depress said floor and compact the paper fibers and assure a recess *c*, of the desired depth with a more or less smooth-surfaced floor, and to thereby assure the splitting up of the pick-up end of the tab *t*, of the full thickness desired.

After the step D, wherein the floor of the recess is flattened and compressed, the ribbon *a*, moves forward a step, bringing the area of the ribbon *a*, that has passed through the preceding steps A, to D, to rest for the step or operation E, whereby the pick up end *t'*, of the tab *t*, is elevated and split from the body of the ribbon. This initial separation or splitting of the tab from its pick up end for a short distance can be accomplished in various ways. In the particular embodiment illustrated by Figs. 2, 3, 8, 9, and 9^a, this result is accomplished by forcing the ribbon down on the sharp ends of one or more upright pointed pins 11, that puncture the ribbon immediately below the tip end of the tab so that the said end of the tab will split and separate from the body of the ribbon under the pressure of the pin points as the body of the web *a*, is depressed. The paper will horizontally split and separate as it descends and permit the tab end to remain elevated before the pin points puncture the tab itself. The resistance of the tab against puncturing by the pins exceeds the strength of the paper against splitting horizontally in the plane of the floor of recess *c*, and the bottom of the incision outlining the tab *t*, and intersected by recess *c*.

At the station where step E, is performed, a die plate 11^a, is secured on the bed 3, and one or more vertical pin points 11; is or are fixed in and rise from said die plate so that the ribbon *a*, normally travels and is arranged above the same and so that when the ribbon comes to rest these pin points, below the ribbon, will be located below the inner or pick-up end of the tab that is to be separated or elevated. The length of the vertical projection of these pin points above the top surface of die plate 11^a, determines the distance the tab end will be elevated from the plane of the ribbon *a*, when the ribbon is forced down around the points onto the top face of the die plate 11^a.

The ribbon *a*, is forced down toward the top face of the die plate 11^a, by a pusher foot rigid with and depending from the vertically movable cross head, and preferably formed with a comparatively narrow transverse heel 12, to engage the top face of the ribbon *a*, clear and just in advance of the pick up end of tab *t*, (usually to engage the floor of recess *c*,), and just in advance of an elevated bearing or fulcrum edge, to bend or flex the ribbon *a*, downwardly over said edge as a fulcrum, which flexing or bending action of the horizontally splittable paper board or stock will cause horizontal splitting or separation of the pick up end of the tab *t*, from the body of the ribbon, owing to its tendency to

remain in its original plane and its resistance to the bending or flexing operation. However, in this species of Figs. 2, 9, and 9ª the points 11, are provided to puncture the ribbon under the pressing action of the pressure heel, and thereby positively lift the tab end, under the flat elevated sole portion 12ª, of the presser foot.

In order to strip the ribbon *a*, upwardly from the pin points 11, and to flex the ribbon to approximately again restore the freed or loosened tab pick up end to its seat within the top of the ribbon and to the plane of the ribbon, I provide a vertically movable plunger 13, in the bed 3, movable vertically through the die plate 11ª, and yieldingly upheld by expansion spring 13ª, to normally elevate the paper ribbon *a*, above and clear of the points 11, with the under surface of the ribbon bearing on, and when feeding forward, sliding across the top end of said plunger. This plunger is located, in this embodiment, just in advance of the vertical plane of movement of the presser heel 12. When this heel descends on its operative stroke, it depresses the ribbon *a*, and with it the plunger against the tension of the plunger elevating spring 13ª. When the presser heel has completed its operation and returns on its upward stroke, the plunger under the tension of its spring, moves upwardly and strips the ribbon *a*, upwardly clear and free of the pin points, and upholds the ribbon *a*, clear of said points on the next forward advancing step of the ribbon *a*, which brings the ribbon area just operated on to the stapling position. At the stapling position, a staple *s*, is driven through the ribbon and clinched, with the top cross portion of the staple seated down in the previously depressed groove *g*.

The next forward advancing step of the ribbon *a*, brings the stapled area to the final or punching position, at which the completed disk is cut from ribbon *a*, and drops onto belt *o*, for delivery to the waterproofing mechanism or for final delivery without waxing or other treatment.

When thus completed, the freed or split pick up ends of the tabs of the closure disks do not project upwardly beyond the planes of the top surfaces of the disks but are seated down in their sockets flush with the disk top surfaces. The various parts and mechanisms that operate on the disk forming areas of the paper ribbon *a*, are accurately spaced with respect to the operating strokes of the ribbon feeding devices, to bring about accurate operative registration of said areas of the ribbon with said parts and mechanisms, when the ribbon comes to rest after each advancing step.

The incising blades are set to penetrate about half way through the paper ribbon, and this is also true of the hollow punch 9.

For the production of some closure disks, the groove forming presser punch 8ª, and the recess floor presser die 10, can be either or both omitted.

In apparatus for producing the closure disks of my said Patent 1,403,532, it is within my present invention, to utilize the hollow punch 9, and cooperating features, with or without the presser die 10, although I prefer to use this die, and this apparatus will then not employ the presser means 8ª, or the tab end releasing devices 11, 12, and the spring plunger, or the stapling mechanism.

Also, it is within my invention to omit the mechanisms that perform steps B, C, D, E, while employing mechanisms that perform steps A, E, and the stapling and punching mechanisms, to produce the closure disk without the cut out recess *c*, but with the stapled outlined tab having its pick up end separated or partially freed.

Also, my invention is not confined to any particular shape or form of incising blade 6, nor to the provision of one blade to outline the tab. The tab can be outlined by several blades plus the recess *c*. The blade 6, need not be annular or continuous in form. The blade can be U-shaped with its inner ends separated so that the inner ends of the incision can be intersected and connected by the recess *c*, or the longitudinal edges of the tab can be outlined by separated incisions to be bridged and connected by the recess *c*.

I gain advantages, however, by employing two steps to completely outline the tab top, namely, by first incising the longitudinal form or edges of the tab by blade 6, and then completing the tab form by the cross cut, namely; recess *c*, made by punch 9, joining the spaced separated inner ends of the first incision made by blade 6, or vice versa.

The apparatus can also be utilized to produce a top incised disk or cap on the order of that shown by Fig. 10, but without the staple, by removing or disconnecting the stapling apparatus.

Also, the apparatus can be utilized for the manufacture of a sheet paper material disk or cap, say on the order of those shown by Figs. 10 and 11, with one or more top recesses, such as *c*, formed by removing a paper plug, but without the staple and without the top and/or top and bottom incisions. To produce such non-incised and non-stapled disks, it is only necessary to disconnect or remove the incising and stapling devices. In such non-incised and non-stapled caps, the top recesses formed by cutting and removing the paper plug, provide shoulders and weakened puncturing portions, whereby the disks can be more readily removed from bottle mouths by the use of forks, ice picks and other implements.

Various other means than the puncturing

points 11, can be employed to perform step E. namely:—to free or split the pick-up end portion of the tab *t*.

For instance, in Figs. 12, 13 and 14, I show simple mechanism for this purpose that can be successfully employed in the apparatus in place of the puncturing pin mechanism of Figs. 2, 8, 9 and 9ª, and this mechanism embodies a fixed upward spherical or other rounded projection 20, rising from the top face of die plate 11ª, or of the bed 3, immediately under the pick-up end portion of the tab *t*, when the web is at rest for performance of step E. This upward projection can be formed for instance, by a steel roller bearing ball partially embedded in and rising from plate 11ª, that represents the bed 3. The purpose of this projection 20, is to form an upward bulge in the paper web *a*, when that web is forced down at points in front of and behind the pick-up end of the tab. When the paper is thus flexed, the pick up end of the tab will be caused to split, as hereinbefore described, and as illustrated particularly by Fig. 13. To thus depress the paper web *a*, on the projection 20, I show the reciprocatory head 4, formed with spaced depending presser bars or members 21, one arranged to bear down on the base portion of tab *t*, in rear of the projection 20, and the other to simultaneously strike and bear down on the paper in front of the tab end and about at the recess *c*, and at the front portion of the projection 20, or immediately in front thereof. These presser bars 21, will thus press the paper down over the projection, and the tab end will be thereby released. While the paper web remains at rest, the bars 21, will start up on their return stroke, and the paper will thereupon spring back to normal flat plane form with the tab approximately flush with the top face thereof. When the head 4, is elevated, the paper web on its feeding strokes, slides forward on projection or projections 20.

Figs. 15, 16 and 17, illustrate still another mechanism that can be substituted in the apparatus, for the puncturing point arrangement, for performing the step E, that frees or spilts the tab pick-up end. In Figs. 15, 16 and 17, at the point where step E, is performed, the paper web *a*, travels across and rests on the flat top face of a transverse bar or elevated anvil 23, so arranged that when the web comes to rest, the recess *c*, will be in advance of said anvil, and the tab *t*, will be over the anvil with its pick-up end projecting forwardly therefrom (Fig. 15). The vertically reciprocatory head 4, carries a vertical depending transverse presser bar 24, movable toward and from the top face of anvil 23, and another simultaneously movable depending and parallel presser bar 25, spaced forwardly a distance from bar 24, and depending to a lower level than does bar 24, and movable in a vertical plane in advance of anvil 23. The arrangement is such, that when the paper web is at rest, the presser bars 24, 25, descend simultaneously, and the bar 25, strikes the paper web about at recess *c*, in advance of the pick-up end of tab *t*, and thereby flexes the web downwardly over the front edge of anvil 23, while bar 24, clamps the web against the top of the anvil 23, bearing down on the rear portion of the tab *t*. The tab end consequently splits, as illustrated by Fig. 16. When step E, is completed, the head 4, rises, and the paper web returns to its normal flat form or condition, with the tab end approximately flush with the top surface of the web.

Furthermore, whatever mechanism is employed to free or strip the pick-up ends of the tabs, it is desirable that these ends of the tabs be restored to position flush with the top surfaces of the completed closure disks. This is accomplished by the natural resiliency of the paper and by the cooperating rolls between which the paper web and the completed disks are passed before final discharge from the cap making and paraffining machinery.

No claim is herein made specifically to the species of Figs. 12 to 17, both inclusive, and to the corresponding method species that involves bending or flexing the paper stock to split the same to free the pull tab panel, as such are specifically claimed in my copending application filed Dec. 3, 1928, S. No. 323,384 for production of split up pull tab closure disks.

What I claim is:—

1. In the production of closure disks from a flat ribbon of paper stock by successive operations on successive areas of the ribbon and cutting out such areas to form the disks; those steps which comprise incising successive disk forming areas of the stock through a portion of its thickness to outline at least the longitudinal edges of a panel to split up from the ultimate disk to form a pull tab, and cutting partially through the thickness of the ribbon to form a paper plug and withdrawing and removing the paper plug to leave an open top closed bottom recess defining and exposing the pick-up edge of said panel.

2. In the production of a paper material stock closure disk cut partially through to form a panel that can be split from the body of the disk and lifted at one end to form a pull tab; those steps which comprise cutting the stock part way through its thickness to outline a pull-tab forming panel having an open-top recess exposing the pick-up end of the panel, and depressing and leveling the floor of said recess.

3. In the production of a flat closure disk of paper material stock having a panel that can be split up at one end from the body of the disk to form a pull tab that is stitched or stapled to the body of the disk; those steps

which consist in forming pull tab defining incisions partially through the stock, cutting partially through the stock to form a paper plug and removing the plug to form a recess defining and exposing the pick up end of the pull tab, securing the pull tab to the body of the stock by stitching, such as stapling, transversely through the stock, and finally cutting the disk from the stock.

4. In the production of closure disks from sheet paper stock, those steps which consist in incising successive areas of the stock part way through the thickness thereof to form panels that can be picked up from one end and split from the stock to form closure cap pull tabs; puncturing the successive areas from below said panels to free or split the pick up end portions of said areas from the body of the stock; and finally cutting the areas from the stock to form the disks.

5. In the production of closure disks, those steps which comprise advancing a ribbon of paper stock step by step, incising successive areas of the paper stock part way through the stock to outline pull tabs, successively puncturing said stock from the side opposite the panels to strip the pick-up ends of the panels, and finally cutting the areas from the stock to form the completed closure disks.

6. In apparatus for the production of closure disks comprising, means to advance a ribbon of paper stock, means to incise and cut successive areas of said stock part way through to form each area with a pull tab portion that can be split up from one end from the body of the stock, puncturing and pressure means for separating or splitting the pick-up ends of said portions from the body of the stock, and means for finally cutting said areas from the stock as closure disks.

7. Apparatus for the production of pull tab closure disks from sheet paper material stock, comprising means for cutting areas of the stock part way through to provide each area with a pull tab portion that can be thereafter partially split from the body of the stock to form a tab, means for then operating on said cut areas for separating or splitting the pick-up ends of said pull tab portions from the body of the stock by relative movements of the stock and said ends of said portions and for then bringing said ends back into the plane of the stock, and thereafter cutting said areas from the stock in closure disk form.

8. Closure disk producing apparatus comprising means for advancing a ribbon of paper stock, a cutter for incising successive areas of the stock to provide each area with panel to split up to form a tab, means to impress a groove transversely of each panel; means to secure staples to and through the stock, one staple for each panel and seated in said groove of the panel; a punch for removing a plug of paper from each stock area at the pick up end of its said panel; a presser die to depress the floor of each open-top recess formed by the removal of said plugs; means to free or split the pick up end of each panel from the body of the ribbon; and a cutter to punch out said areas as complete closure disks.

9. Closure disk producing apparatus comprising means for advancing a ribbon of paper stock; a bed over which said ribbon advances; a vertically reciprocatory cutter above said bed and ribbon to incise areas of the stock part way through in the formation of panels to split from the body of the stock to provide the completed disks with pull tabs; a vertically reciprocatory presser foot above said bed and ribbon; a puncturing point rising from said bed below and out of vertical alinement with said foot; a spring-upheld plunger carried by said bed and bearing up against said ribbon to normally elevate the same clear of said point; means for advancing the ribbon step by step to successively bring each said area of the ribbon to rest with the pick up end of its panel above said point and out of vertical alinement with said foot, and means to finally cut said areas from the ribbon as completed pull tab closure disks.

10. Closure disk producing apparatus, comprising a bed having an upstanding point; means to hold a sheet of paper stock that has been incised to provide the same with a pull tab capable of splitting up from the body of the stock, with the pick up end of the tab directly above said point; means to cause relative movement of the point and stock to drive the point into the stock below said pick up end to lift the same with respect to the stock; and means to clear the stock and point.

11. Closure disk producing apparatus, comprising cutting means to incise a pull tab panel in one side of sheet paper stock; a bed to face one side of said stock; a pin point rising from said bed; a depressible spring-upheld device normally holding the stock yieldingly upheld from said point; and a presser die having a depending heel out of line with said panel, said die being movable with respect to the bed toward and from said stock to cause its heel to depress the stock and said device to drive the point into the stock to elevate the panel pick-up end, said spring-upheld device adapted to elevate the stock clear of said point on the return stroke of the die.

12. Closure disk producing apparatus, comprising cutting means to incise a pull tab panel in the side of sheet paper material stock; a bed backing said stock; a hollow punch movable toward and from said stock to cut a plug in and part way through said stock and to remove the paper plug therefrom; and means for removing and discharg-

ing the paper plugs from the interior of said punch.

13. Closure disk producing apparatus, comprising a step by step feed for advancing a ribbon of paper stock over a bed; means for incising areas of said stock to form pull tab panels therein; a member movable toward and from the incised side of the ribbon and provided with a hollow punch to cut and remove paper plugs from each area adjacent to the pick up ends of said panels to form open top recesses in said areas, said punch having a tapering bore through which the removed plugs feed from the cutting end of the punch, a chamber being provided to loosely receive said plugs, air passages and connections being also provided for removing and discharging said plugs from said chamber by air flow.

14. Apparatus for producing flat paper closure disks from sheet paper stock, comprising means for transversely incising the the stock part way through its thickness to outline thereon a panel capable of being picked up and partially split from the body of the paper to form a pull tab; and mechanism for driving a staple through the stock and clinching the same to transversely overlie the stock approximately at the base portion of said panel to limit the splitting of the pull tab from the stock.

15. Apparatus for producing flat paper closure disks from sheet paper, comprising means to vertically incise the paper part way through to form elongated vertical cuts spaced apart at adjacent ends and outlining the longitudinal edges of a pull tab panel; and means to form a transverse vertical cut part way through the paper and joining said ends to form the pick up end of the tab.

16. Apparatus for producing flat paper disks including paper stock feed means; means for cutting and removing paper plugs from the stock; and means forming air blast discharge passages for said paper plugs.

17. Apparatus for producing flat paper material closure disks, including paper stock feed means; a bed for said stock; means for cutting and removing a paper plug from each disk forming area of the paper stock to form therein a top recess but part way through the thickness of the stock; and means for cutting said areas from the stock to form disks having such top recesses.

18. In the production of sheet paper material closure disks from paper stock; that step which consists in incising the stock part way through its thickness to outline a paper plug and removing the plug to form a recess closed at the bottom by a relatively thin floor.

In testimony whereof I have hereunto set my hand at Fulton, New York, this 15th day of September, 1927.

WILBUR L. WRIGHT.