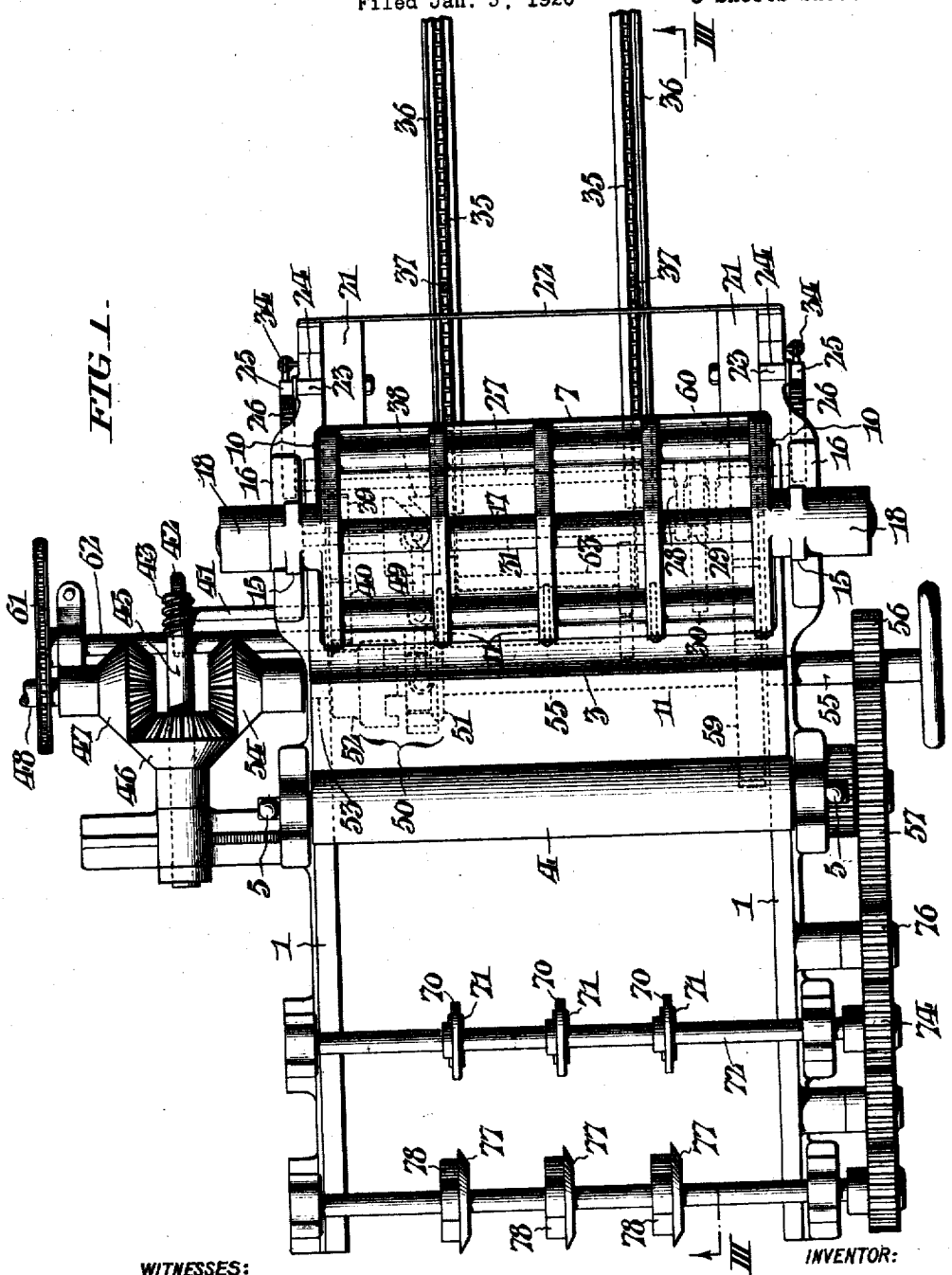
Jan. 15, 1924. 1,481,183

F. A. BROWNE

PRODUCING BITUMINOUS SHINGLES AND THE LIKE

Filed Jan. 3, 1920 3 Sheets-Sheet 1

FIG. 1.



WITNESSES:

John C. Bergner

James H. Ball

INVENTOR:

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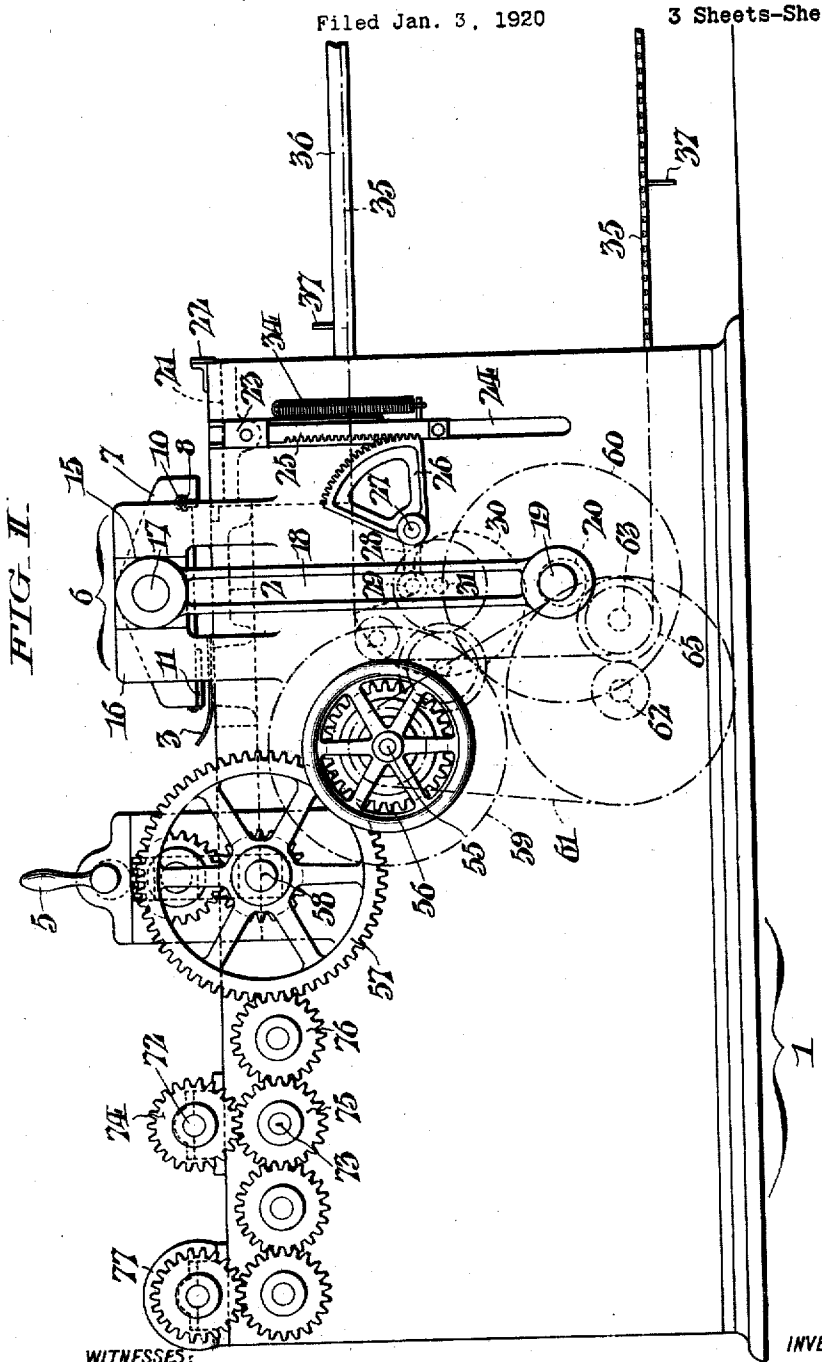
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PRODUCING BITUMINOUS SHINGLES AND THE LIKE

Filed Jan. 3, 1920 3 Sheets-Sheet 2

FIG. II.



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PRODUCING BITUMINOUS SHINGLES AND THE LIKE

Filed Jan. 3, 1920 3 Sheets-Sheet 3

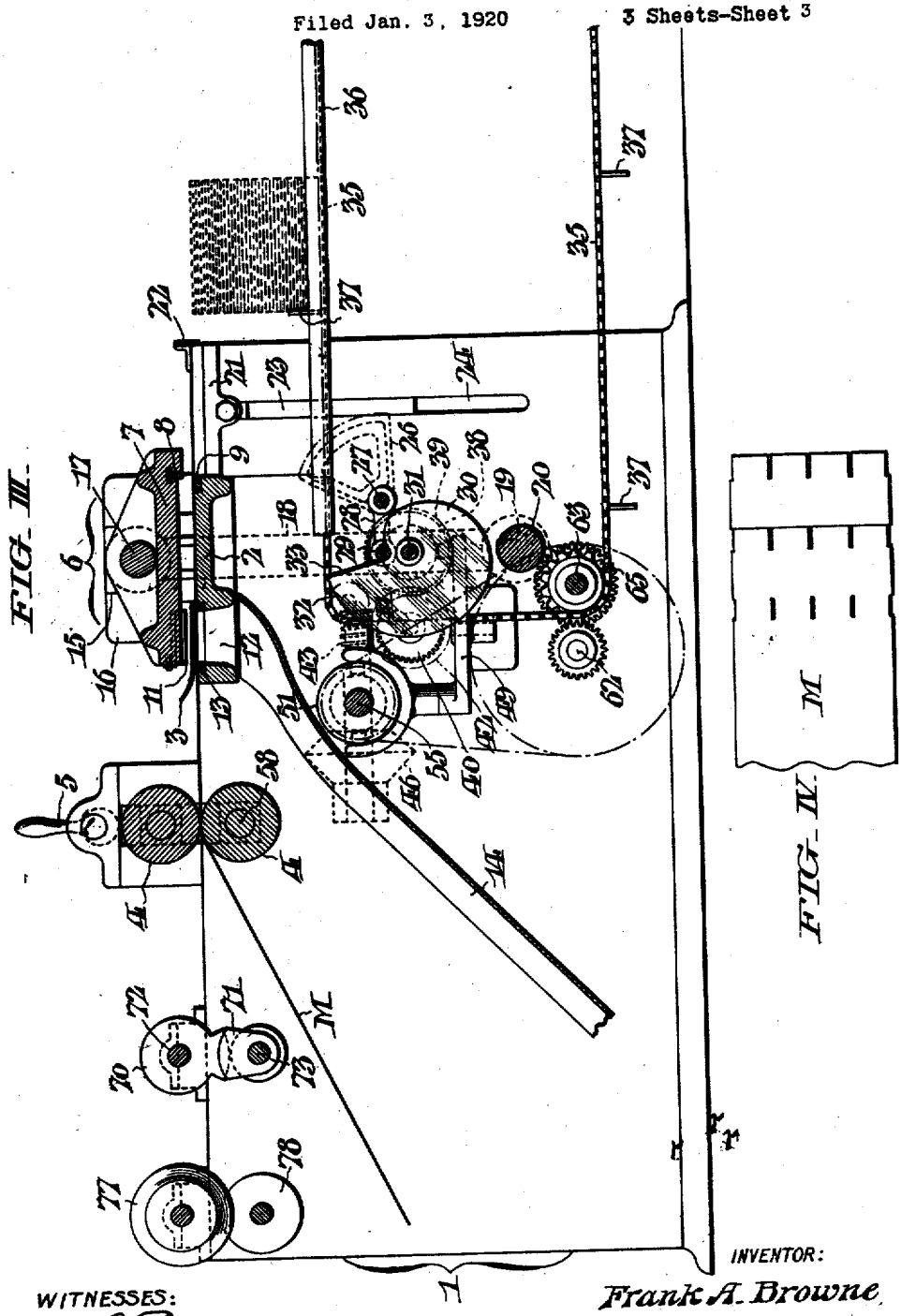


FIG. III.

FIG. IV.

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Patented Jan. 15, 1924. 1,481,183

UNITED STATES PATENT OFFICE.

FRANK A. BROWNE, OF WAYNE, PENNSYLVANIA, ASSIGNOR TO THE BARBER ASPHALT COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

PRODUCING BITUMINOUS SHINGLES AND THE LIKE.

Application filed January 3, 1920. Serial No. 349,309.

To all whom it may concern:

Be it known that I, FRANK A. BROWNE, a citizen of the United States, residing in Wayne, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Producing Bituminous Shingles and the like, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates generally to apparatus for producing bituminous shingles and the like, and more specifically to machines wherein such products are manufactured from prepared sheet material.

The invention is directed to a machine of the above type, which is adaptable for producing either what are commonly known as strip shingles, or when desired, individual shingles of standard dimensions.

The invention comprehends means whereby these shingles, after being cut from a continuous web, are built into stacks of a predetermined number; and also means whereby such stacks, after completion, are removed to any convenient point for subsequent wrapping.

The invention is also in part directed to a novel cutting means by which a sheet may be provided with punchings of any desired shape or size, and previously punched portions at the same time, severed into strips.

The invention further comprehends an apparatus in which the cutting organization above set forth is supplemented by certain auxiliary cutting devices, which may be used in certain operations, in substitution, or, when desired, in connection therewith to produce varied results in the finished product.

The invention also comprehends certain other novel details of construction and arrangement which will become apparent from the detailed description which follows.

In the drawings, Fig. I, is a plan view of an apparatus for producing shingles from sheet material, conveniently embodying my invention.

Fig. II, is a side elevation of the same as viewed from the bottom of Fig. I.

Fig. III, is a longitudinal sectional view of the structure along the line in III—III of Fig. I.

Fig. IV, is a diagrammatic view showing the precise manner in which a strip shingle is formed from a continuous sheet.

As herein represented, the apparatus comprises a frame structure comprehensively indicated at 1, by which the various moving parts are supported. Incorporated with the frame 1, is a table having the form of a plate 2, which may be removably secured to the supporting structure in any convenient manner, and over which the material M, in continuous sheet form is passed under guidance of a flared guard 3, and under propulsion of a pair of relatively superimposed feed rolls 4, 4. These rolls run substantially in contact, and during their operation, sufficient pressure to insure proper feeding, is afforded by means of eccentric devices 5, which are of well known construction and need not be further described herein.

In the course of its travel across the top of the supporting plate 2, the sheet is punched at intervals to provide openings which may be of any desired size or shape, and at the same time severed laterally into strips. These operations are performed by a cutting means 6, which includes a platen 7, adapted to reciprocate vertically over the plate 2. At one end, this platen carries a transversely disposed replaceable cutter 8, which co-operates with an insert cutter 9, set in the edge of the plate 2. As seen in Fig. III, the cutter 8, is of a T shaped cross section and fits within a correspondingly shaped slot in the platen, and is removably secured to the latter by washered screws 10, which engage the ends thereof and hold the same against longitudinal displacement. At the opposite side of the platen are attached a number of punches 11, having the same sectional configuration as the cutter 8, and preferably secured in the same manner. These punches may be made in any desired size or shape depending upon the character of the punching required. In the present instance, these cutters are rectangular in form and so grouped as to punch at the desired intervals, a transverse series of longitudinal slots. In this office, these punches co-operate with openings 12, in the plate 2, said openings being provided with replaceable die facings 13. The punchings dropping through the openings are disposed of by means of a chute 14, which leads to any convenient receptacle, not shown. In addi-

tion to its guiding function, the guard 3, serves as a stripper to prevent the ascending punches 11, from lifting the sheet M as they recede upward. The movements of the platen 7, are so timed that for each of its operations or strokes the end of the sheet is permitted to move beyond the forward edge of the table a distance corresponding to the desired strip or shingle dimension in this direction before lateral severance is effected in the manner suggested in Fig. IV, i. e., along a series of openings formed at the next preceding stroke. In practice, the spacing of the punches with respect to the transverse cutter corresponds either to the width of one, or a larger multiple of the strips finally severed from the sheet. The platen is guided in slide ways 15, formed in offset portions 16, of the frame structure 1, and the trunnions afforded by projecting ends of a shaft 17, are connected by links 18, with reduced eccentric extensions 19, of a shaft 20, which will be again referred to hereinafter.

As the strips successively cut from the sheet drop from the cutting means 8, 9, they are directly received in stack upon a movable support comprising members 21, proper positioning being assured through the aid of a stop or gauge bar 22, extending across the end of the frame structure in the path of the sheet material as it is advanced beyond the cutter 8. 9 prior to severance. The members 21, 21, forming the movable support are subjacent to and between the cutting means 8, 9 and the stop means 22 attached to slides 23, 23, mounted for guidance in vertical machined ways 24, 24, formed in the frame structure 1, and on them is placed a board which receives the shingles or strips as cut and is subsequently removed with them. The movable support, by reason of the spacing of its members 21, 21, sustains the board with its pile or stack of severed sheets only at its ends. The reason for providing such interruption will become apparent from subsequent description.

In the course of its operation, the movable support is lowered or caused to recede gradually downward with the growth of the stack as the severed strips are discharged thereon, to permit stacking of these strips on the support and to keep the top of the stack below the cutter means (and the edge of the table 2), in proper receiving relation thereto. After the stacking of a predetermined number of strips, the support is caused to dwell for a sufficient time period to permit removal of the stack before being restored to its initial or starting position. This is accomplished by a mechanism which may be briefly described as follows:

Secured to the outer sides of the slides 21, are racks 25, which are engaged by intermeshing gear sectors 26, mounted upon a rock shaft 27. In this shaft is formed a crank 28, between the arms of which is supported a roller 29, adapted for co-operation with a rotary edge cam 30, fixed upon a continuously rotating shaft 31. As will be seen from Fig. III, this cam has a gradual rise by which the recession of the movable support is effected in the manner above referred to; a concentric portion 32, which induces a dwell of the support for the previously stated purpose; and an abrupt drop 33, which causes the restoration of the support to the initial or starting position after the completion of a stack. In order to maintain the operative engagement between the roller 29, and the cam 30, springs 34, have been interposed in the system, and in this instance shown as being directly effective upon the slides 23, so that as the roller 29, drops off the high portion of the cam, the support is instantly returned to its initial or starting position. Thus it will be seen that for each rotation of the cam, a predetermined number of strips will be built into a stack upon the movable support.

The removal of the successive completed stacks is effected by means of an endless conveyor consisting of a pair of spaced sprocket chains 35, 35, the upper runs of which are sustained by angle bars 36. The course of the conveyor intersects the path of movement of the support by which the severed strips are received, so that as the latter recedes, the stacks are successively transferred to and taken by the conveyor, this being made possible by reason of the interspace between the constituent members 21, 21, of the support. The conveyor chains are provided, at intervals, with projections or pins 37, which become successively functional in shifting the completed stacks beyond the path of the movable support during its dwell period.

During this dwell period of the support it, of course, becomes necessary to temporarily suspend the feeding of the sheet and the cutting of the strips, and this is accomplished by means of a grooved controlling cam 38, set upon the continuously rotating shaft 31, already described. Pausing for a moment to trace the means by which the shaft is driven, it will be noted that the latter carries, as shown in Fig. I, a spur gear 39, which is actuated by a similar intermeshing gear 40, on a stub shaft 41. The latter also carries a worm gear 42, actuated by a worm 43, upon a shaft 45, which is in turn rotated by means of bevel gears 46, 47, from a main driving shaft 48. Referring back to the cam 38, it will be noted from Figs. I and III, that the latter is instrumental in controlling, by means of a lever 49, a clutch 50, which comprises a movable member 51, and a relatively fixed member 52. The latter is secured to a shaft 53,

is driven by means of a bevel gear 54, from the bevel gear 46, previously referred to. The movable clutch member 51, is slidably mounted upon a shaft 55, which is co-axially aligned with the shaft 53, and serves as a common drive for the sheet feed rolls 4, 4, and also the cutting means 6. The former is actuated by a spur pinion 56, meshing with a gear 57, upon the shaft 58, which carries the lower feed roller of the pair, while the drive shaft 20, of the latter is actuated from the shaft 55, by the intermeshing spur gears 59 and 60, conventionally represented in Figs. I and II. The conveyor is directly driven from the main shaft 48, by means of a sprocket chain 61, which imparts motion to a shaft 62, having gear connection with a shaft 63, upon which the driving sprockets 65, for the conveyor chains are mounted.

As an auxiliary means for effecting additional cutting operations in the sheet, I have provided a series of paired, co-operative rotary cutters 70 and 71, of any approved design. These cutter couples are mounted at desired intervals upon shafts 72 and 73, which are respectively provided at one side of the structure with intermeshing pinions 74 and 75, which receive their motion through an interposed idler 76, from the gear 57. The shaft 72, and its appendages are so mounted as to be readily removable when not in use. The auxiliary cutters may be employed in substitution for the punches 11, in forming the slots in the web, or they may be made of any configuration to work co-operatively with them in providing additional cuts as may be desired, the transverse cutter functioning the same in each instance in severing the strip shingles from the sheet in the manner already understood.

In case it be desired to cut individual shingles, the apparatus may be supplemented with an additional set of rotary cutters such as shown at 77, 78. These are mounted in a manner similar to the auxiliary cutters 70 and 71, and driven by an extended gear train as best seen in Fig. II. In operation, the cutters 77, 78, serve to divide the sheet into ribbons, which are subsequently cut into a plurality of individual shingles or of strip shingles by the transverse cutter 8. The last described auxiliary means may obviously be employed in association with any, or all of the other cutting devices in obtaining additional variations in the shingles.

Having thus described my invention, I claim:

1. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for cutting the sheet into strips; a movable support adapted to receive the severed strips; and mechanism for causing the gradual recession of said support until a stack of a predetermined number of the strips is formed, and the instantaneous return of the support to starting position after the removal of a completed stack.

2. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for simultaneously punching and cutting the sheet transversely into strips; means subjacent to said cutting means for receiving successive strips as they drop therefrom and gradually receding downward under their weight until a stack is formed; and means for removing successive stacks from said receiving means.

3. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for simultaneously punching and cutting the sheet into strips; means subjacent to said cutting means for receiving successive strips adapted to gradually recede downward with the growth of a stack; and means for taking the stack from said receiving means when receded and removing it therefrom.

4. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for cutting the sheet into strips; a support adapted to receive the severed strips; mechanism for causing the recession of said support to permit stacking of the strips thereon; and a conveyor with projections for successively removing the completed stacks from the support.

5. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for simultaneously punching and cutting the sheet into strips; a support for receiving the severed strips; mechanism for causing the gradual recession of the said support to permit stacking of the strips thereon; and a conveyor intersecting the path of movement of the support and for successively removing the completed stacks therefrom.

6. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for cutting the sheet into strips; a movable support adapted to receive the severed strips, said support being interrupted in such manner as to sustain the pile of strips only at its ends; means for causing the recession of the support to permit stacking of the strips; a conveyor operative with the interruption of the support, and provided with projections for successively removing the completed stacks from the support.

7. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for cutting the sheet into strips; a movable

support adapted to receive the severed strips; mechanism for causing the gradual recession of the support to permit stacking of the strips, and the instantaneous return to starting position after the removal of a completed stack, said mechanism including a rack attached to the support; an intermeshing sector segment provided with an actuating arm; and a rotary cam for controlling the movements of said arm, said cam being formed with a gradual rise and an abrupt terminal drop; and resilient means for maintaining the operative engagement between the actuating arm and the rotary cam.

8. In an apparatus of the character described, the combination of means for feeding a continuous sheet transversely of material; means for cutting the sheet into strips; means for building the severed strips into stacks; and automatic means for temporarily suspending the activity of the sheet feeding and cutting means after the completion of each stack, to permit removal of the same.

9. In an apparatus of the character described, the combination of means for feeding a continuous sheet of material; means for cutting the sheet into strips; a movable support adapted to receive the severed strips; a continuously rotating cam of such configuration as to cause, through interposed devices, a gradual recession of the movable support to permit stacking of the strips, a dwell at the completion of a stack to permit removal and a subsequent return to starting position; and a second continuously revolving cam for causing the operation of a clutch for temporarily suspending the activity of the strip feeding and cutting means during the dwell period of the movable support.

10. In an apparatus of the character described, including means for feeding a continuous strip of material; an intermittently actuated cutting means adapted to punch the sheet and at the same time severing the latter transversely into strips; in combination with auxiliary devices for performing additional cutting operations during the traverse of the material through the apparatus.

11. In an apparatus of the character described, a bed plate having a series of receptive die members and a reciprocatory shearing member, means to continuously feed a strip of material over said bed plate, a platen movable over the bed plate and between the die and shearing members thereof, a series of penetrative die members carried along one edge of the platen cooperative with the receptive members to cut a transverse series of slots in the material with each reciprocation of the platen, a shearing member carried along the opposite edge of the platen cooperating with the first mentioned shearing member to sever the strip at each reciprocation along a series of slots formed during a previous reciprocation of said platen, a depending extension of the platen formed adjacent the shearing member carried thereby to press the severed strips away from the unsevered portion and an actuating member engaging the platen at a point substantially midway of its cutting members, whereby the cutting strain is divided differentially between said cutting members of the platen, a movable support adapted to receive the severed strips, and means for effecting the gradual recession of said support until a stack of predetermined size is formed.

12. In an apparatus of the character described, a support having die and cutting members, means to feed a strip of material over the support, a platen movable toward and away from the support, and having a series of recesses communicating with lateral openings, punches fitted in and movable laterally into said recesses cooperating with the die members to cut a series of slots in the material, a cutter carried by the platen cooperating with the support cutting member to sever the strip, a movable support adapted to receive the severed strips, and means for effecting the gradual recession of said support until a stack of predetermined size is formed, said means being capable of instantly returning the movable support after the stack is removed.

13. In an apparatus of the character described, a fixed support having cutting and punching members, means to move a strip of material over the support, a platen movable toward and away from the support and carrying cooperative die and cutting members, a power means beneath the support, and a transmitting means operable by the power means and engaging the platen to draw the same toward the support when effecting a cutting operation, a movable support adapted to receive the severed strips, and means for effecting the gradual recession of said support until a stack of predetermined size is formed, said means being capable of instantly returning the movable support after the stack is removed.

14. In an apparatus of the character, described, a fixed support carrying cutting and punching members, means to move a strip of material over the support, a platen mounted over the support and carrying cooperative cutting members, a vertical guide at each end of the plate, angular trunnions forming part of the platen operating in the guides to prevent rotation of the platen, means to reciprocate the platen, a movable support adapted to receive the severed strips, and means for effecting the gradual recession of said support until a stack of predetermined

size is formed, said means being capable of instantly returning the movable support after the stack is removed.

15. In an apparatus of the character described, means for progressing a strip of material, means for slotting the strip, a receding support for receiving the slotted portion of the strip, means for severing the slotted portion from the strip, while the latter is resting upon the support, and means for receding the support to form a stack of the severed strips, said means being adapted to effect the instantaneous return of said receding support after the stack of severed strips has been removed therefrom.

16. In an apparatus of the character described, a frame, a plate supported upon the upper portion of the frame containing cutting elements, a platen movable above the plate supporting cooperative cutting elements, guides at each end of the platen, a shaft mounted in the frame, having an eccentric connection to the shaft and a pivotal connection to the platen, whereby the latter is lowered upon the plate by rotation of the shaft, means for progressing a strip of material above the plate, and a co-ordinated means for simultaneously operating the shaft and feeding means.

17. In an apparatus of the character described, means for progressing, punching and severing a strip of material, a movable support receiving the severing portions including a rack bar, an operating segment meshing therewith, a cam operating the segment to cause movement of the support to form a stack of severed strips, a continuously moving conveyor to remove the stack when formed, means for operating the cam and conveying means simultaneously, said cam including a quick acting portion to elevate the support when the latter is unloaded.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 2nd day of January 1920.

FRANK A. BROWNE.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.