No. 791,102. PATENTED MAY 30, 1905.

G. S. MAYHEW.

MACHINE FOR FORMING COMPOUND DEALS.

APPLICATION FILED NOV. 23, 1904.

4 SHEETS—SHEET 1.

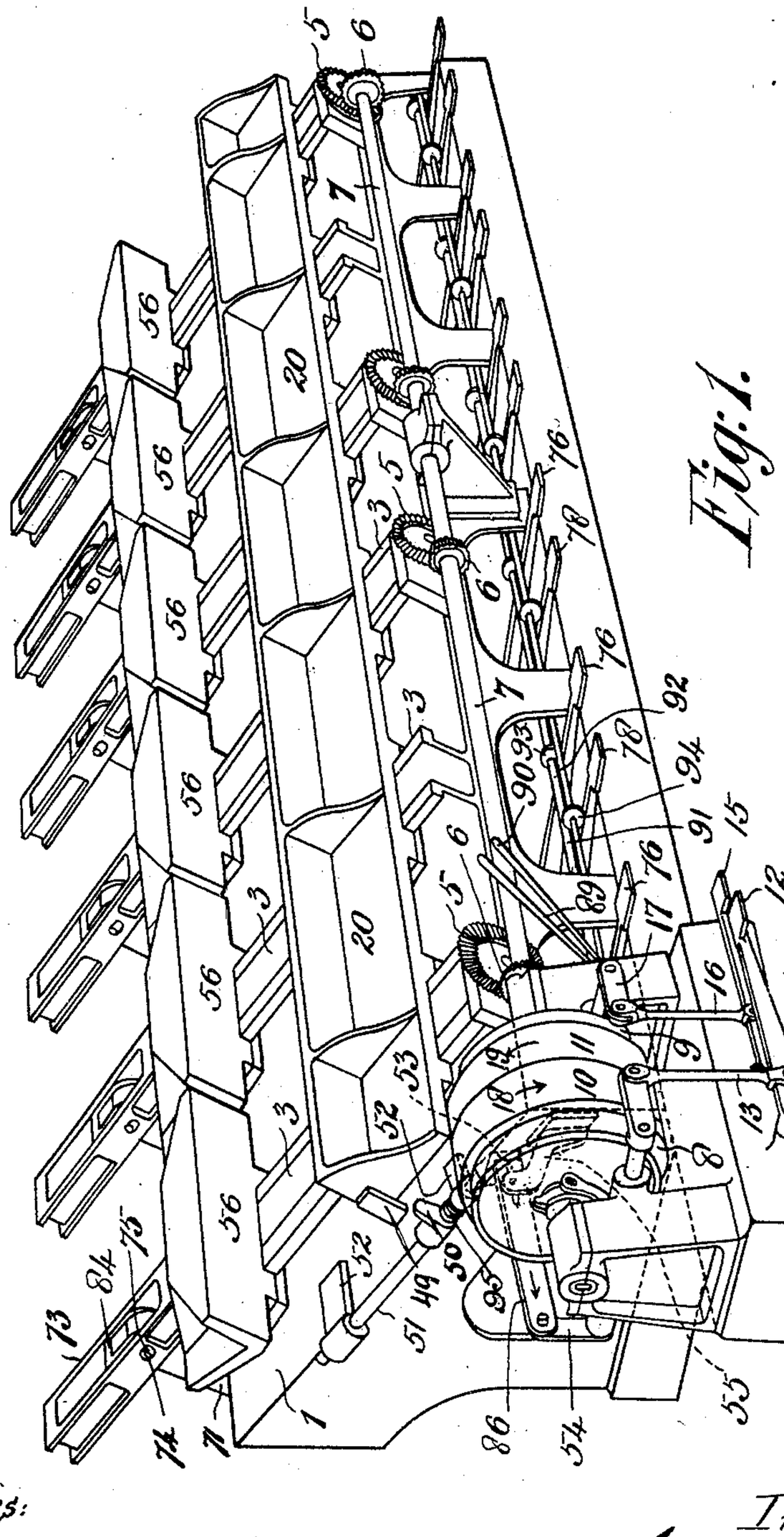

Fig. 1.

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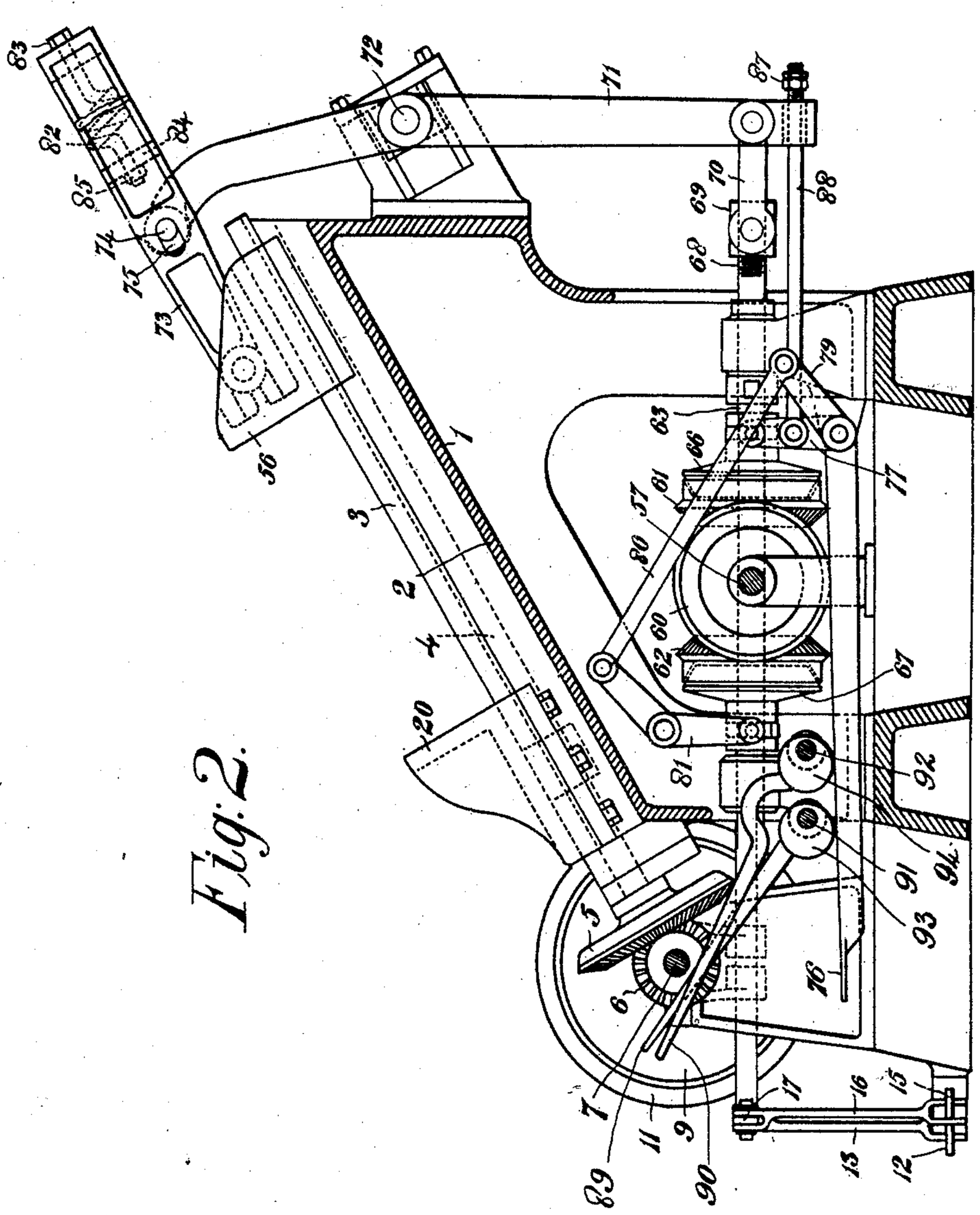

Fig. 2.

Witnesses:
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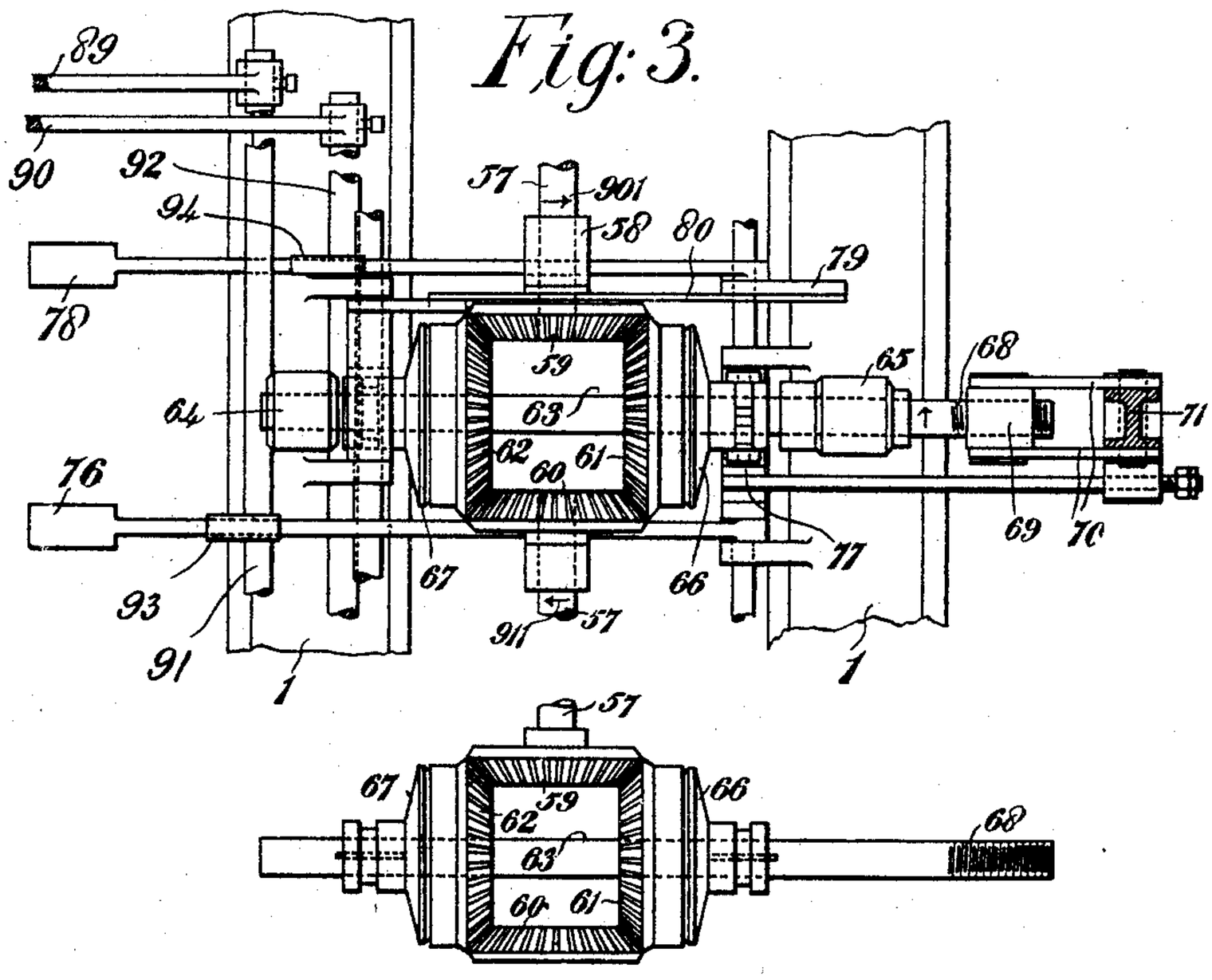
4 SHEETS—SHEET 3.

Fig: 3.



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4 SHEETS—SHEET 4.

Fig: 4.

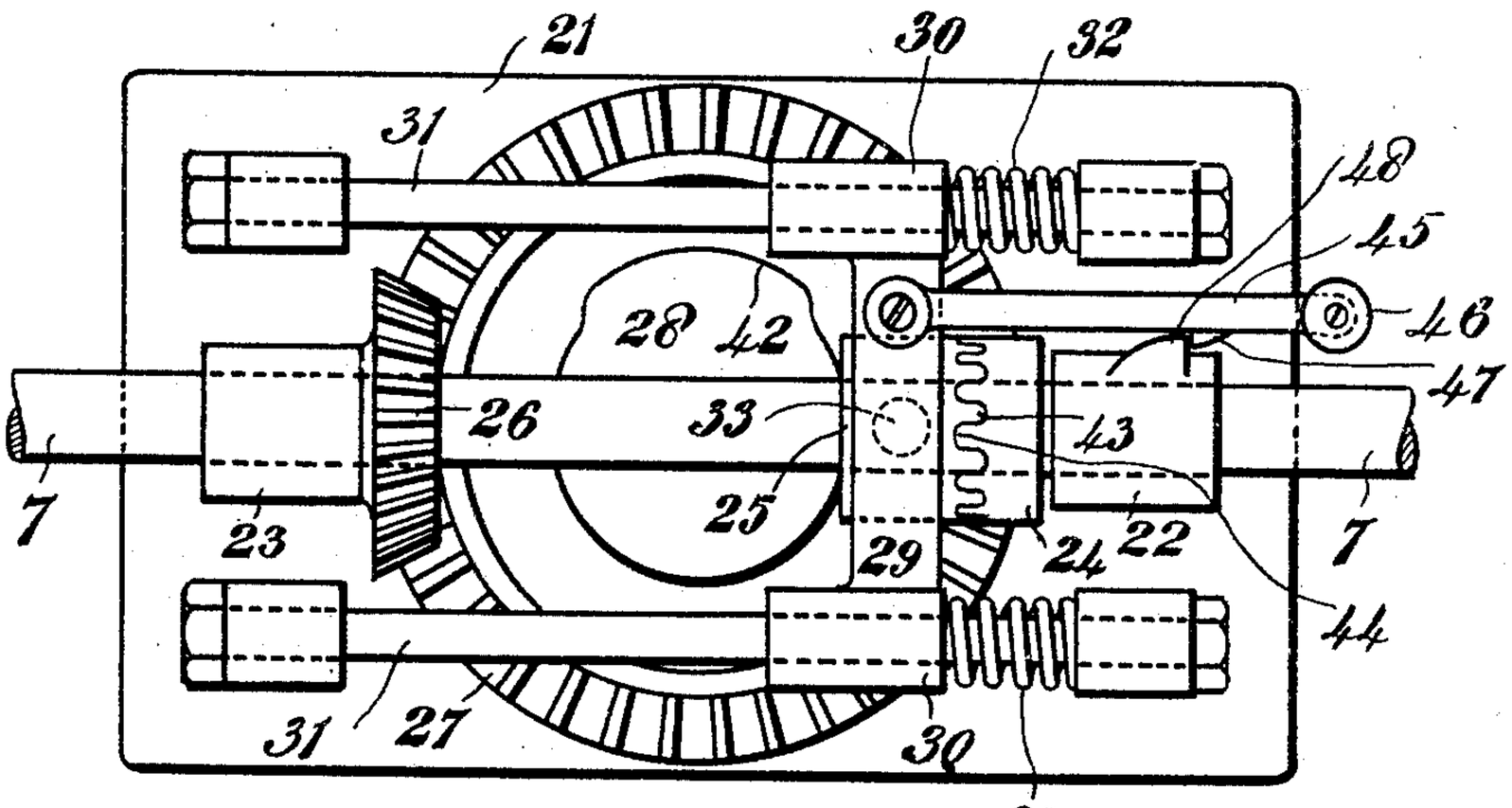


Fig: 5.

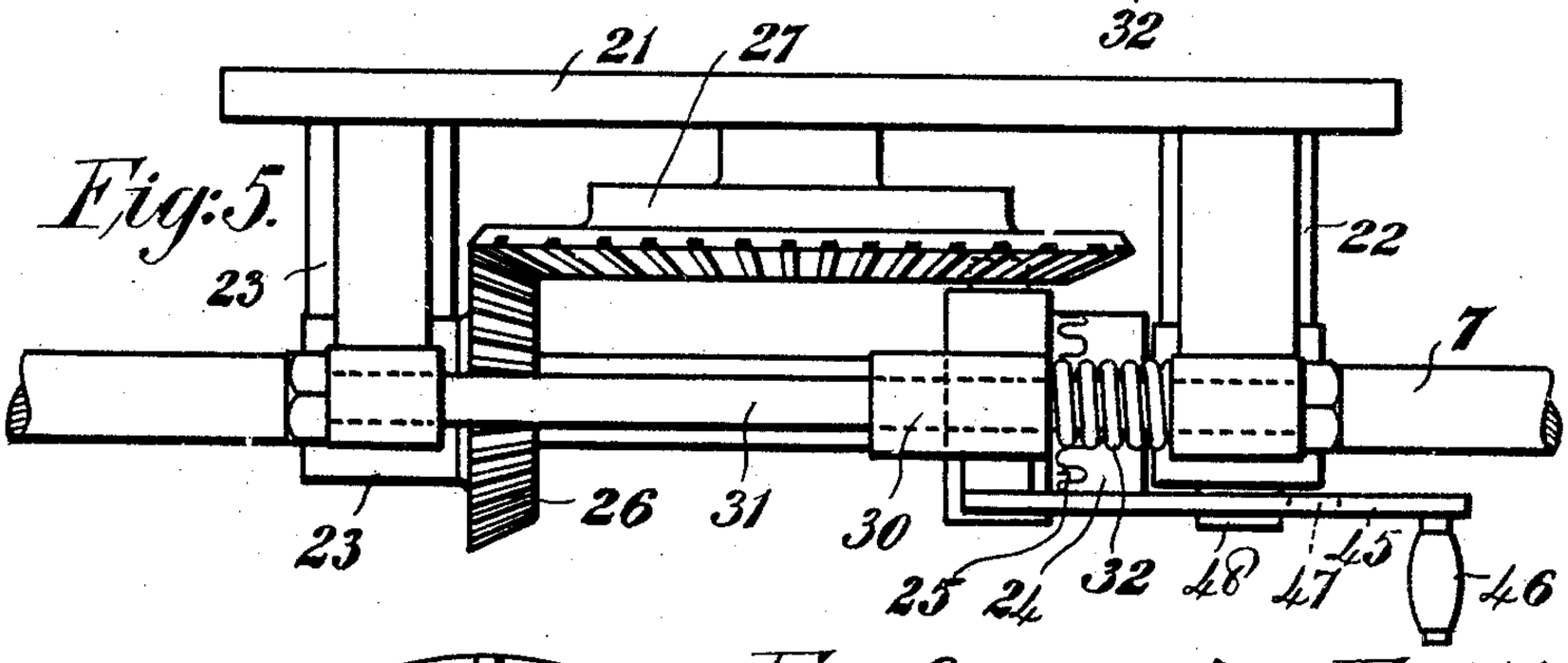


Fig: 6.

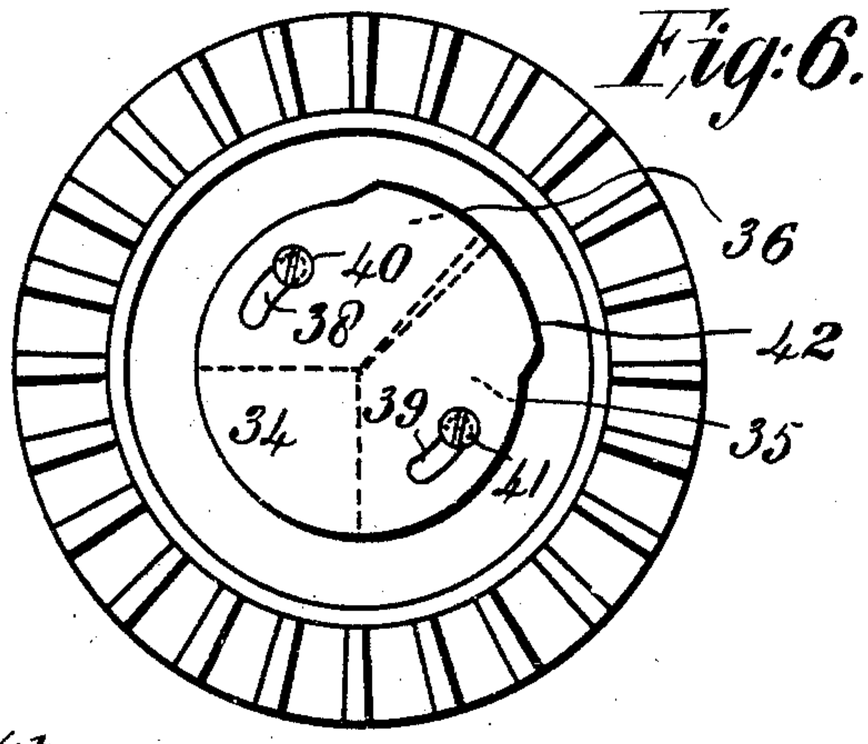
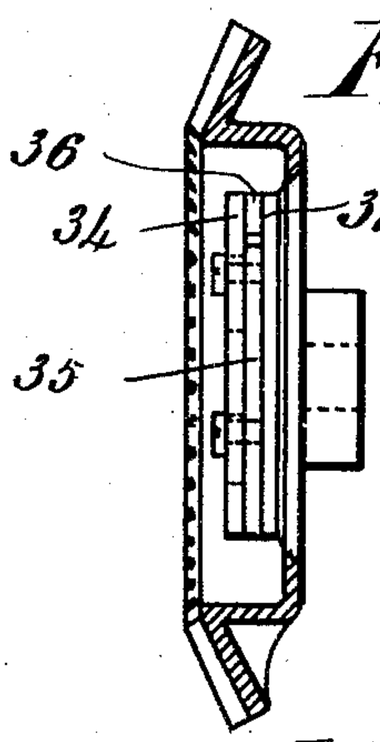


Fig: 7.



Witnesses:

H. A. Cushman

"

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No. 791,102. Patented May 30, 1905.

UNITED STATES PATENT OFFICE.

GEORGE SKAATS MAYHEW, OF LONDON, ENGLAND, ASSIGNOR TO GEORGE WILLIAM MELLOR, OF LONDON, ENGLAND.

MACHINE FOR FORMING COMPOUND DEALS.

SPECIFICATION forming part of Letters Patent No. 791,102, dated May 30, 1905.

Application filed November 23, 1904. Serial No. 233,980.

To all whom it may concern:

Be it known that I, GEORGE SKAATS MAYHEW, a citizen of the United States of America, residing at 2 Basinghall avenue, in the city and county of London, England, have invented a new and useful Improved Machine for Forming Compound Deals, of which the following is a specification.

My invention relates to an assembling-machine for producing compound deals. These compound deals are comprised of waste wood or nearly waste wood, the pieces being of relatively small and irregular sizes as to thickness, length, and breadth. In order to produce the deal, the pieces of wood are first thoroughly dried and smoothed and instead of being cut into small strips their faces are cemented with a very small quantity of thin strong waterproof glue size or other waterproof material and are then joined together into compound deals or blocks by aid of pressure.

The object of the present invention is to provide a machine capable of producing the above-described deals in a quick and efficient manner.

The machine of my invention is so devised that each layer of wood is pressed against the preceding one as the deal is built up in the machine, so that the finished product forms a whole integrally united throughout.

My invention comprises a bottom clamp extending throughout the length of the machine and adapted to slide on the table of the machine, operating in conjunction with a series of top clamps, all said clamps being driven by suitable mechanism, so as to press the pieces of wood together and to form the deal as above described.

My invention is more particularly described with reference to the accompanying drawings, in which—

Figure 1 shows an isometric view of the front of the machine. Fig. 2 shows a section of Fig. 1. Fig. 3 shows a partial plan view of the top-clamp-operating mechanism. Fig. 4 shows a detail view of the automatic mechanism for giving a step-by-step movement to the continuous bottom clamp, and Figs. 5, 6, and 7 show detail views of an adjustable cam of the step-by-step mechanism.

Referring now to the drawings, I provide a suitable framework 1, provided with an inclined table 2, supporting a series of guides 3. Preferably the two outer guides and the two inner guides of said series of guides are each provided with a traversing screw 4, as shown in dotted lines, said screws being provided at one end with a bevel-wheel 5, engaging a bevel-wheel 6, mounted upon the main shaft 7 of the machine. The shaft 7 is rotated through a pair of cone-clutches 8 and 9, adapted to be clutched to the driving-pulleys 10 and 11, which are driven in opposite directions from the source of power by any convenient means. The said pulleys 10 and 11 are mounted loosely upon the main shaft 7, and the cones 8 and 9 are feather-keyed upon said shaft.

The cone 8 is operated by means of the pedal 12, through a rod 13 and bell-crank lever 14, so as to bring it into engagement with the pulley 10, and the cone 9 is likewise brought into engagement with the pulley 11 by means of the pedal 15, through a rod 16 and bell-crank lever 17.

It will be clearly seen that, supposing the pulleys 10 and 11 are driven in the direction of the arrows 18 and 19, respectively, in order to produce an upward movement of a clamp 20, extending the length of the machine and mounted on the above-mentioned traversing screws 4 and the guides 3, the operator will press down the pedal 15, thereby bringing into engagement the clutch 9 with the pulley 11. In the same manner if it is required to produce a downward movement of the above-mentioned clamp 20 the operator will press down the pedal 12, and so bring the clutch 8 into engagement with the pulley 10.

In order to give the above-mentioned clamp 20 a step-by-step motion, I have arranged in the main shaft a clutch mechanism (shown in Figs. 4 and 5) supported in a convenient position upon the main framework of the machine between the part of the main shaft supporting the above-mentioned cone-clutches 8 and 9 and a part of the main shaft

carrying the bevel-wheel 6, said clutch mechanism forming a coupling for said parts of the main shaft, as hereinafter described. The said step-by-step mechanism is mounted on a plate 21, fixed to the framework of the machine, and carries two bearings 22 and 23, supporting the adjacent ends of the divided main shaft 7. At a short distance in front of the bearing 22 and at the end of the part of the main shaft carrying the bevel-wheel 6 I mount, as shown in Figs. 4 and 5, one member 24 of a clutch, the other member of said clutch being mounted on the adjacent end of the part of the shaft 7 supporting the above-mentioned cone-clutches 8 and 9. The member 24 of the clutch is securely keyed upon its end of the divided shaft 7, while the member 25 is slidingly keyed upon its end of the shaft. Upon the shaft 7 is mounted a bevel-wheel 26, engaging with an idle running bevel-wheel 27, which has mounted on its face an adjustable cam 28. The aforementioned member 25 of the clutch supports a cross-bar 29, provided at its ends with guideways 30, adapted to slide upon guide-rods 31 31. Two springs 32 32 normally press a pin or roller stud 33 on the cross-bar 29 and shown in dotted lines in Figs. 4 and 5, into engagement with the aforementioned cam 28. The latter, as shown in Figs. 6 and 7, is comprised of two outer plates 34 and 37, which are relatively fixed to one another and have between them an inner plate divided into two parts 35 and 36, made capable of adjustment by means of slots 38 and 39 and set-screws 40 and 41, so that the cam may be extended or contracted, as desired, in order to give a correct amount of movement to the lower clamp 20, as hereinafter described.

It will be readily understood that the bevel-wheel 26, mounted on the cone-clutch part of the shaft 7, will rotate in one or the other direction, according to whether the pedal 12 or 15 is operated, as above described, and will rotate the bevel-wheel 27, so that the projection 42 of the cam engages with the roller 33, mounted on the clutch member 25, at every revolution of said cam.

It will be evident that as long as the projection 42 upon the cam 29 is in engagement with the roller 33, attached to the clutch member 25, the latter will be in engagement with the opposite clutch member 24, mounted upon the part of the main shaft 7 supporting the bevel-wheel 6, and said part of the main shaft will be rotated until the projection 42 has passed the roller 33, when the springs 32 will press back the cross-bar 29 with the clutch member 25, moving the latter out of engagement with the clutch member 24 until the projection 42 again strikes the wheel 33.

As above described, if it is desired to produce an upward movement of the clamp 20 the operator will press down the pedal 15, thereby bringing into engagement the clutch 9 with the pulley 11, and the clutch member 25 will be engaged with the clutch member 24 when the cam projection 42 comes into engagement with the roller 33, and thereby rotating the main shaft, and so rotating the traversing screws 4 through the bevel-wheels 6 and 5, so as to give an upward movement to the clamp. In the same manner if it is desired to bring the clamp down the operator will press upon the pedal 9, thereby reversing the movement of the main shaft and the traversing screws.

The aforesaid cam and mechanism are merely for the purpose of obtaining a predetermined movement of the clamp 20 while the deal is being assembled, as will be obvious the amount of movement depending upon the ratio of the gear-wheels 26 and 27, the traversing screws 4, and the cam projection 42, which latter is adjustable, as above described. In practice the bevel-wheels 26 and 27 and the screws 4 will preferably be constant, while the cam will be variable within limits to give the utmost range of movement to the clamp desired. When the said step-by-step or intermittent movement is not required and it is only desired to move the clamp 20 continuously up or down the table of the machine, I arrange the clutch-teeth 43 44 of the above-mentioned clutch members 24 and 25 so as to give a wider range of movement than is necessary for operating the clamp 20, so that by means of a handle 46 and a link 45, attached to the cross-head 29, I am able to move the clutch 25 against the pressure of its controlling-springs 32 32 clear of the path of the cam 42. In order to hold the clutch member 25 permanently in engagement with the clutch member 24 in this position, I arrange a catch 47, adapted to engage with a projection 48 upon the bearing 22.

In order to prevent the clamp 20 from being run too far down the table, I provide a stop 49 at the end of said clamp, adapted to engage an adjustable trip 50, mounted upon a rod 51, sliding in suitable guides 52, attached to the table of the machine, as shown in Fig. 1. Upon the lower end of the rod 51 I mount a wedge-shaped projection 53, adapted to bear against the end of the bar 86, said bar in turn operating the end of the bell-crank lever 54. The said bar 86 is mounted in a bracket 55, secured to the main framework of the machine, said bracket also supporting the aforementioned pedal bell-crank lever 14.

The operation of this device is as follows: Assuming the operator has continued to keep his foot upon the pedal, bringing down the clamp 20 too long, the projection 49 is brought into engagement with the trip 50, thereby bringing down the bar 51 and forcing the wedge-shaped projection 53 against

the end of the bar 86 and moving the latter in the direction of the arrow, thereby turning the bell-crank 54 and bringing the cone 8 out of engagement with the pulley 10, and so arresting any further movement of the clamp 20. The rod 51 is provided with a spring 95, adapted to bring it back into position when the lower clamp 20 is moved up the table again. I arrange on the aforementioned guides 3 a series of upper independently-operated clamps 56, adapted to move through a relatively small distance toward the above-mentioned bottom clamp 20, extending the whole length of the machine, and in order to move the upper clamps I arrange a shaft 57 in a suitable position beneath the table of the machine, as shown in Figs. 2 and 3, and carrying a series of fixed bevel-wheels 59 and 60, adapted to engage with other bevel-wheels 61 and 62, mounted on a series of counter-shafts 63, said counter-shafts being supported in bearings 64 and 65, as shown.

I will describe one element of the above gearing adapted to move one of said series of upper clamps either toward or away from the bottom clamp 20. In said element the bevel-wheels 61 and 62 are loosely mounted upon the shaft 63, but are capable of being connected with said shaft by means of the sliding cone-clutches 66 and 67. The end 68 of the shaft 63 is screwed and provided with a nut 69, having attached thereto links 70, connected to a rocking arm 71, arranged at the back of the machine, pivoted at 72 and connected to the pusher-bar 73 of the upper clamp 56 by means of a pin 74 passing through a slot 75 in said pusher-bar, as shown in Fig. 2.

In order to move the upper clamp 56 downward toward the lower clamp 20, the operator places his foot upon the pedal 76 and through the medium of the bell-crank 77 brings the cone 66 into engagement with the bevel-wheel 61, thus locking said bevel-wheel 61 to the shaft 63, and thereby causing the rotation of the driving-shaft 57 to be communicated to said counter-shaft 63 in the direction indicated by the arrow and forcing outward the nut 69, carrying with it the arm 71, and thus bringing down the upper clamp 56 toward the lower clamp 20.

In order to reverse the direction of the clamp 56—that is to say, to move it up the table away from the clamp 20—the operator places his foot upon the pedal 78, which in turn operates the bell-crank lever 79, the links 80, and the fork-lever 81, thereby operating the cone-clutch 67 and bringing it into engagement with the bevel-wheel 62, which in turn transmits the rotation of the shaft 57 to the counter-shaft 63 in the opposite direction to the motion said shaft received when the cone-clutch 66 was brought into engagement with the bevel-wheel 61, and thereby screwing the nut 69 inward, and with it the lower end of the rocking arm 71, and so moving outward or up the table the clamp 56.

From the foregoing it will be understood that the upper sectional clamp comprises a series of clamps 56, which are movable independently of each other, and that each of said clamps 56 is provided with its own operating mechanism; also, that each of said operating mechanisms, which are duplicates of the mechanism shown in Fig. 3, is controlled by pedals 76 and 78, as above described, a series of these controlling-pedals being provided, as shown in Fig. 1. Owing to this feature of the sectional upper clamp comprising the series of independently-movable upper clamping elements, the machine is adapted for building up long deals, one section at a time, from pieces of wood, many of which may be comparatively short, and thus much of what might otherwise be waste material may be utilized in the built-up deals. This operation is facilitated by the inclined position of the table 2, supporting the guides 3, and the clamps movable up and down on said guides.

In order to prevent the deal from being crushed between the clamps, I arrange the aforementioned pin 74 in the slot 75 of the pusher-bar, and in said pusher-bar 73 I arrange a spring 82, said spring being connected to the pusher-bar 73 by means of the bolt 83 at one end and connected at the other end to a link 84 by means of the bolt 85, which latter is connected to the pin 74. By this arrangement when the arm 71 is rocked, so as to bring the clamp 56 down the table and compress the deal between it and the clamp 20, said clamp will continue to travel until it meets the resistance of the board. The spring 82 will then be brought into play, sufficient movement being allowed by the slot 75.

When the clamp 56 has imparted sufficient pressure to the deal—that is to say, when it is at the end of its stroke—the lower end of the arm 71 strikes against a nut 87, which in turn operates the bell-crank lever 77 through the medium of the rod 88, thus bringing the cone 66 out of engagement with the bevel-wheel 61, and thereby arresting the rotation of the counter-shaft 63 and the further movement of the clamp 56.

In the arrangement shown the shaft 57 is divided into a number of short shafts arranged between the separate elements and coupled to one another by means of the bevel-wheels 59, 60, 61, and 62. Each of said short shafts will rotate in the opposite direction to the one in front of it in the series—that is to say, the shaft next to the shaft moving in the direction of the arrow 901, (shown in Fig. 3) will rotate in the direction of the arrow 911, and therefore the gearing in the element driven by the latter shaft will rotate in the opposite direction to the element in front of it, so that in order to get said series of upper

clamps to move together in an upward and downward direction it is necessary to arrange the screws 68 at the end of the shafts 63 alternately right-handed and left-handed.

In order to raise or lower the whole series of clamps 56 simultaneously, I arrange a pair of hand-levers 89 and 90, as shown in Figs. 1 and 2, adapted to rotate, respectively, the shafts 91 and 92, respectively provided with a series of cams 93 and 94, bearing against the pedals 76 and 78. When it is desired to bring the whole series of clamps 56 down the table toward the lower clamp 20, the operator brings down the hand-lever 89, thereby pressing down the pedals 76 through the cams 93 and moving the clamps 56 down the table, as described above. In the same manner by bringing down the hand-lever 90 the pedals 78 are pressed down by the cams 94, and the clamps 56 are moved up the table.

The operation of the machine is as follows: The lower clamp 20 is first moved up the table into a position close to the series of upper clamps 56, sufficient space being left between said lower clamp and the series of upper clamps to allow of the insertion of a board. A second board or a number of waste pieces of wood which have been previously coated with cement are then inserted between the aforementioned board and the series of clamps 56. The operator then places his foot upon the pedals 76 and brings down the clamps 56 until sufficient pressure has been given, when said clamps are arrested by the automatic means above mentioned. The lower clamp is then brought down either directly to the distance desired by the operator or if the step-by-step motion is in operation automatically to the distance to which the cam has been set to move it, and a further plank or a number of waste pieces of wood are inserted between the previously-inserted plank or pieces of wood and the upper clamps, which are then again brought down, pressing the wood together into one deal. After this operation the lower clamp is again moved another step down and further pieces of wood are inserted and compressed. In this manner I am enabled to produce a compound deal out of waste wood or nearly waste wood in pieces of relatively small or irregular sizes, both as to thickness, length, and breadth, in a quick and efficient manner.

What I claim is—

1. In a machine for assembling compound deals, the combination with a table provided with a series of guides, of a lower clamp movable up and down on said guides, power-driven means for operating said lower clamp, a series of independently-operated upper clamps also movable on said guides, and power-driven means for independently operating said upper clamps, substantially as described.

2. In a machine for assembling compound deals, an inclined table provided with a series of guides, a lower clamp moving on said guides, traversing screws arranged in said guides adapted to move said lower clamp up or down the table, bevel-wheels mounted on said traversing screws engaging with bevel-wheels mounted on a driving-shaft, clutch mechanism operating said driving-shaft, means for automatically disconnecting the clutch mechanism of said driving-pulleys and stopping said lower clamp at its lowest position on said table, a series of upper clamps moving on said guides and power-driven means for independently operating said upper clamps, substantially as described.

3. In a machine for assembling compound deals, an inclined table provided with a series of guides, a lower clamp moving on said guides, traversing screws arranged in said guides adapted to move said lower clamp up or down the table, bevel-wheels mounted upon said traversing screws engaging with bevel-wheels mounted upon a driving-shaft, a pair of loose driving-pulleys running in opposite directions mounted on said driving-shaft, cone-clutches sliding on said shaft engaging with and adapted to lock one or other of said loose pulleys to said shaft, pedal mechanism for operating said cone-clutches, cam-and-clutch mechanism adapted to give said shaft an intermittent motion, a series of upper clamps moving on said table and power-driven means for independently operating said upper clamps, substantially as described.

4. In a machine for assembling compound deals, an inclined table provided with a series of guides, a lower clamp moving on said guides, traversing screws arranged in said guides adapted to move said lower clamp up or down the table, bevel-wheels mounted upon said traversing screws engaging with bevel-wheels mounted upon a divided driving-shaft, a pair of loose driving-pulleys running in opposite directions mounted on said shaft, cone-clutches sliding on said shaft engaging with and adapted to lock one or other of said pulleys to said shaft, pedal mechanism operating said cone-clutches, clutch members mounted upon the adjacent divided ends of said shaft, lever mechanism adapted to move said clutch members into engagement and to couple the parts of said divided shaft, an adjustable cam adapted to move said lever mechanism intermittently, springs for moving said clutch members out of engagement, beveled gearing adapted to rotate said cam and transmit motion from the said driving-pulleys, means for automatically disconnecting the clutch mechanism of said driving-pulleys and stopping said lower clamp at its lowest position on the ta-

ble, a series of upper clamps moving on said table and means for operating said upper clamps, substantially as described.

5. In a machine for assembling compound deals, an inclined table provided with a series of guides, a lower clamp moving on said guides, traversing screws arranged in said guides adapted to move said lower clamp up or down the table, bevel-wheels mounted on said traversing screws engaging with bevel-wheels mounted upon a driving-shaft, clutch mechanism operating said driving-shaft, a stop arranged at one end of said lower clamp engaging with an adjustable strip mounted on a rod sliding at the end of said table, a wedge-shaped projection mounted at the end of said sliding rod adapted to bear against the end of a sliding bar, a bell-crank lever operated by said sliding bar and adapted to disconnect said clutch mechanism and stop the rotation of said driving-shaft, a series of upper clamps moving on said guides and means for operating said upper clamps, substantially as described.

6. In a machine for assembling compound deals, a table provided with a series of guides, a lower clamp moving on said guides, means for operating said clamp, a series of upper clamps moving on said guides, a series of spring-controlled pusher-bars attached to said upper clamps, a series of rocking arms operating said spring-controlled pusher-bars, a series of screws engaging the lower ends of said rocking arms, a series of clutches and bevel-gearing rotating said screws, a driving-shaft rotating said bevel-gearing, pedal mechanism operating each of said series of clutches and bevel-gearing independently, hand-levers and a series of cams operating said series of clutches and bevel-gearing simultaneously and means for disconnecting said clutches and stopping the rotation of said screws when said upper clamps are at the end of their stroke, substantially as described.

7. In a machine for assembling compound deals, an inclined table provided with a series of guides, a lower clamp moving on said guides, means for operating said lower clamp, a series of upper clamps moving on said guides, a series of pusher-bars attached to said upper clamps, a series of rocking arms operating said pusher-bars, a series of screws engaging the lower ends of said rocking arms, means for rotating said screws, a series of nuts adapted to be engaged by said series of rocking arms when said upper clamps are at the end of their stroke, a series of lever mechanism operated by said nuts adapted to stop the rotation of said screws operating said rocking arms and upper clamps, substantially as described.

8. In a machine for assembling compound deals, the combination of a suitable framework or support provided with a series of guides, a lower clamp movable up and down on said guides, power-driven mechanism for operating said clamp, a sectional upper clamp device, power-driven mechanism for independently operating the sections of said upper clamp device, and springs for softening the clamping action of the clamps to prevent the deals from being crushed by too much clamping pressure.

9. In a machine for assembling compound deals, the combination of a suitable framework or support provided with a series of guides, a lower clamp movable up and down on said guides, power-driven mechanism for imparting relatively long traversing movements to said lower clamp, a sectional upper clamp device, and power-driven mechanism for imparting independent and relatively short traversing movements to the sections of said upper clamp device.

10. In a machine for assembling compound deals, the combination of a suitable framework or support provided with a series of guides, a lower clamp movable up and down on said guides, power-driven mechanism for imparting relatively long traversing movements to said lower clamp, a sectional upper clamp device, power-driven mechanism for imparting independent and relatively short traversing movements to the sections of said upper clamp device, and springs for softening the clamping action of the clamps to prevent the deals from being crushed by too much clamping pressure.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE SKAATS MAYHEW.

Witnesses:
ARTHUR J. STEPHENS,
LEONARD E. HAYNES.