No. 824,155.

PATENTED JUNE 26, 1906.

W. B. SHEPERD.

MACHINE FOR MAKING CELL CASES.

APPLICATION FILED JUNE 19, 1905.

3 SHEETS—SHEET 1.

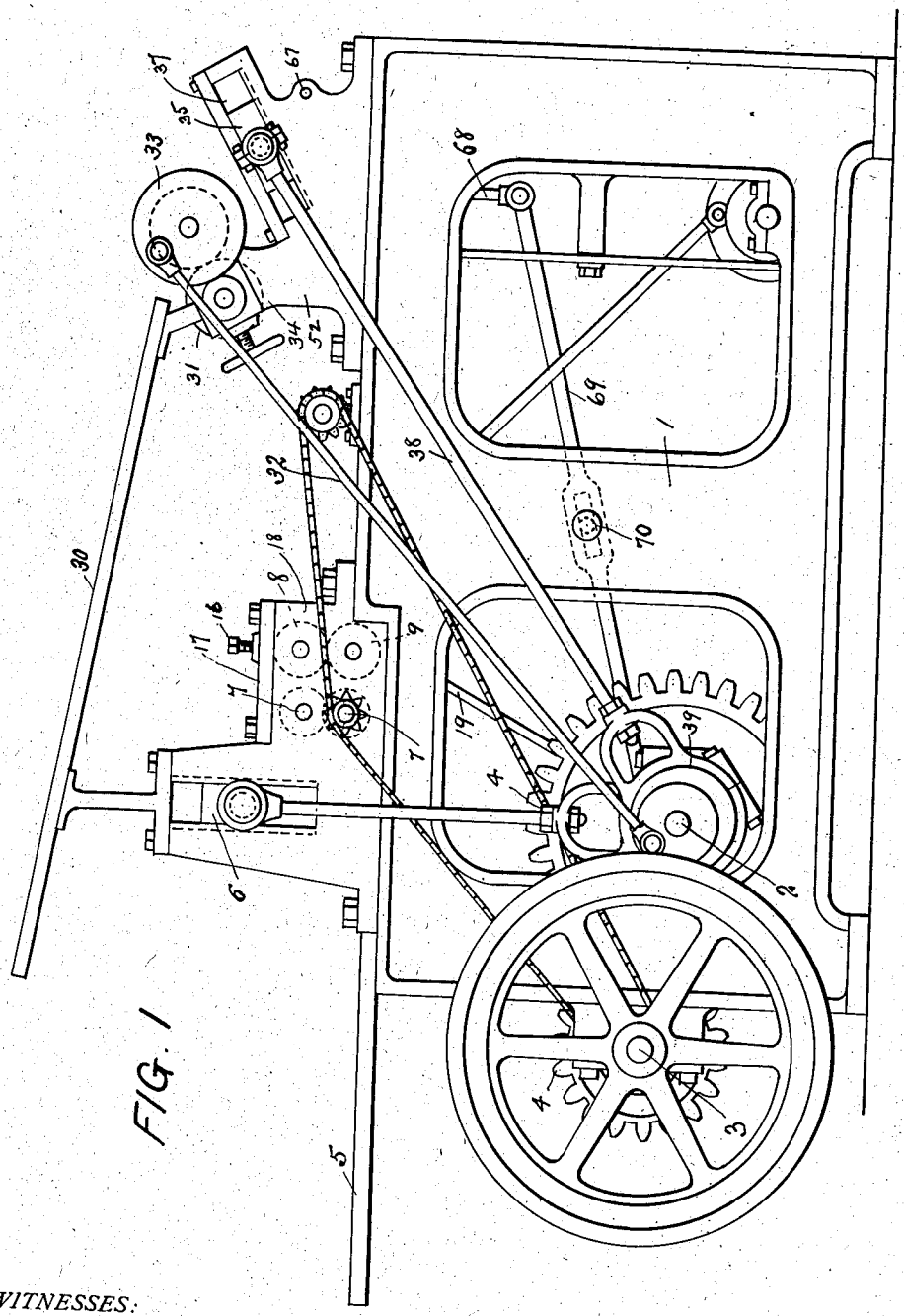

FIG. 1

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3 SHEETS—SHEET 2.

FIG. 2.

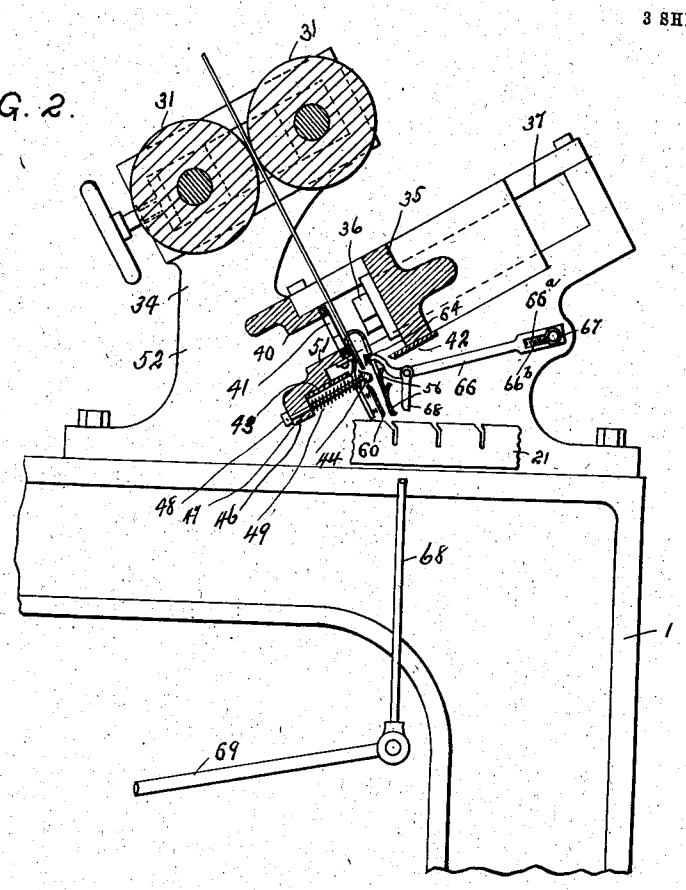


FIG. 3.

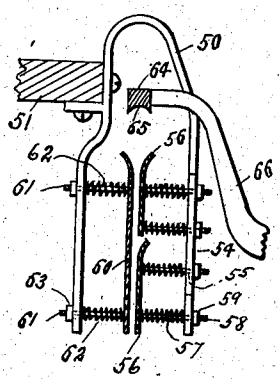
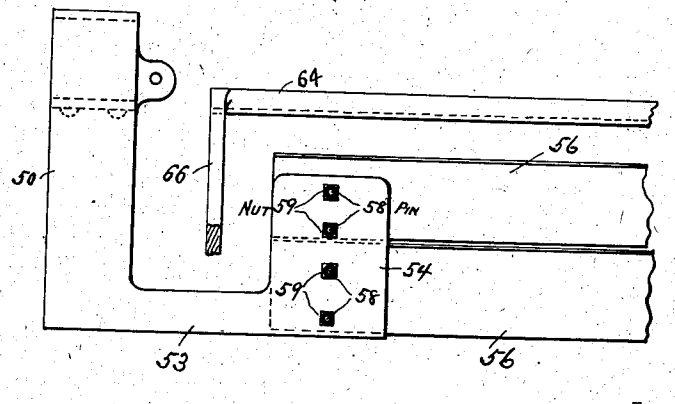


FIG. 4.



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3 SHEETS—SHEET 3.

FIG. 5.

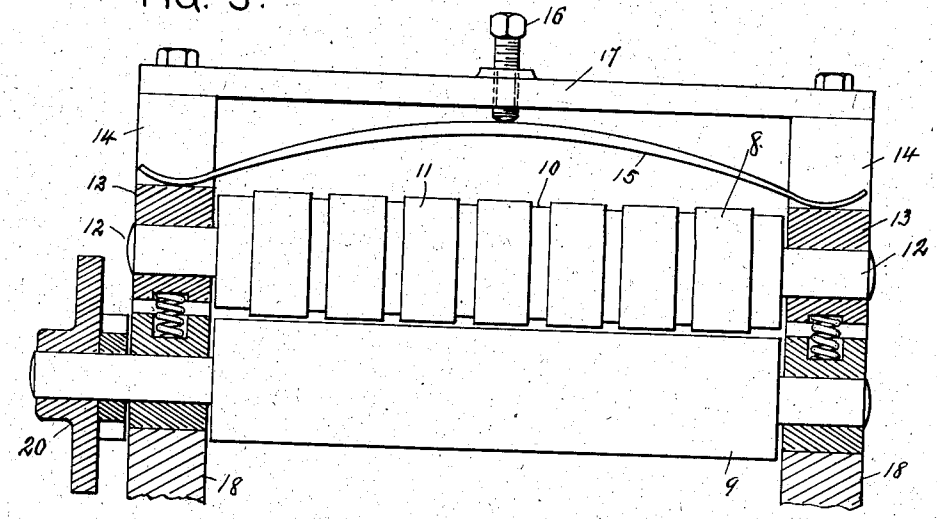


FIG. 6.

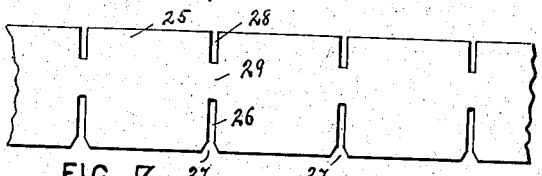


FIG. 7.

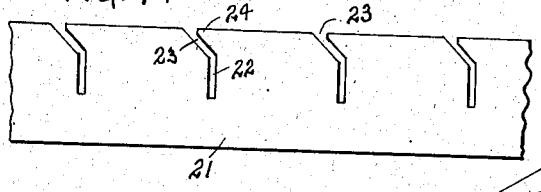


FIG. 8.

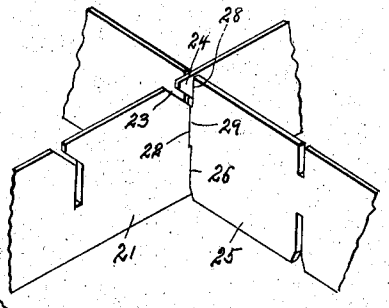
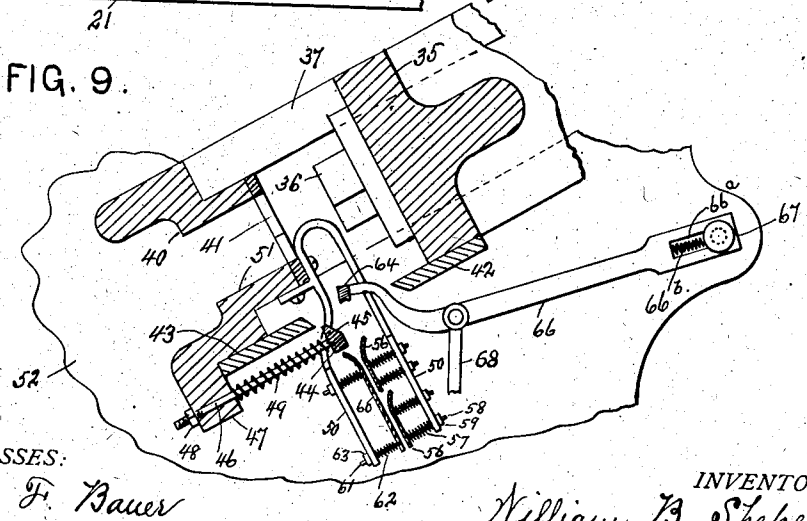


FIG. 9.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING CELL-CASES.

No. 824,155. Specification of Letters Patent. Patented June 26, 1906.

Application filed June 19, 1905. Serial No. 265,971.

To all whom it may concern:

Be it known that I, WILLIAM B. SHEPERD, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Machines for Making Cell-Cases, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for making cell-cases, being in the nature of an improvement upon what is set forth in my prior Letters Patent No. 722,329, of March 10, 1903.

The chief objects of the present invention are to simplify the construction set forth in my said prior patent, to provide an improved feeding mechanism for the strips which are fed longitudinally through the machine, and to provide a mechanism for uniting or assembling the strips in a new and improved manner.

To these ends my invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention in one form. Fig. 2 is a central vertical sectional view of a portion of the same. Fig. 3 is an enlarged detail view, in end elevation, of the strip holding and guiding plates and their supporting means. Fig. 4 is a plan view of the same, only one end thereof being shown. Fig. 5 is an elevation of the feed-rolls for the longitudinal strips, the housing being shown in partial section. Fig. 6 is a view of a part of one of the transverse strips. Fig. 7 is a similar view of one of the longitudinal strips. Fig. 8 is a perspective view showing the two strips united and interlocked, and Fig. 9 is a still further enlarged view of the central portion of Fig. 2.

The machine illustrated in the said drawings is substantially identical with that set forth in my prior Letters Patent above referred to, except as to those portions thereof which relate to the mechanism for feeding the longitudinal strips through the machine and those portions thereof which relate to the means for handling the transverse strips and uniting them to the longitudinal strips. I will therefore only refer briefly to those parts of the mechanism common to the present and prior machines.

1 indicates the frame of the machine, and 2 the main shaft, driven from a counter-shaft 3 by gears 4.

5 indicates the feeding-table for the stock or sheet of material from which the longitudinal strips are formed, it being understood that the cell-case is formed of a plurality of strips fed longitudinally through the machine in a horizontal direction and another plurality of strips which are fed to the first-mentioned strips in a direction transverse to their line of travel, said second set of strips being fed so as to move in a direction transverse to their longitudinal axes. For convenience of reference the first-mentioned strips are referred to as "longitudinal" strips and the second set as "transverse" strips.

6 indicates a cross-head driven from the main shaft 2 and carrying punches or dies by means of which the necessary slots or openings are formed in the material from which the longitudinal strips are made. This material is next severed longitudinally into separate strips by means of cutters mounted upon shafts 7, the independent continuous strips thus formed being fed forward through the machine by means of feed-rolls 8 and 9, located immediately in front of the cutters. Heretofore these feed-rolls have been made in the form of cylinders each of equal diameter throughout and extending across all of the strips into which the sheet has been severed by the cutters. It results from this construction that the strips are unequally fed and are sometimes crumpled up, obstructing the operation of the machine. To remedy this difficulty, I groove one or both of the feed-rolls or otherwise subdivide it or them into a number of independent feed-rolls corresponding with the number of strips and bearing only upon the central portion of each strip, the edges of the strips lying in the grooves and not being compressed between the feed-rolls. In the present instance I have shown the upper feed-roll as provided with a plurality of grooves 10, which divide the roll into a plurality of independent feed-rolls 11, one for each strip, this construction being shown more particularly in Fig. 5. I also make provision for rendering the feed-rolls capable of self-adjustment to the vary-

ing thickness and inequalities of the material, and to this end I mount one of the rolls, preferably the upper roll, in such a way as to permit it to yield in such a manner as to make it self-adjusting. To this end the upper feed-roll shaft 12 is mounted in bearings 13, free to slide vertically and somewhat loosely in guideways 14, and is forced toward the lower feed-roll by means of spring-pressure. The form of spring which I prefer is that shown, consisting of a single bow-spring 15, bearing at its end against the boxes 13, while its central portion rests against an adjustable abutment consisting of a screw 16, threaded through a cross-bar 17, connecting the side members 18 of the housing in which the feed-rolls are mounted. The lower feed-roll 9 is intermittently driven in any suitable way—as, for instance, by means of a pitman 19 and ratchet mechanism 20, such as are set forth in my prior Letters Patent hereinbefore referred to.

It will be seen that the grip of the feed-rolls upon the material may be readily adjusted by means of the screw 16, that the upper feed-roll is free to yield and rock to accommodate inequalities in the material, the spring acting as an equalizer between the two bearing-boxes, and that each strip will be gripped by its central portion only, its edges being free and not compressed between the feed-rolls, the result being that the several strips are fed along evenly and without being marred or crumpled up. These longitudinal strips are turned from a horizontal to a vertical position and guided and held in position to receive the transverse strips and also severed into pieces of the desired length by mechanism such as is set forth in my prior Letters Patent hereinbefore referred to or other suitable mechanism, which, forming no part of my present invention, requires no description here.

Before proceeding to a description of the mechanism which I have devised for assembling the transverse and longitudinal strips an understanding of said mechanism will be facilitated by an understanding of the character of the strips. In cell-cases of this character provision is made for locking the strips together after they are assembled, so that they will not accidentally become separated in transit or handling. To effect this result, the strips employed in connection with this machine are constructed in the manner shown in detail in Figs. 6, 7, and 8. The longitudinal strips (indicated by the reference-numeral 21) are provided in their upper portions with slots 22, having a lower vertical portion and an upper inclined portion, terminating in a slightly-enlarged mouth 23, formed by the removal of the tip end of the tongue 24, resulting from the inclination of the upper portion of the slot 22. The transverse strips (indicated by the reference-numeral 25) have in their lower portions vertical slots 26 with enlarged mouths 27, their upper portions having shorter vertical slots 28 in alinement with the slots 26 and separated therefrom by a connecting-strip 29, having a width between the slots 26 and 28 equal to the length of the vertical portions of the slots 22 of the strips 21. These strips are not engaged when at right angles to each other, the engagement being effected by placing the upper strip 25 transversely to the lower strips 21 and at an inclination to the vertical corresponding to the inclination of the upper ends of the slots 22. The transverse strip 25 is then moved downward in the plane of its inclination, the enlarged mouth 27 of the slot 26 facilitating its engagement with the corresponding longitudinal strip, which is embraced between the walls of the slot 26 until the end of said slot comes into contact with the wall of the vertical portion of the slot 22. The connecting-strip 29 then slides down into said vertical portion, the transverse strip gradually assuming a vertical position, and the tongue 24 extending through the upper slot 28, as shown in Fig. 8, thereby locking the parts against accidental separation. The assembling mechanism which I have devised is organized for the purpose of carrying out this operation of uniting the strips by movement of the transverse strip in a plane inclined to the vertical, and this mechanism I will now proceed to describe.

30 indicates the table from which the material for the transverse strips is fed into the machine, the feed-rollers being indicated at 31 and being driven intermittently by means of a connecting-rod 32 from the main shaft 2, and a ratchet-gear 33, as in my prior patent hereinbefore referred to, or any other means for imparting an intermittent motion to these rolls may be employed. It will be observed, however, that the feed-rolls 31 are supported upon brackets 34 with their axes lying in a plane inclined to the horizontal, so that the material is fed downward in an inclined plane instead of vertically, as in my said prior patent. 35 indicates a cross-head carrying the male dies or punches 36, said cross-head sliding in inclined ways 37 at right angles to the path of the material and being reciprocated by pitmen or connecting-rods 38, driven by eccentrics 39 on the main shaft 2.

40 indicates the housing or die-block for the female dies 41, the same having its face arranged parallel with the inclined path of the material. The cross-head 35 carries a knife 42, which serves to sever the strips, the housing or die-block 40 carrying a fixed ledger-blade 43 coöperating with said knife. Below said fixed ledger-blade there is located a yielding thrust-bar 44, lying normally in the path of the material and having an inclined

or beveled surface 45 to receive and guide the same. This bar is supported on guide-pins 46, which extend through a flange or lugs 47, extending downward from the housing 40, said pins having heads 48, which limit the forward motion of the bar. These heads may be adjustable or in the form of nuts, which the ends of the pins are threaded to receive, so that the limit of forward motion of the bar may be adjusted thereby. The bar is thrust normally forward by means of springs 49, coiled on the pins 46 between the flange 47 and bar.

Below the thrust-bar 44 there are located yielding guide-plates, which hold the strip in position to be acted on by the push-bar, to be hereinafter referred to, said guide-plates also serving to guide and hold the strip while it is being pushed into engagement with the longitudinal strips. These plates are supported by means of yokes 50, located at each side of the machine at the ends of the lower cross-bar 51 of the housing 40, immediately adjacent to the inner faces of the side members 52 of the frame which supports the ways 37 and feed-rolls 31. Each yoke 50 has an inward extension 53, carrying a plate 54, having guide-apertures 55 to receive the guide-pins of the guide-plates 56, which are located one above the other on one side of the path of the strip. These plates are thrust normally toward the path of the strip by means of springs 57, bearing against the plates 56 and 54 and coiled around guide-pins 58, which are attached to the plates 56, extend through the apertures 55 in the plate 54, and are provided with threaded ends to receive nuts 59, which form adjustable stops to limit the movement of the guide-plates toward the material. The other arm of each yoke 50 has mounted on it one end of a guide-plate 60, provided with a similar pin 61, spring 62, and adjusting-nut 63.

The upper ends of the guide-plates are curved outward or made flaring, so as to render the entrance of the strip between said plates more easy and certain. I prefer to divide the guide-plate on one side into two parts, as shown, for the reason that where two plates on a side are employed, as shown at 56, the lower plate will maintain its hold upon the strip when the upper plate is forced away from the strip by the passage of the push-bar downward between the guide-plates.

64 indicates the push-bar, which extends across the machine between the side members 52 for the full width of the transverse strips, said push-bar being grooved on its under face, as indicated at 65, to better engage the upper edge of said strip. Said push-bar is carried by arms 66, pivoted at one end to the side members 52, as indicated at 67, their other free ends being connected to the push-bar at points between the yokes 50 and the ends of the guide-plates 56 and 60. These arms 66 are connected by links 68 to the front ends of pitmen 69, guided at 70 on the main frame 1 between their ends and having their rear ends connected to eccentrics on the main shaft 2, so that a combined oscillating or vibrating and reciprocating motion is imparted to said pitmen, causing them through the links 68 to intermittently vibrate the arms 66 in such a way as to move the push-bar 64 downward and upward at proper intervals.

The construction and arrangement of the parts just described is such that the web of material from which the transverse strips are to be formed is intermittently fed downward in an inclined plane corresponding to the inclination of the upper ends of the slots 22, which receive said strips. When the lower portion of the web is in proper position between the dies, with its lower edge in line with the plane of action of the knife 42, the cross-head 35 is moved forward and the dies punch in the material the slots 26 and 28. It should be noted in this connection that the dies for cutting the slots 26 are located above the dies which cut the slots 28, so that each completed strip has its lower slots formed first by one stroke of the cross-head and its dies, the upper slot of said strip being formed simultaneously with the lower slot of the next strip by the next movement of the cross-head and dies, the severing of the strip subsequently taking place along a line which intersects the web of material where the mouths of the upper slots of one strip communicate with the mouths of the lower slots of the next strip. It will be understood, of course, that the perforated web is fed downward after being punched to a distance such as to cause it to project beyond the ledger-blade 43 to an extent equal to the width of the strip, and during this downward motion said lower edge of the web is forced down between the guiding and holding plates 56 and 60, the thrust-bar 44 yielding to permit its passage and the inclined surface 45 of said thrust-bar preventing the lower edge of the web from catching on the bar. At the next forward movement of the cross-head 35 the knife 42 severs the strip from the web, the thrust-bar 44 yielding backward to permit the advance of the knife for this purpose. When the knife recedes after severing the strip, the thrust-bar moves forward to its original position, moving the freshly-severed upper edge of the strip into the path of the push-bar, where it is held by said thrust-bar and by the guiding and holding plates 56 and 60. These latter plates also serve to so hold the strip as to prevent its falling by gravity as soon as it is severed. The push-bar then descends and engages the upper edge of the strip, forcing said strip downward between the yielding guide-plates 56 and 60, this movement of the strip

being in an inclined plane such that said strip engages the longitudinal strips which are held in vertical position below the transverse strip ready to receive the same. This engagement is effected at the proper inclination and in the manner hereinbefore described by me, the transverse strip moving downward at an inclined plane into the inclined upper ends of the slots 22. The guide-plates 56 and 60 yield to permit the passage of the push-bar, and, as already explained, the lower plate 56 maintains its hold upon the strip after the upper plate 56 has been forced back by the advance of the push-bar. As the transverse strip engages further with the longitudinal strips its lower portion gradually tends to assume a vertical position, and when the upper edge of the transverse strip passes clear of the guide-plates said upper portion is free to spring over into a vertical plane, causing the tongues 24 of the longitudinal strips to engage with the slots 28 of the transverse strip, thus completing the interlocking of the strips. The operation of feeding the transverse strips to and engaging them with the longitudinal strips is repeated until the desired number of transverse strips have been placed in position, whereupon the longitudinal strips are severed, and the complete set of cells is removed from the machine.

It should be noted in this connection that the path of the transverse strip between the guiding-plates to the longitudinal strips is straight, or substantially so, the transverse strips traveling in an inclined plane. In order to permit the push-bar to travel in the same plane, I provide the arms 66 with slots 66^a to receive the pivots 67, on which said arms are mounted, and I place within said slots springs 66^b, which hold the push-bar in proper position at the beginning of its stroke and return it thereto at the end of its stroke, while permitting said bar to depart from the curved path which it would otherwise follow without this provision, rendering it possible for the push-bar to follow the straight path defined by the guide-plates.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as it is obvious that these details may be modified without departing from the principle of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of means for feeding forward a web of material from which the transverse strips are formed and engaging the same with the longitudinal strips, the forward-feeding and engaging movement being in a plane inclined to the vertical, said plane being the plane of said material, substantially as described.

2. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of means for forming and feeding transverse strips and engaging them with the longitudinal strips, the engaging movement being in a plane inclined to the vertical, said plane being the plane of said material, substantially as described.

3. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of means for forming and feeding transverse strips and engaging them with the longitudinal strips, the feeding and engaging movements being in a plane inclined to the vertical, said plane being the plane of said material, substantially as described.

4. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of means for intermittently feeding downward a web of material, means for punching and severing therefrom transverse strips, means for frictionally holding the severed strip in position above the longitudinal strips, and means for positively forcing said strip into engagement with the longitudinal strips while so held, substantially as described.

5. In a cell-case machine, the combinationl with means for forming, feeding and holding in upright position a plurality of longitudina, strips, of means for intermittently feeding downward a web of material, means for punching and severing therefrom transverse strips, means for frictionally holding the severed strip in inclined position above the longitudinal strips, and means for positively forcing said strip into engagement with the longitudinal strips while so held, said engaging movement being in the plane of inclination of the strips, substantially as described.

6. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of spring-actuated guiding and holding plates located immediately above said longitudinal strips, means for feeding a web of material between said plates and for forming and severing therefrom a transverse strip, and means for pushing the severed strip downward between said plates and engaging it with the longitudinal strips, substantially as described.

7. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of spring-actuated guiding and holding plates located immediately above said longitudinal strips, means for feeding a web of material between said plates and for form-

ing and severing therefrom a transverse strip, and means for pushing the severed strip downward between said plates and engaging it with the longitudinal strips, said last-mentioned means comprising a push-bar adapted to engage the upper edge of the transverse strip and moving first downwardly and then upwardly between the plates, substantially as described.

8. In a cell-case machine, the combination, with means for forming, feeding and holding in upright position a plurality of longitudinal strips, of spring-actuated guiding and holding plates located immediately above said longitudinal strips, means for feeding a web of material between said plates and for forming and severing therefrom a transverse strip, and means for pushing the severed strip downward between said plates and engaging it with the longitudinal strips, said last-mentioned means comprising a push-bar adapted to engage the upper edge of the transverse strip and moving first downwardly and then upwardly between the plates, there being a plurality of superposed holding-plates located on one side of the path of said push-bar, substantially as described.

9. In a cell-case machine, the combination, with spring-actuated guiding and holding plates, and a reciprocating push-bar located above said plates at the beginning of its stroke, of means for feeding a web of material between said plates at one side of the push-bar, a reciprocating cross-head carrying a knife to sever a transverse strip from said web, a frame member carrying a ledger-blade coöperating with said knife, and a spring-actuated thrust-bar arranged adjacent to said ledger-blade in the path of said knife, yielding before the advance of the same during the severing of the strip, and serving to move the upper edge of the strip into the path of the push-bar when the knife recedes, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM B. SHEPERD.

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