No. 891,500. PATENTED JUNE 23, 1908.

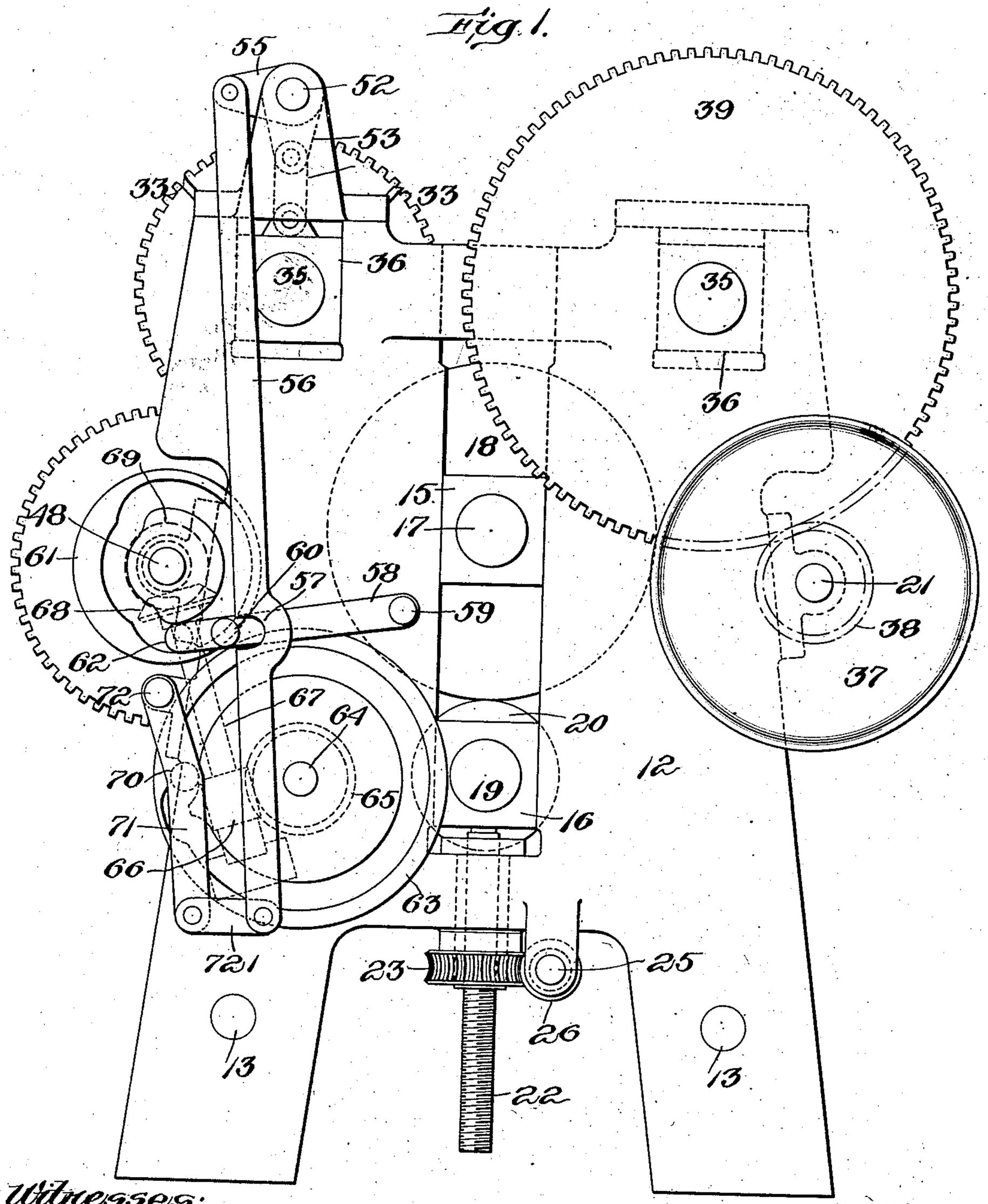
F. C. OVERBURY.

MACHINE FOR CUTTING SHINGLE STRIPS, &c.

APPLICATION FILED JUNE 26, 1907.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Forest Roulstone

E. Batchelder

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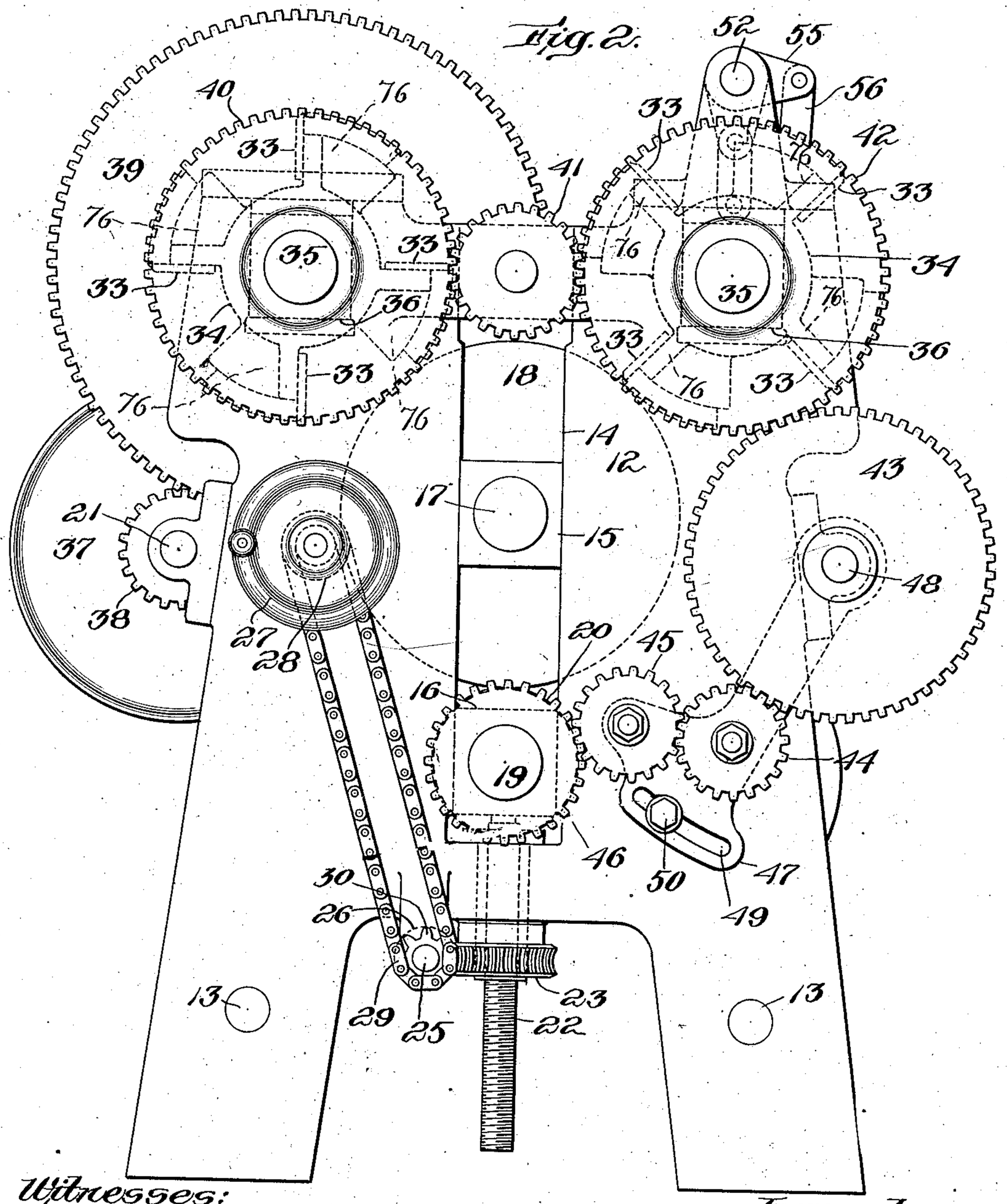
3 SHEETS—SHEET 2.

Fig. 2.



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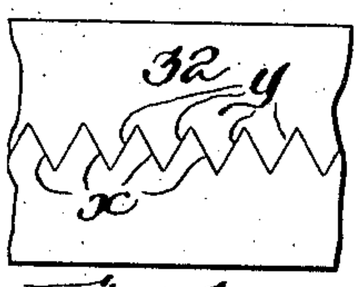

Fig. 4.

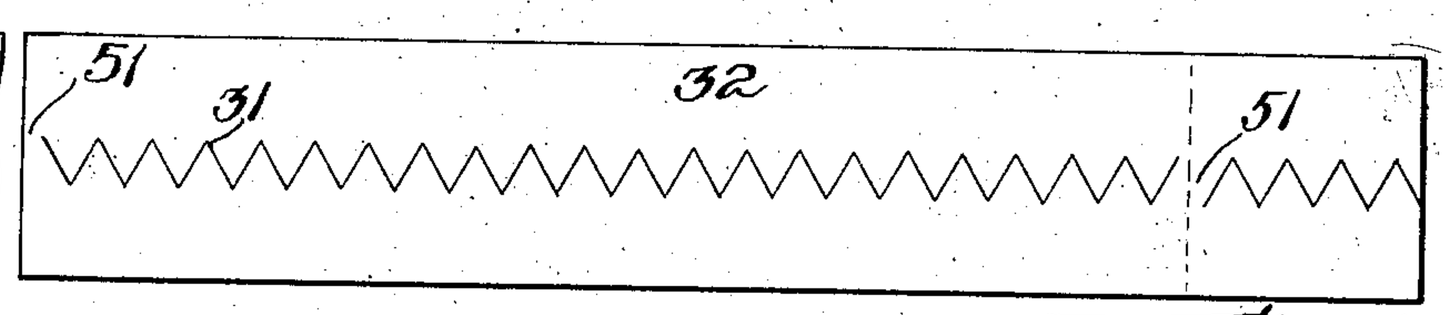

Fig. 5

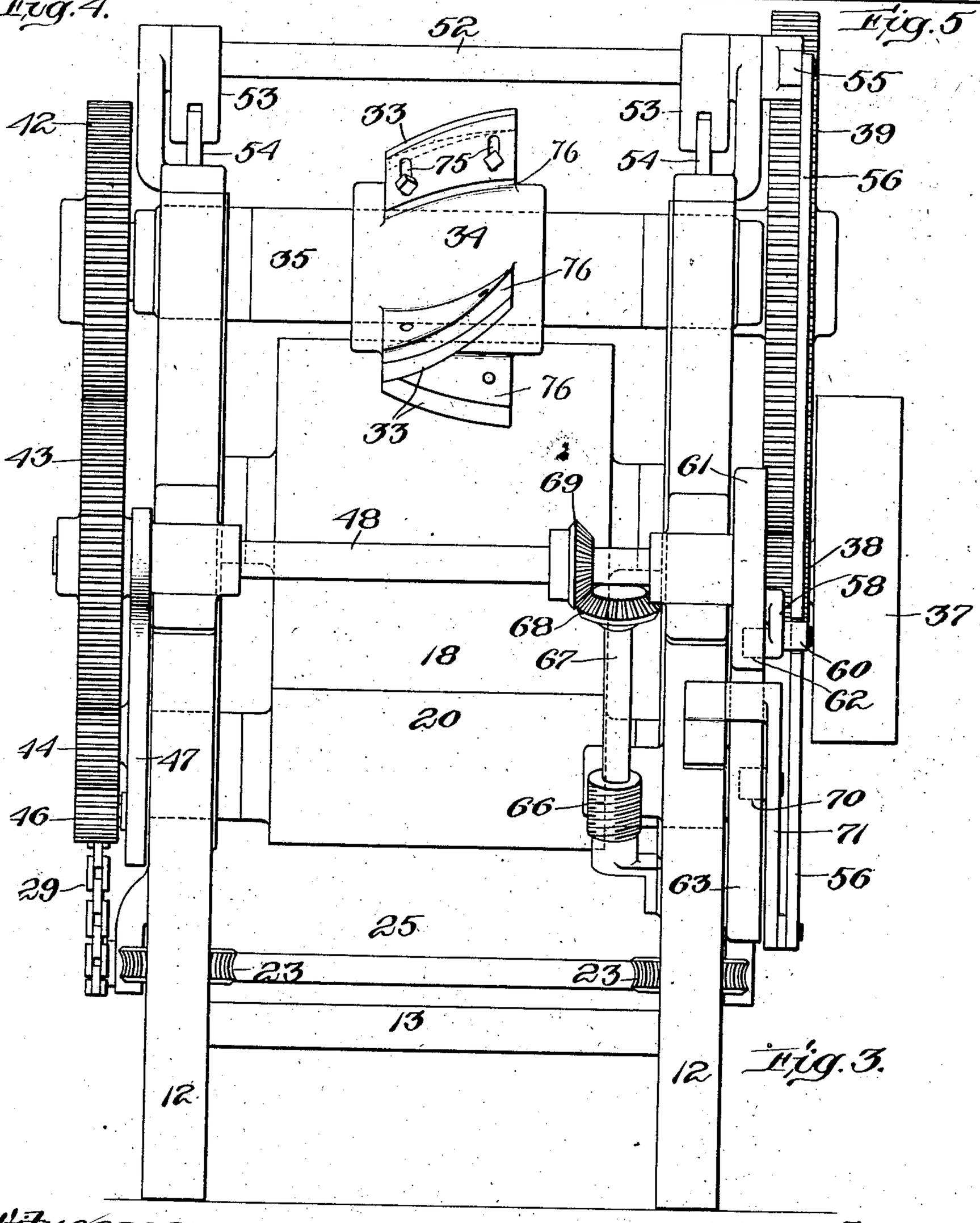

Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK C. OVERBURY, OF NEW YORK, N. Y., ASSIGNOR TO FLINTKOTE MANUFACTURING COMPANY, OF RUTHERFORD, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR CUTTING SHINGLE-STRIPS, &c.

No. 891,500. Specification of Letters Patent. Patented June 23, 1908.

Application filed June 26, 1907. Serial No. 380,855.

To all whom it may concern:

Be it known that I, FREDERICK C. OVERBURY, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Cutting Shingle-Strips, &c., of which the following is a specification.

This invention relates to machines for forming a longitudinal cut between the edges of a web or sheet of flexible material, such as that employed for coverings of roofs and walls of buildings, and usually denominated roofing material.

The invention has especial reference to means for making a zig-zag longitudinal cut, which divides a web or sheet of roofing material into two roofing strips, each having a serrated edge composed of alternating tongues and recesses. When the strips are laid upon a roof, the serrated edges are exposed, and give the roof a desirable diversified appearance similar to that produced by pointed shingles.

The invention has for its object first to provide a simple and effective machine for making a zig-zag longitudinal cut in a sheet or web of roofing material, the machine having suitable provisions for compensating for wear of the parts or members of the cutting apparatus.

The invention also has for its object to enable the longitudinal cut to be interrupted at intervals, to the end that the two serrated strips formed by the longitudinal cut, may not be entirely separated from each other, but will be connected at intervals by uncut portions of the sheet or web, so that the sheet or web, as a whole, may be wound into a roll or coil which is composed of two nearly independent serrated roofing strips which are locked together by the uncut portions of the sheet, so that the tongues of one strip occupy the recesses between the tongues of the other strip in the coil or roll, the tongues of both strips being thus protected and prevented from distortion and injury, while the coil is in storage or transit.

The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents an end elevation of a strip-cutting machine embodying my invention. Fig. 2 represents an elevation of the end of the machine opposite that shown in Fig. 1. Fig. 3 represents a rear elevation of the machine shown in Figs. 1 and 2. Fig. 4 represents a side view of a portion of a sheet or web illustrating the method of forming the zig-zag cut therein. Fig. 5 represents a side view of a longer portion of the web showing interruptions of the cut at stated intervals.

The same reference characters indicate the same parts in all the figures.

In the drawings the frame of the machine is represented as composed of the two side portions 12 12 and suitable tie rods or braces 13 connecting the side pieces. Each side piece has a vertical slot or opening 14, the sides of which constitute guides for movable bearings 15 16 which are movable vertically in the openings 14. In the bearings 15 are journaled the end portions of a loose or idle shaft 17, to which is affixed an idle bed roll 18, preferably made of paper or otherwise dense fibrous material, adapted to coöperate with the cutting knives hereinafter described. In the bearings 16 are journaled the end portions of a shaft 19, to which is affixed a carrier roll 20, the latter constituting a support for the idle bed roll 18. The shaft of the carrier roll is positively driven by gearing, hereinafter described, connecting said shaft with the driving shaft 21, and is supported with the carrier roll preferably in such manner that the carrier roll may be adjusted vertically to compensate for wear of the bed roll caused by the action of the cutting knives, hereinafter described, on the periphery of the bed roll. The means here shown for adjusting the carrier roll 20 comprise vertical, screw-threaded shafts 22 engaged with nuts 23, which are formed externally as worm gears, and are journaled in bearings in the supporting frame, so that they may be rotated without vertical movement, their rotation causing the supporting shafts 22 to rise or fall, according to the direction of rotation. The bearings 19 of the carrier roll shaft are supported by the screw shafts 22, and are raised and lowered by adjustments of the latter. The nuts 23 are simultaneously operated by means of a shaft 25, journaled in bearings on the supporting frame, and provided with worms 26 engaging the worm teeth of the nuts 23. The shaft 25 may be rotated by means of a hand

wheel 27, rotatably mounted on the frame of the machine, a sprocket wheel 28 affixed to the hub of the hand wheel, and a sprocket chain 29 connecting the sprocket wheel 28 with a sprocket wheel 30 affixed to the shaft 25.

I employ a plurality of cutting knives 33, which are arranged to coöperate with the periphery of the bed roll in forming a longitudinal zig-zag cut 31 in a web or sheet 32 of roofing material, as shown in Fig. 5. The said knives are preferably arranged in two series, and on two rotary carriers 34 having axes of rotation which are parallel with the axis of the bed roll, said carriers being located above the bed roll, and on opposite sides of the vertical plane of the axis of the latter, as shown in Figs. 1 and 2. The said carriers 34 are preferably hubs or collars affixed to shafts 35 which are journaled in bearing blocks 36 located in openings in the upper portions of the sides of the supporting frame, the said shafts and the carriers being positively located by the gearing hereinafter described. The knives 33 on each carrier are inclined or obliquely arranged relatively to the axis of the carrier, the knives of one carrier being inclined in one direction, while the knives of the other carrier are inclined in the opposite direction, the arrangement being such that the knives of one carrier form a series of parallel cuts x (Fig. 4), while the knives of the other carrier form a series of parallel cuts y, said cuts uniting to form the zig-zag cut 31 shown in Fig. 5. The cutting edges of the knives are of segmental contour, all parts of each cutting edge being an equal distance from the center of the carrier on which it is located, so that each cutting edge cuts progressively through the web or sheet, all parts of each cutting edge coming to a bearing on the periphery of the bed roll.

The cutter-carrying shafts 35 are positively rotated in unison, and in the same direction, by the mechanism next described. The driving shaft 21, to which is affixed a driving pulley 37 engaged with a driving belt or otherwise driven, is provided with a small driving gear 38 meshing with a relatively large gear 39 affixed to one of the end portions of one of the knife-carrying shafts 35. To the opposite end of the same shaft is affixed a smaller gear 40, meshing with an intermediate gear 41, which in turn meshes with a gear 42 of the same size as the gear 40, and affixed to the other knife-carrying shaft 35. The described gearing causes the simultaneous rotation of the two shafts 35 and the knife-carriers thereon.

The carrier roll 20 is rotated by means of the above-described gearing, and in addition thereto a gear 43 meshing with the gear 42, a smaller gear 44 meshing with the gear 43, and an intermediate gear 45 meshing with the gear 44 and with a gear 46 affixed to the shaft 19 of the carrier roll. The carrier roll is thus rotated in the direction required to cause it to rotate the idle bed roll by friction in conformity to the rotation of the knife carriers, as indicated by arrows in Fig. 2.

The above-described mechanism for driving the carrier roll has provisions for compensating for the vertical adjustments of the carrier roll, which are made to compensate for wear of the latter and of the knives. Said provisions, as here shown, are embodied in an arm 47 mounted to swing on the shaft 48, which supports the gear 43, said arm having a segmental slot 49, through which pass set screws 50 engaged with the supporting frame, said screws being adapted to support the arm 47 in different positions. The gears 44 and 45 are mounted on the arm 47. When it becomes necessary to adjust the carrier roll upwardly or downwardly, the arm 47 is given a corresponding adjustment to maintain the proper engagement between the gears 45 and 46.

The web or sheet to be cut is passed between the idle roll and the two knife carriers, and passes from the knife carriers downwardly between the idle roll and the carrier roll, the said web being engaged by the nip of the idle roll and carrier roll, and kept under a constant tension, and fed forward by the rotation of said rolls, aided by the revolving movement of the cutting knives. The knives of the first carrier form the parallel cuts x (Fig. 4), and when these reach the second carrier, they are connected by the parallel cuts y formed by the knives of the second carrier. The cut is therefore complete in the portion of the strip that passes from the second carrier to the nip of the bed roll and the carrier roll. The strip may be guided from the machine after passing the said nip by any suitable means.

To provide for an interruption of the cut at stated intervals, and thus form connecting portions 51 which temporarily connect the two serrated strips together, as shown in Fig. 5, I have equipped the machine with mechanism for moving one of the knife-carrying shafts 35, and preferably the shaft of the first carrier, away from the bed roll sufficiently to lift the knives carried by that shaft out of contact with the web or sheet for a brief period, the knives being immediately returned to their operative engagement with the bed roll. The mechanism for accomplishing this result as here shown is as follows: 52 represents a rock shaft journaled in bearings on the frame above the bearings of the first knife-carrying shaft 35, and connected with the bearings 36 of said shaft by means of short arms 53 affixed to the rock shaft, and links 54 connecting the arms 53 with ears on the bearings 36, said bearings being vertically movable in openings in the supporting frame. The rock shaft 52 is provided with another arm 55, to which is joint-

ed the upper end of a lifting bar 56, said bar being provided with a coupling member 57, here shown as a recess formed in one edge of the bar.

58 represents an oscillatory lifting lever pivoted at 59 to one of the side portions of the frame, and provided with a complemental coupling member 60, here shown as a laterally-projecting stud adapted to enter the recess 57 forming the coupling member on the lifting bar.

61 represents a lifting cam, affixed to the shaft 48, which supports the gear 43 and swinging arm 47. The lifting lever 58 is provided with a trundle roll or stud 62, which enters the cam 61, the latter being formed to swing the lever 58 upwardly and downwardly, the lever being given a downward motion and an upward motion once during each rotation of the shaft 48. The lifting bar 56 is normally held out of engagement with the coupling member 60 on the lifting lever, and is briefly thrown into engagement with said lever by an edgewise movement which causes the coupling member 57 to receive the coupling member 60. When this takes place, the described upward and downward movements of the lifting lever will be imparted to the lifting bar, causing the latter to first raise the knife-carrying shaft through the rock shaft 52 and the described connections, thus lifting the knives carried by that shaft from the bed roll until a short length of the web or sheet has passed uncut, the lifting bar being then moved downwardly, and caused to return the knives carried by the shaft 35 to their position of engagement with the bed roll. The lifting lever is engaged with and disengaged from the lifting bar by means of a trip cam 63, which is mounted to rotate on a short shaft 64 journaled in bearings in one of the side pieces of the supporting frame, the said shaft being provided with a worm gear 65 meshing with a worm 66 affixed to an inclined shaft 67, which is journaled in suitable bearings on the supporting frame, and has at its upper end a bevel gear 68 meshing with a bevel gear 69 affixed to the shaft 48. Provision is thus made for imparting to the trip cam a relatively slow rotation. When the offset or concentric portion of said cam, shown in Fig. 1, reaches a trundle roll 70 on a pendent lever 71, which is pivoted at 72 to the supporting frame, it swings said lever to the left, as viewed in Fig. 1, thus causing a link 721 connecting the lever 71 with the lower end of the lifting bar 56 to move the lifting bar in the same direction, and thus engage its coupling member 57 with the coupling member 60 of the lifting lever 58. This engagement is maintained briefly, and until the offset portion of the cam 63 passes the trundle roll 70, and returns the latter and the lifting lever to the inoperative position shown in Fig. 1. The described mechanism is so timed that the lifting bar is raised, and the knives on the shaft 35 with which it is connected, are made inoperative, after a length of the web or sheet sufficient to form one roll has been provided with a continuous zig-zag cut, the cut being then interrupted briefly, leaving the connecting portion 51 which occurs at the point where the web or sheet is to be severed to convert it into roofing strips.

The arrangement of the cutting knives in two series on separate carriers, one series forming parallel cuts inclined in one direction, while the other series form parallel cuts extending in the opposite direction, is preferred by me because it simplifies the construction of the knives, each knife being a flat blade, which is adapted to be adjustably secured to the carrier by screws passing through slots 75 in the blades, the screws engaging the blade-supporting arms on the carrier. If both series of blades were arranged on one carrier, there would be more or less difficulty in the proper joining of the ends of the blades to form the angles of the zig-zag cut. So far, however, as features of the machine not necessarily dependent on this arrangement of the cutting knives is concerned, the construction may be varied, and all the knives arranged on one carrier without departing from the spirit of the invention.

I do not limit myself to the details of mechanism here shown and described, and the same may be variously modified.

It is obvious that the cutters may be formed and arranged to make alternating tongues and recesses of other than the V-shaped form here shown.

I claim:

1. A machine of the character stated, comprising means for continuously feeding a web or sheet, mechanism for forming therein a severing cut extending lengthwise of the sheet between the edges thereof, and automatic means for making the cutting mechanism intermittently inoperative to interrupt the cut, and form connections between the divisions of the strip.

2. A machine of the character stated, comprising a bed roll, cutting knives opposed to the periphery of the bed roll, means for carrying the knives, the said knives being arranged to extend crosswise of the axis of the bed roll, and form in a sheet or strip passing between the roll and knives, a severing cut extending lengthwise of the sheet between the edges thereof, and automatic means for intermittently interrupting the operative engagement between the roll and knives to interrupt the cut, and form connections between the divisions of the strip.

3. A machine of the character stated, comprising a bed roll, a plurality of rotary carriers, each having a series of knives which are adapted to coöperate with the periphery

of the bed roll, each series of knives being inclined, and the inclination of one series being opposite that of the other series, the two series of knives being arranged to form a longitudinal zig-zag cut in a sheet passed between the bed roll and the knives.

4. A machine of the character stated, comprising a bed roll, a plurality of rotary carriers, each having a series of knives which are adapted to coöperate with the periphery of the bed roll in forming a longitudinal zig-zag cut in a sheet passed between the bed roll and the knives, and mechanism for intermittently moving one of the carriers and its series of knives away from the bed roll, to interrupt the cut.

5. A machine of the character stated, comprising a bed roll, a rotary carrier having knives adapted to coöperate with the bed roll in cutting a sheet passed between the roll and carrier, and means for periodically moving the carrier and its knives away from the bed roll to interrupt the cutting action.

6. A machine of the character stated, comprising a bed roll, a rotary carrier having knives adapted to coöperate with the bed roll in cutting a sheet passed between the roll and carrier, movable bearings for the carrier, and mechanism for intermittently moving said bearings to interrupt the cutting action, said mechanism comprising a rockshaft connected with said bearings, a lifting bar connected with the rockshaft, an oscillatory lifting lever, means for oscillating said lever, and means for periodically engaging the lifting bar with the lifting lever to impart movement through the lifting bar and rockshaft to the knife carrier.

7. A machine of the character stated, comprising a bed roll, a rotary carrier having knives adapted to coöperate with the bed roll in cutting a sheet passed between the roll and carrier, movable bearings for the carrier, a rockshaft connected with said bearings, a lifting bar connected with the rockshaft, and provided with a coupling member, an oscillatory lifting lever having a complemental coupling member, a lifting cam engaged with the lifting lever, and means for periodically shifting the position of the lifting bar to connect and disconnect the said coupling members.

8. A machine of the character specified, comprising a rotary knife carrier, movable bearings therefor, a lifting bar having a coupling member, connections between the bar and the said bearings, a lifting lever having a complemental coupling member, means for oscillating the lifting lever, and means for periodically shifting the position of the lifting bar to engage it with and disengage it from the lifting lever, said means including a tripping cam, and a lever engaged therewith and connected with the lifting bar.

9. A machine of the character stated, comprising a bed roll, cutting knives, and means for carrying the same, said knives being adapted to coöperate with the bed roll, means for revolving the knives, a carrier roll supporting the bed roll, and mechanism for positively rotating the carrier roll and the knife-carrying means.

10. A machine of the character stated, comprising a bed roll, cutting knives, and means for carrying the same, said knives being adapted to coöperate with the bed roll, means for revolving the knives, a carrier roll supporting the bed roll, means for adjusting the carrier roll to compensate for wear of the bed roll, and mechanism for positively rotating the carrier roll and the knife-carrying means.

11. A machine of the character stated, comprising a bed roll, cutting knives, and means for carrying the same, said knives being adapted to coöperate with the bed roll, means for revolving the knives, a carrier roll supporting the bed roll, means for adjusting the carrier roll to compensate for wear of the bed roll, and driving mechanism for the carrier roll and knife-carrying means, said mechanism being adjustable to compensate for adjustments of the carrier roll.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FREDERICK C. OVERBURY.

Witnesses:
JOS. N. MILEHAM,
LUTHER SHAFER.