H. E. HULL.

APPARATUS FOR WEAVING VENEER STRIPS.

APPLICATION FILED MAR. 9, 1909.

937,608.

Patented Oct. 19, 1909.

4 SHEETS—SHEET 1.

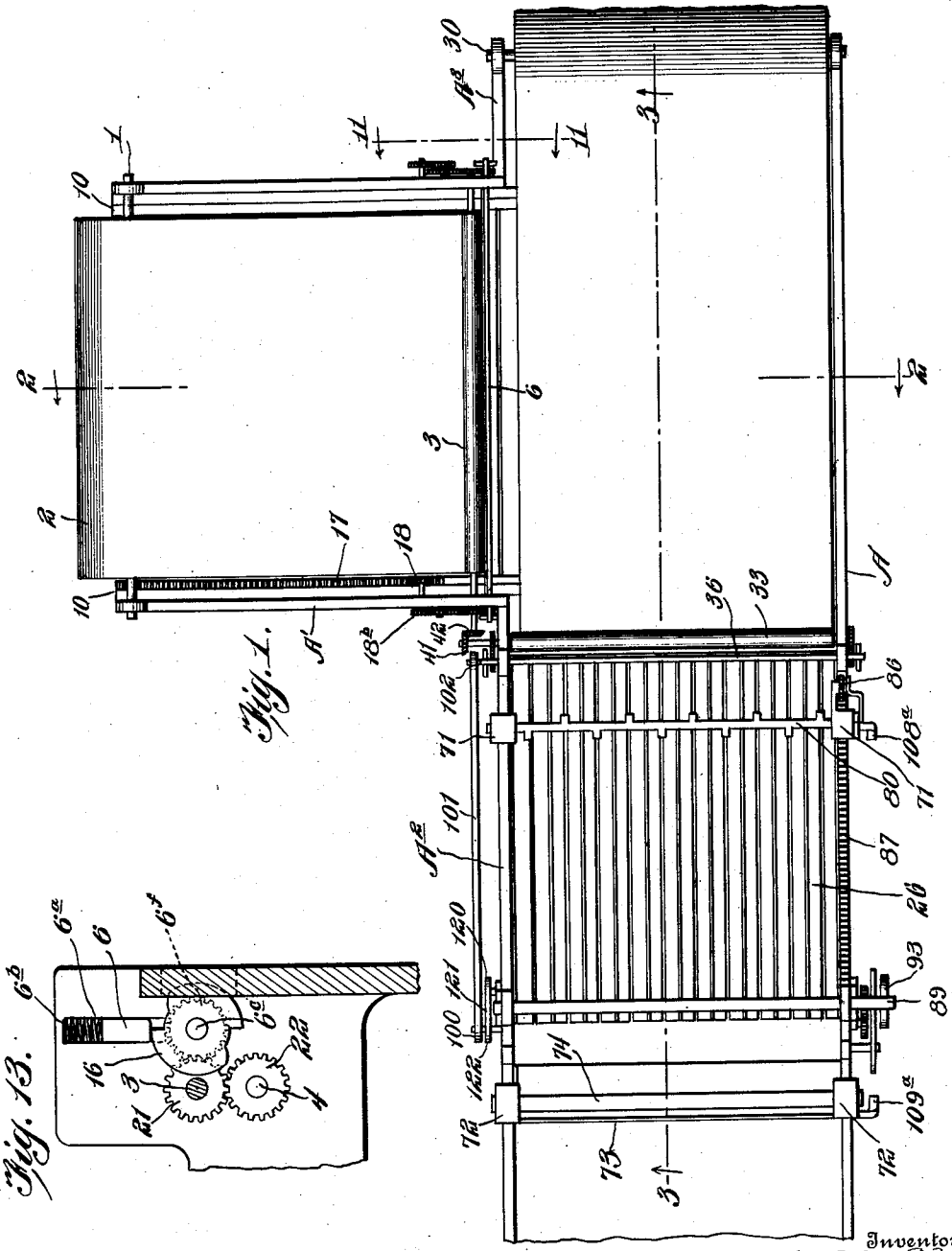

Fig. 1.

Fig. 13.

Witnesses

Louis R. Heinrichs

C. C. Hines.

Inventor

Henry E. Hull

By Victor J. Evans.

Attorney

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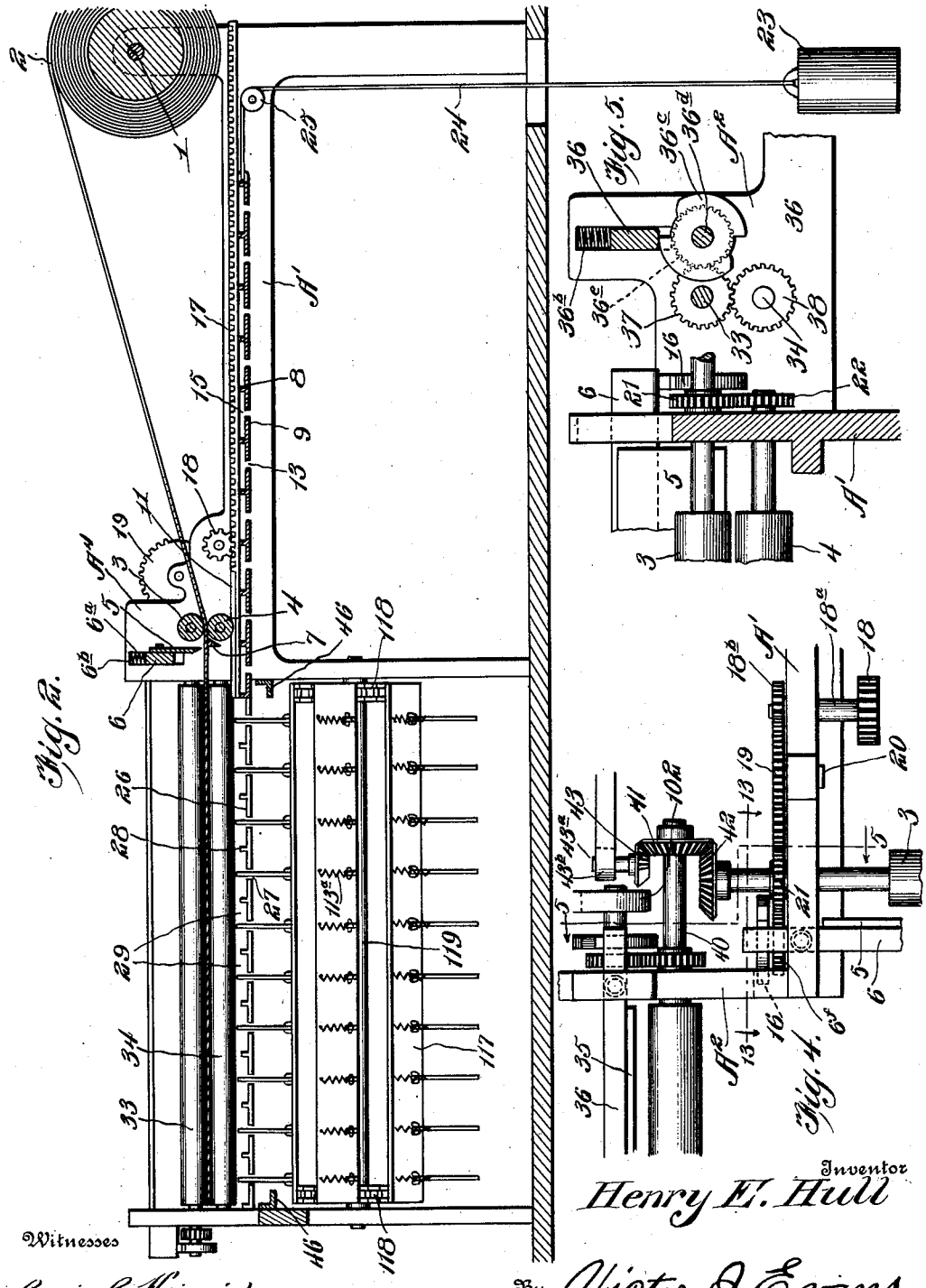

Fig. 2.

Fig. 5.

Fig. 4.

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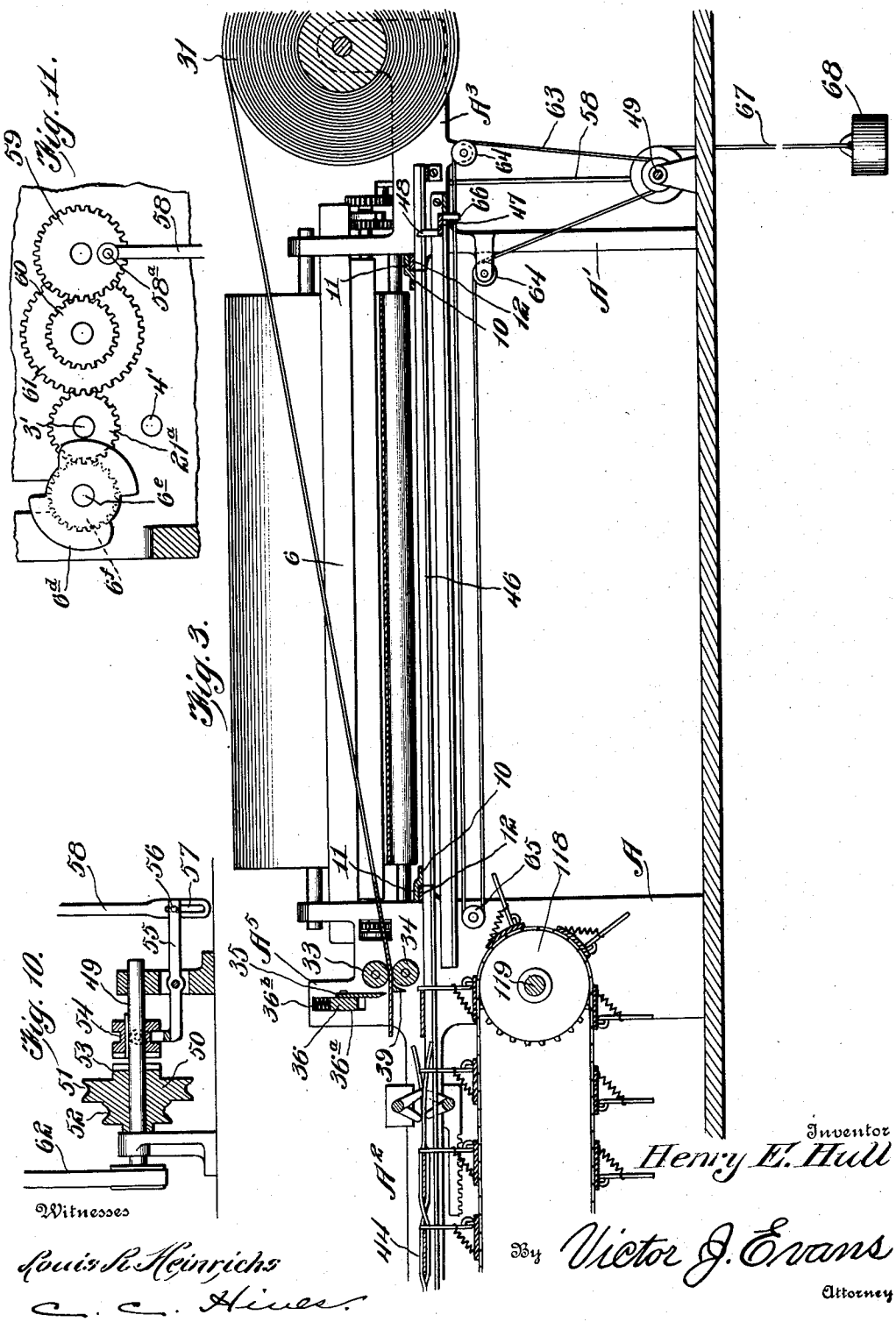

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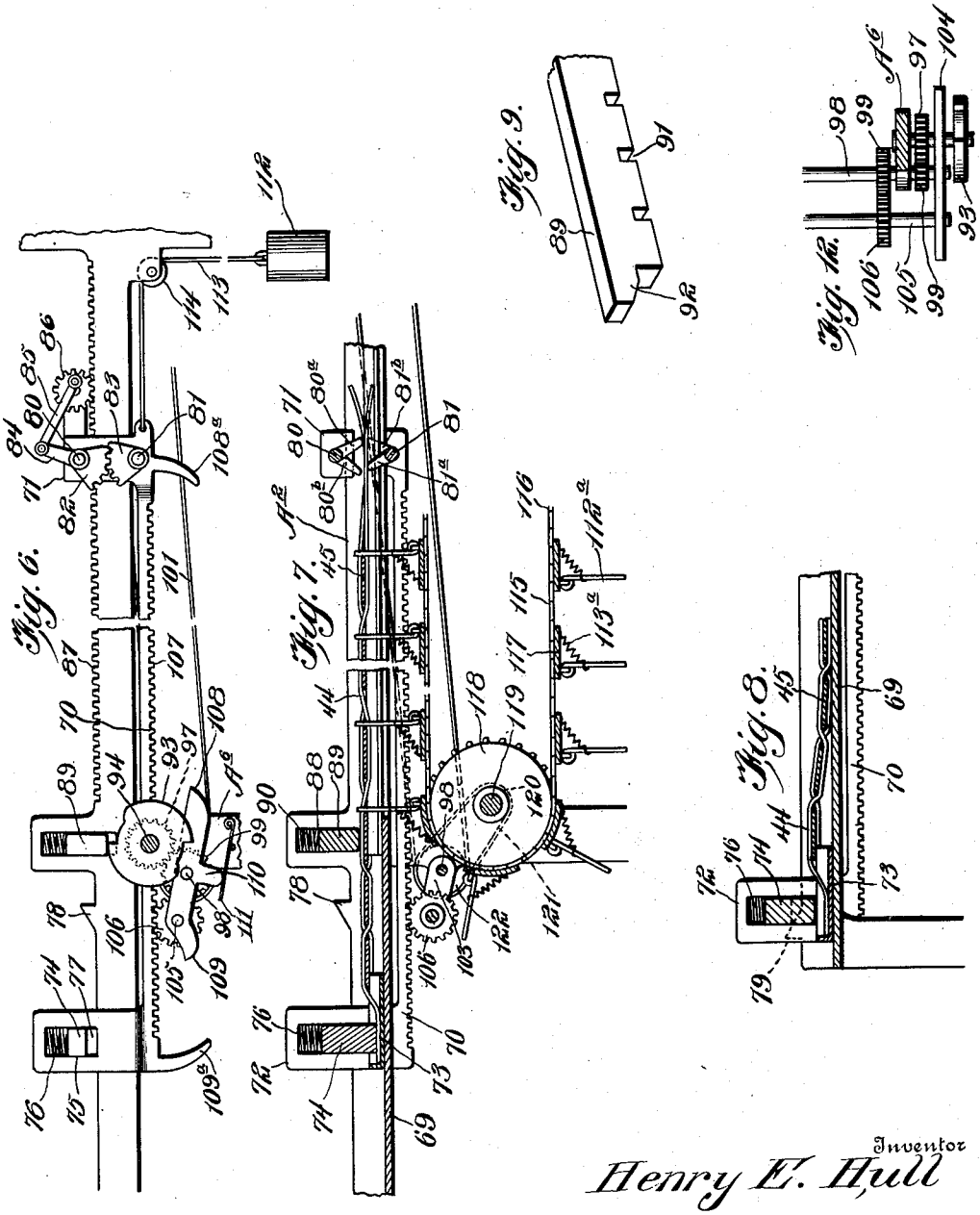

Fig. 6.

Fig. 7.

Fig. 9.

Fig. 10.

Fig. 8.

Witnesses

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C. C. Hines.

Inventor

Henry E. Hull

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

HENRY E. HULL, OF ST. JOSEPH, MISSOURI, ASSIGNOR OF ONE-HALF TO CHARLES A. BUDDY, OF ST. JOSEPH, MISSOURI.

APPARATUS FOR WEAVING VENEER STRIPS.

937,608. Specification of Letters Patent. Patented Oct. 19, 1909.

Application filed March 9, 1909. Serial No. 482,356.

To all whom it may concern:

Be it known that I, HENRY E. HULL, a citizen of the United States of America, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented new and useful Improvements in Apparatus for Weaving Veneer Strips, of which the following is a specification.

This invention relates to an apparatus or machine for weaving strips of veneer or the like together at right angles to each other for the production of a blank or body of material adapted to be used in the manufacture of baskets and other articles.

The object of the invention is to provide a machine of this character whereby the strips may be formed from rolls of the sheet veneer and then assembled or woven in a rapid and effective manner, the operation being automatic in entirety so as to reduce to a minimum the number of attendants required to run the machine, thus insuring economy in the manufacture of goods of this class.

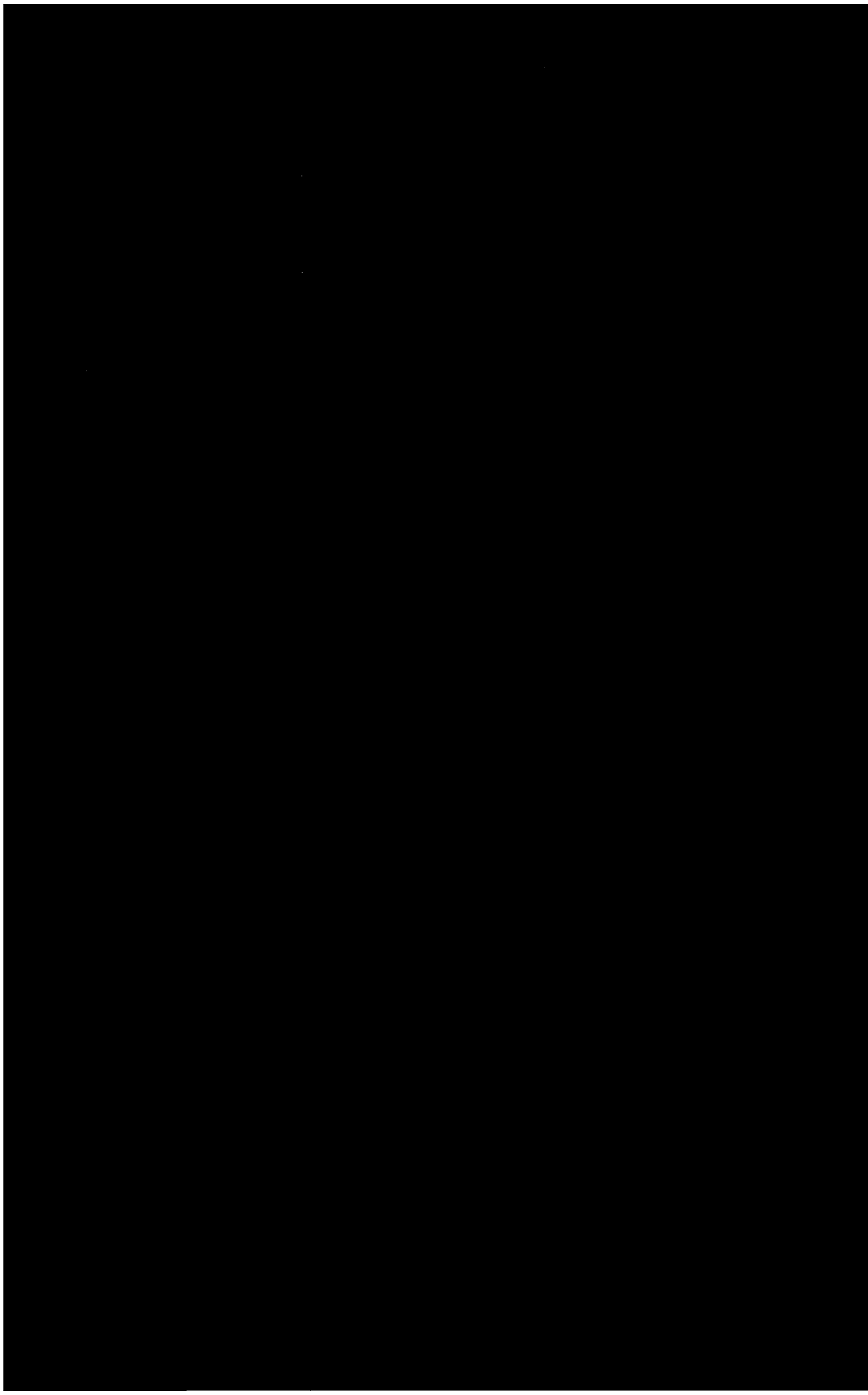
With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a top plan view of the machine. Fig. 2 is a vertical transverse section on line 2—2 of Fig. 1. Fig. 3 is a vertical longitudinal section along the line 3—3 of Fig. 1. Fig. 4 is a top plan view of a portion of the frame and gearing for the feed rolls and associated mechanism for operating the knives. Fig. 5 is a section on line 5—5 of Fig. 4. Fig. 6 is a side elevation of the feed carriage. Fig. 7 is a longitudinal section through the same and a portion of the feed belt or apron carrying the fingers whereby the transverse strips are fed in the weaving operation. Fig. 8 is a detail longitudinal section through the outer ends of the delivery table and carriage, showing the clamping bar on the carriage retracted to release the woven blank. Fig. 9 is a fragmentary detail view of one of the clamping bars. Fig. 10 is a section through the pulley and clutch gearing of the mechanism for operating the sliding feed bar. Fig. 11 is a section on an enlarged scale on line 11—11 of Fig. 1. Fig. 12 is a detail view of the carriage feeding and releasing devices of the weaving mechanism. Fig. 13 is a section on the line 13—13 of Fig. 4.

Referring to the drawings, the letter A designates a suitable supporting frame, having portions A′ and A^2 arranged at right angles to each other, and a portion A^3 connecting with the inner end of the portion A′ and in longitudinal alinement with the portion A^2, as shown.

Journaled in suitable bearings on the outer end of the frame section A′ is a shaft 1 for supporting a roll 2 of sheet veneer, and also journaled in bearings at the inner end of said frame section are feed rolls 3 and 4 arranged one above the other, and adapted to grip and feed the free end or portion of the veneer from the roll forwardly to a vertically reciprocating cutting knife 5 mounted upon a transverse supporting bar 6 adjacent said feed roll. This knife is moved up and down at timed intervals to sever the extreme free portion of the end of the sheet of veneer into strips, which drop upon a feed table hereinafter described, the free edge of the sheet being supported beyond the rolls for the effective action of the knife thereon by a rigid cross bar 7. The knife carrier bar 6 is fitted to slide in slots 6^a in bracket extensions A^4 at the sides of the frame portion A′, in each of which slots is an expansion spring 6^b which impels the bar and knife downward. The ends of the bar project beyond the sides of the frame portion A′ and are arranged to be engaged and lifted against the resistance of the springs by cams 16, each of which is mounted upon a stub shaft 6^c, on which is also fixed a spur gear 6^f. The wings of these cams alternately engage and elevate the cutter bar, thereby compressing the springs, which upon the release of the bar by the wings force the bar downward so that the knife will sever the underlying portions of the veneer sheets.

Mounted for a sliding or reciprocating movement on the frame portion A′ is a feed table 8 comprising a series of transverse bars or plates 9 united at their opposite ends by longitudinal strips 10, which are formed with outwardly extending guide flanges 11 to run upon guides or track rails 12. The cross bars or plates 9 are spaced to provide intervening slots 13, and each is formed with an upwardly extending longitudinal rib 14, whereby a series of longitudinal pockets or



ing fingers 48 which are properly spaced to project upward through the longitudinal slots 13 in the table 8 when the latter has been fed forward to the limit of its movement and its pockets 15 are filled with the strips 44. It will be understood that through the intermittent action of the drive mechanism, the table 8 will be intermittently fed forward a distance equivalent to the distance between adjacent pockets 15, when the mechanism will come to a stop, at which time the cutting knives will be released by the cams and projected by their springs, thus forming the strips, after which the table 8 will again move forwardly and the operation will be repeated, and that during this intermittent movement of the table 8 the parts of the weaving mechanism including the cutting means for forming the transverse strips will be operated in timed relation therewith, so that while a set of the strips 44 is being prepared for use the weaving mechanism on the frame A^2 will be in operation to interweave the strips 44 previously prepared with the strips 45 constantly produced by the action of the cutter 35.

Mounted on a shaft 49 below the frame portion A^2 is a double pulley 50 having portions 51 and 52 of different diameters and provided at one end with a clutch member 53 adapted to be engaged by a grooved clutch collar 54 slidably and rotatably mounted on said shaft and engaged by the forked end of a pivot lever 55, the opposite end of which carries a pin 56 movable in the longitudinally slotted lower end 57 of a rod 58, thus forming a sliding or slip joint connection between said lever and rod. The upper end of the rod 58 is connected to a crank or wrist pin 58^a on a crank gear 59 which meshes with a pinion 60 rigidly mounted on the same shaft as a gear 61 which meshes with the gear 21^a on the roll shaft 3. As the shaft 3 rotates in feeding the veneer from the roll 2 forward for the formation of the strips 44, the gear 59 is rotated through the intervening train and slowly elevates the crank pin 58^a, thus drawing up upon the rod 58, which is elevated until the lower portion of the slotted end thereof engages the pin 56 and trips the lever 35 to throw the clutch member 54 into engagement with the clutch member 53, thus fixing the loose pulley 50 to the shaft 49, which latter is constantly driven from the guide shaft by a belt 62. When the pin 58^a passes beyond center at the highest point of its path of travel and again begins to descend, the reverse operation ensues, the clutches remaining in gear until the upper end of the slot 57 engages the pin 56 and trips the lever in the opposite direction, and thereby throws the clutch 54 out of engagement with the clutch 53 and releases the pulley 50. Wound around the portion 52 of the pulley is a cord or cable 63 which extends in the form of a loop around suitable superposed guide pulleys 64 and 65 arranged respectively upon the frame portions A^1, A^3 and A^2 and connected at its opposite ends to a lug 66 depending from the bar 47. A rope or cable 67 is fixed to and adapted to wind upon the portion 51 of the pulley 50 and carries at its free end a retracting weight 68. The gear 21^a is so proportioned to the gear 59 that the table 8 is allowed one complete forward movement to fill all the pockets thereof with the strips 44 while the pin 58^a is moving from its highest to its lowest point and up again, so that while said table is intermittently feeding outward the rod 58 will make one complete operative movement and at the time the table is filled and completely projected the clutch 54 will be thrown into action. By this means the pulley 50 will be rotated to move the cable or belt 63 to feed the bar 47 forward, in which operation it slides along the guide rails 46 and its fingers 48 travel in the slots 13 of the table 8, thus sliding the set of strips 44 from said table into the pockets 29 of the stationary table on the frame section A^2. At the instant the strips pass from the feed table to the stationary table, the clutch 54 is disengaged from the gear 50, whereupon the weight 68 quickly retracts the bar 47, and as soon as the fingers 48 are released from engagement with the table 8 the latter is retracted by the weight 23 in readiness for a repetition of the operation above described.

The frame section A^2 is provided at its outer end with a receiving tray or table 69 extending from a point adjacent the outer end of the stationary table and adapted to receive the completed mats. Mounted on said frame section is a feed carriage comprising a pair of rack bars 70 slidably supported upon the side bars of the frame section by sets of hangers 71 and 72 and connected for movement in unison by suitable cross bars (not shown) and the cross elements of the mechanism hereinafter described. This carriage is provided at its outer end with a cross piece 73 forming a stationary clamping jaw against which the outer ends of the strips 44 bear and against which they are normally held by vertically movable clamping bars 74 mounted in guide slots 75 in the hangers 72 and forced downward by springs 76. The ends of the bar have reduced beveled extensions 77 to engage sets of stationary cams 78 or inclined projections 78 and 79 on the frame, by which the bar is respectively elevated against the resistance of its springs to receiving and releasing positions when the tag is at the limit of its inward and outward movements. At the inner end of the carriage above and below the plane of the stationary table of the

frame section A^2 are arranged transverse rock shafts 80 and 81, which thus extend transversely above and below said table, and these shafts are respectively provided with sets of forwardly and rearwardly projecting radial fingers 80^a and 80^b and 81^a and 81^b, the forwardly and rearwardly projecting fingers of each shaft alternating in arrangement with each other. On the ends of said shafts at one side of the table are intermeshing segments 82 and 83, and connected with the shaft 80 is a crank arm 84 connected by a link 85 with a crank pinion 86 meshing with rack teeth 87 formed on the upper edge of the adjacent side bar of the frame section, by which in the travel of the carriage the shafts will be actuated.

Mounted for sliding movement in slotted guides 88 on the sides of the frame sections is a transverse clamping bar 89 adapted to be depressed by springs 90 in said guide to clamp the strips 44 and 45 during the intermittent feed movements of the carriage, so that the strips 45 fed forward by an accelerated movement, as hereinafter described, may be successively held for the close weaving of the strips 45 in the meshes formed by the strips 44. The lower edge of this bar is provided with transverse notches 91 in alinement with the slots 27 for the passage of the fingers of the weaving belt, hereinafter referred to, and the ends 92 of said bar project beyond the slotted guides and are beveled for engagement with controlling cams 93 mounted on a transverse shaft 94 journaled in bearings on posts or standards A^6 forming part of the frame section A^2 and carrying pinions 97. The cams 93 alternately elevate and permit depression of the bar 89 to permit feed of the strips and to clamp said strips during a portion of the feeding movement the distance between meshes of the strips 44 for the effective forward feed of the strips 45 and the closing of the meshes to form a tightly woven article.

A shaft 98 is journaled in bearings on the standard A^6 and carries pinions 99 meshing with the pinions 97, and said shaft also carries at one end a pulley 100 driven by a belt 101 from a drive pulley 102 on the shaft 36^d. Mounted on said shaft 98 is a tilting frame comprising side bars 103 and 104 and a transverse rod or shaft 105, the latter carrying pinions 106 meshing with rack teeth 107 formed on the lower edges of the side bars of the carriage, by which the latter is fed outward in the operation of the apparatus. The side bar 104 of the said tilting frame is provided with contact portions 108 and 109 beveled or otherwise suitably formed for engagement by trip arms 108^a and 109^a on the adjacent side bar of the carriage. Also projecting from said side bar 104 is a lug 110 adapted to engage a fixed retaining spring 111, and, by frictional contact therewith, to hold the tilting frame tilted up or down. When the tilting frame is tilted up, as shown in Figs. 6 and 7, the pinions 106 mesh with the rack bars 107 to feed the carriage outward through the action of the gearing. When the carriage reaches the limit of its outward movement the arm 108^a on the carriage engages the contact portion 108 of the swinging frame and swings the same upward, thus throwing the shaft 105 downward and moving the pinions 106 out of engagement with the racks 107, leaving the carriage free to be retracted. When the carriage reaches the limit of its inward movement, the arm 109^a engages the contact portion 109 and throws the swinging frame up again, thus bringing the gears 106 into engagement with the racks 107 for the subsequent feed movement of the carriage. A retracting weight 112 is provided to return the carriage to normal position and is connected with one end of a rope or cable 113 passing around a guide pulley 114 on the frame and connected at its opposite end with the opposite end of the carriage. Arranged below the table on the frame section A^2 is an endless belt 115 comprising chains 116 connected by cross slats 117, which chains pass around sprocket wheels 118 on shafts 119. Pivotally mounted upon the slats of this belt are series of transverse weaving fingers 112^a normally maintained at a right angle to the belt by springs 113^a. The fingers upon the upper strips of the belt are adapted to move through the slots 27 in the stationary table and engage and feed the cross strip 45 forward. The shaft 19 is disposed below and adjacent the inner end of the tray or table 69 against the inner edge of which the fingers 112 abut at the limit of their outward movement. When the fingers pass downward around the outer sprocket wheels 118 and become a portion of the return stretch of the belt, they are permitted by their springs 113 to swing rearwardly and pass without interference beneath said receiving table. The outer shaft 119 carries a pulley 120 connected by a belt 121 with a pulley 122 on the same shaft on which the pulley 100 is mounted, by which motion is transmitted to the belt. The gearing for driving the belt is so proportioned as to cause the belt to have a faster feed motion than the carriage, by which an interweaving of the strips 44 and 45 while they are progressively feeding forward in an intermittent manner is effected.

The operation is as follows:—After the longitudinal series of strips 44 has been fed from the table 8 to the stationary table on the section A^2 through the action of the feed bar 47, the mechanism comes into action to cause the bars 74 to clamp the outer free ends of said strips against the cross piece 73,

and at this time the cutter 35 begins to sever the strips 45 from the sheet of material feeding from the roll 31 for use in conjunction with such series of strips 44. As the strips 45 are successively formed and deposited upon the inner ends of the ribs 28 of the stationary table, the carriage begins to feed forwardly and is intermittently moved each time the distance determined proportionately to the distance between the meshes of the proposed fabric. As the carriage is thus operated, the shafts 80 and 81 are rocked to deflect the strips 44 alternately up and down for the production of the meshes to receive the strips 45. Through the action of the pinion 86 the deflector shafts alternately rock in opposite directions. When the shaft 80 is rocked in a forward direction the shaft 81 will be rocked reversely, so that the fingers 80^a and 81^b of said shaft will be respectively moved upward and downward to correspondingly depress and elevate the adjacent portions of the alternate strips 45, thus crossing said strips to produce the meshes, and upon the reverse movements of said shaft the corresponding strips will be deflected in the opposite direction, so that each strip 44 will be alternately deflected upward and downward. The inner ends of the strips when thus deflected up and down will form flaring entrances in side elevation for the passage of the strips 45 between the same. Hence it will be understood that the fingers 112 of the feed belt will push the strips 45 between the deflected portions of the strips 44 and first loosely weave them together, as illustrated in Fig. 7. The table has an intermittent forward or outward feed motion, and the belt a corresponding motion, but as the fingers 112 through arrangement of the gearing having an accelerated or faster motion than the table, it will be understood that they force the strips 45 between the strips 44 at an accelerated speed, and consequently gradually tighten the meshes and bring the strips 45 close together for the production of a closely woven article. The bar 89 successively clamps the strips in transverse alinement with the meshes as they successively come thereunder, thus preventing the meshes from becoming loosened, and at the same time preventing the feed fingers from forcibly projecting the loosely woven fabric forward, thus allowing strips 45 to be fed until they are brought closely together and the meshes closed. This operation continues until the strips 45 are woven at close intervals with and throughout the length of the strips 44, resulting in the formation of a complete mat, at which time the carriage will have been fed outward to the limit of its feed movement, when the arm 108^a will actuate the tilting frame to throw the pinions 106 out of action, while the bar 72 will engage and be retracted by the cams 79, thus freeing the completed mat which drops upon the table 69 from which it may be removed and the free ends of the strips 74 suitably secured to hold the series of strips permanently woven. Upon the retraction of the carriage by the weight 112, the arm 109 strikes the tilting frame and restores the carriage feed gearing to normal position. During this feeding movement of the carriage and while the weaving operation is going on, the feed table 8 is again being filled with strips, which, upon the return of the carriage to normal position, are fed into the pockets of the stationary carriage on the frame section A^2, whereupon the operation of forming the cross strips and weaving the strips into the succeeding mat is begun.

As before described, the operation of the gearing throughout is intermittent and the parts are constructed, arranged and proportioned to act at timed intervals throughout, thus insuring a complete automatic action and reducing the number of attendants required to operate the machine to a material extent.

By means of a machine constructed as described, a large number of mats may be made during the working period each day, and these may be employed in the manufacture of baskets and many other articles.

Having thus fully described the invention, what is claimed as new is;—

1. A machine for weaving strips of veneer, comprising means for forming and assembling a series of longitudinal strips, means for forming and bringing a series of cross strips in proper relation to said longitudinal strips, means for deflecting the first named strips to form meshes and disposing the second named strips therein to produce a woven body, and mean for operating the several parts for effecting the aforesaid operation.

2. A machine for weaving strips of veneer, comprising means for forming and assembling a series of longitudinal strips, means for feeding said strips in the direction of their length, means for assembling a series of transverse strips in juxtaposed relation to said longitudinal strips, means for deflecting the longitudinal strips to lap over and under and form meshes embracing said transverse strips, means for feeding the transverse strips into the meshes during the longitudinal movement of the longitudinal strips, and means for operating the parts to effect the aforesaid operations.

3. A machine for weaving strips of veneer, comprising means for forming a series of longitudinal strips from a sheet and assembling the same in parallel relation, means for forming a series of transverse strips from a sheet and disposing the same for engagement with the longitudinal strips, means for deflecting the longitudinal strips to produce

meshes, means for feeding the assembled strips to dispose the transverse strips within the meshes, and means for operating the parts at timed intervals.

4. An apparatus of the character described, comprising a frame, a carriage, a table, means for forming and depositing a series of longitudinal strips from a continuous sheet of material and depositing the same upon the table, means for intermittently feeding the table forward to a position in line with the carriage, means for discharging the strips therefrom onto the carriage, means for forming a series of transverse strips and successively disposing the same in juxtaposition to the longitudinal strips, means for retracting the table, means for feeding the carriage forward at a determined rate of speed, means for deflecting the strips thereon for the production of meshes, means for feeding the transverse strips forward at an increased rate of speed for engagement with said meshes, and means for operating the several parts in timed relation.

5. A machine of the character described, comprising a frame, a carriage movable thereon, a table movable at right angles to the carriage, means for depositing a series of longitudinal strips on the table, means for discharging the strips from the table to the carriage when said table completes its feeding movement, means for retracting the table, means for assembling a series of transverse strips in position to be interwoven with the longitudinal strips on the carriage, means for deflecting the longitudinal strips for the production of meshes, means for feeding the carriage forward at a determined speed and the transverse strips at a relatively greater speed to dispose said transverse strips in the meshes of the longitudinal strips, whereby said strips are interwoven, means for retracting the carriage at the end of the weaving operation, and means for operating the several parts in timed relation.

6. A machine of the character described, comprising means for forming two separate series of strips from individual rolls of sheet veneer, means for interweaving the series of strips, and automatic operating mechanism.

7. A machine of the character described, comprising a frame, automatic weaving mechanism mounted thereon, supports for rolls of sheet veneer, means for separating the respective sheets into strips, means for feeding said strips and disposing them at right angles to and upon the weaving mechanism, and means for operating the parts in timed relation.

8. In an apparatus of the character described, the combination of a frame, weaving mechanism mounted thereon and including a movable carriage and a movable weaving device associated therewith, means for supplying a series of longitudinal strips to the carriage, means for feeding transverse strips thereto in position to be engaged by said movable weaving device, means upon the carriage for deflecting the longitudinal strip thereon to produce meshes to receive the feeding transverse strips, means for releasing the completed article at the limit of movement of the carriage, means for returning said carriage to normal position, and means for operating the parts in timed relation.

9. In an apparatus of the character described, the combination with a frame, a carriage mounted thereon, a table movable to a position in alinement with the carriage, means for feeding a series of strips onto the table, means for discharging the same therefrom onto the carriage, means for retracting the carriage at the limit of its feeding movement, means for retracting the table at the limit of its feeding movement, means for supplying and disposing transverse strips to be fed forward along the carriage, means for deflecting the longitudinal strips upon the carriage to produce meshes, a device movable at a greater rate of speed than the carriage to feed the transverse strips between the deflected portions of the longitudinal strips, and means for intermittently operating the parts in timed accord.

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

HENRY E. HULL.

Witnesses:

CHARLES A. BUDDY,

JAMES A. TRANT.