

May 1, 1923.

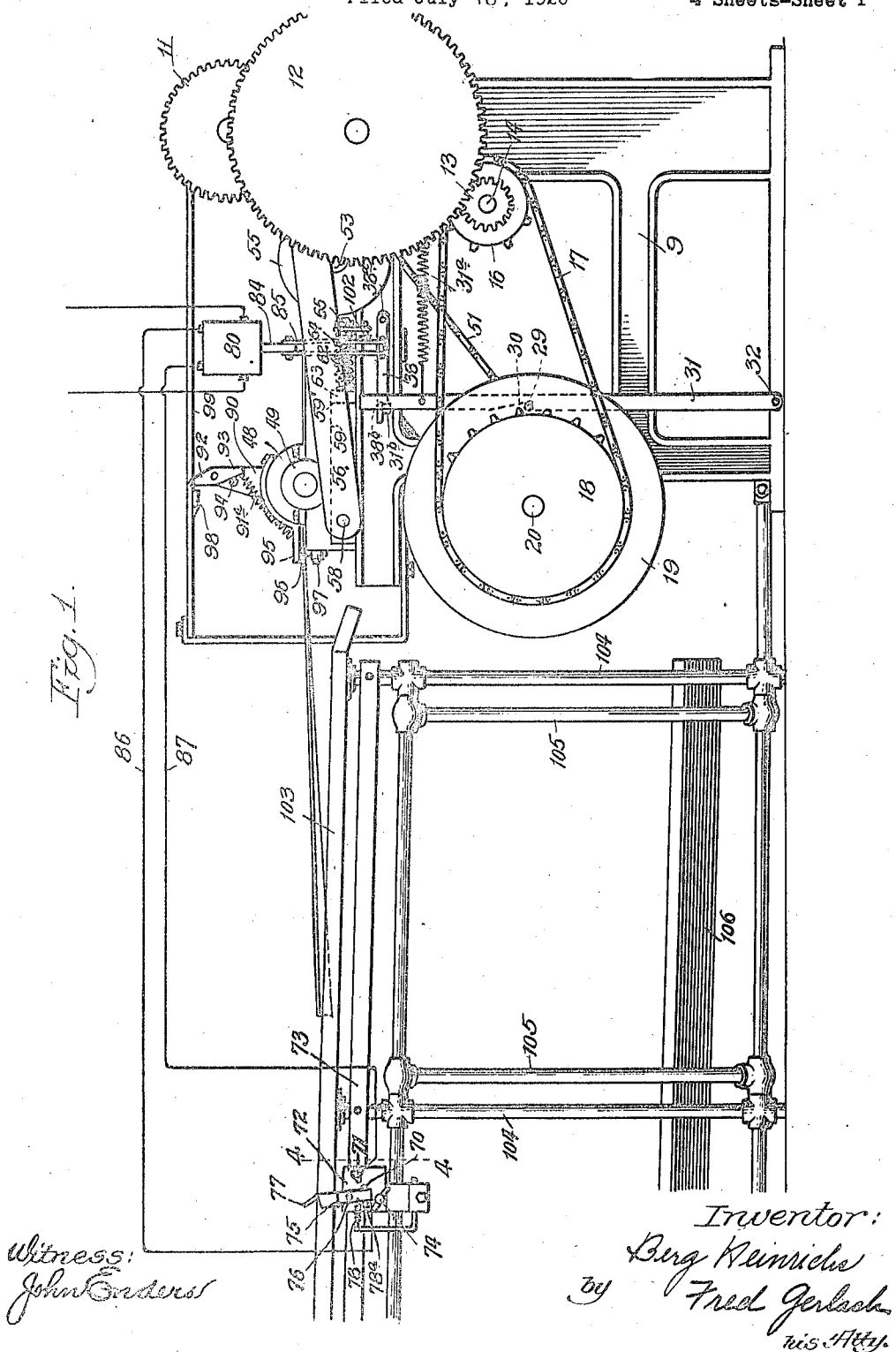
1,453,458

B. HEINRICHS

MACHINE FOR MAKING CORRUGATED BOARD

Filed July 16, 1920

4 Sheets-Sheet 1



May 1, 1923.

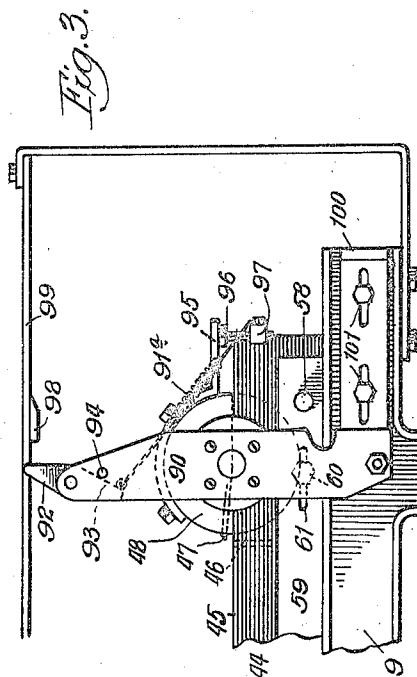
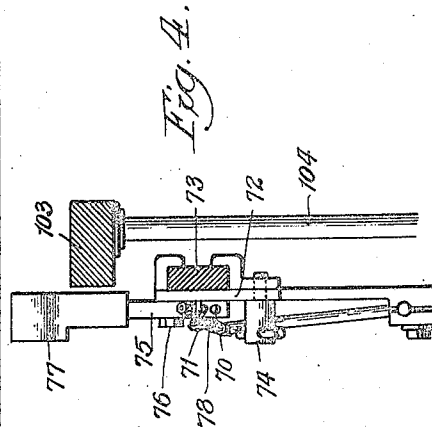
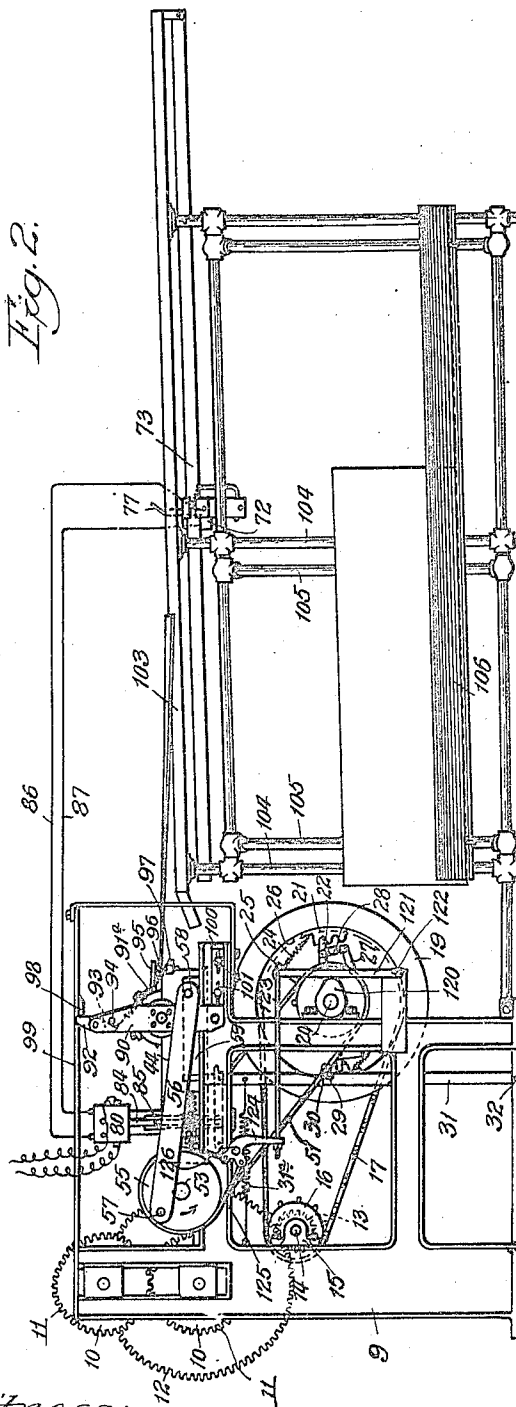
1,453,458

B. HEINRICHS

MACHINE FOR MAKING CORRUGATED BOARD

Filed July 16, 1920

4 Sheets-Sheet 2



Witness:
John Anders

Inventor:
Berg Heinrichs
by Fred Gerlach
his Atty.

May 1, 1923.

B. HEINRICHS

1,453,458

MACHINE FOR MAKING CORRUGATED BOARD

Filed July 16, 1920

4 Sheets-Sheet 3

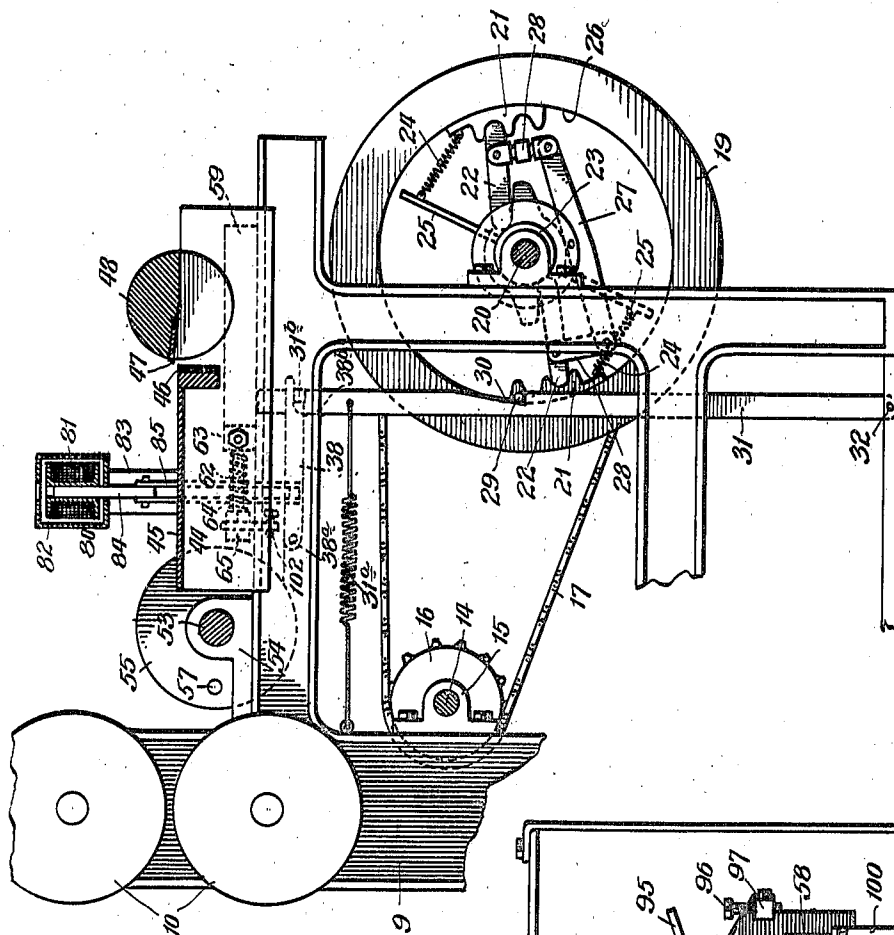


Fig. 5.

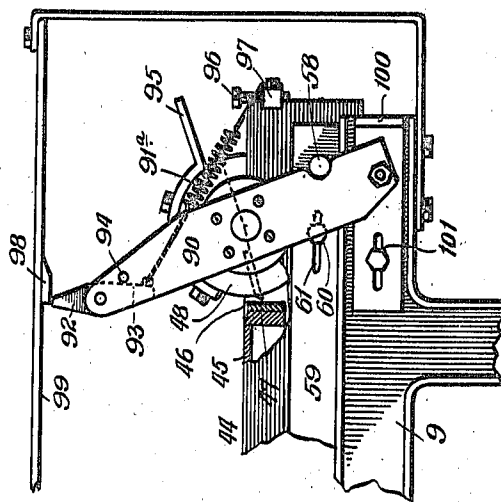


Fig. 6.

Witness:
John Enders

Inventor:
Berg Heinrich
Fred Gerlach
His Atty.

May 1, 1923.

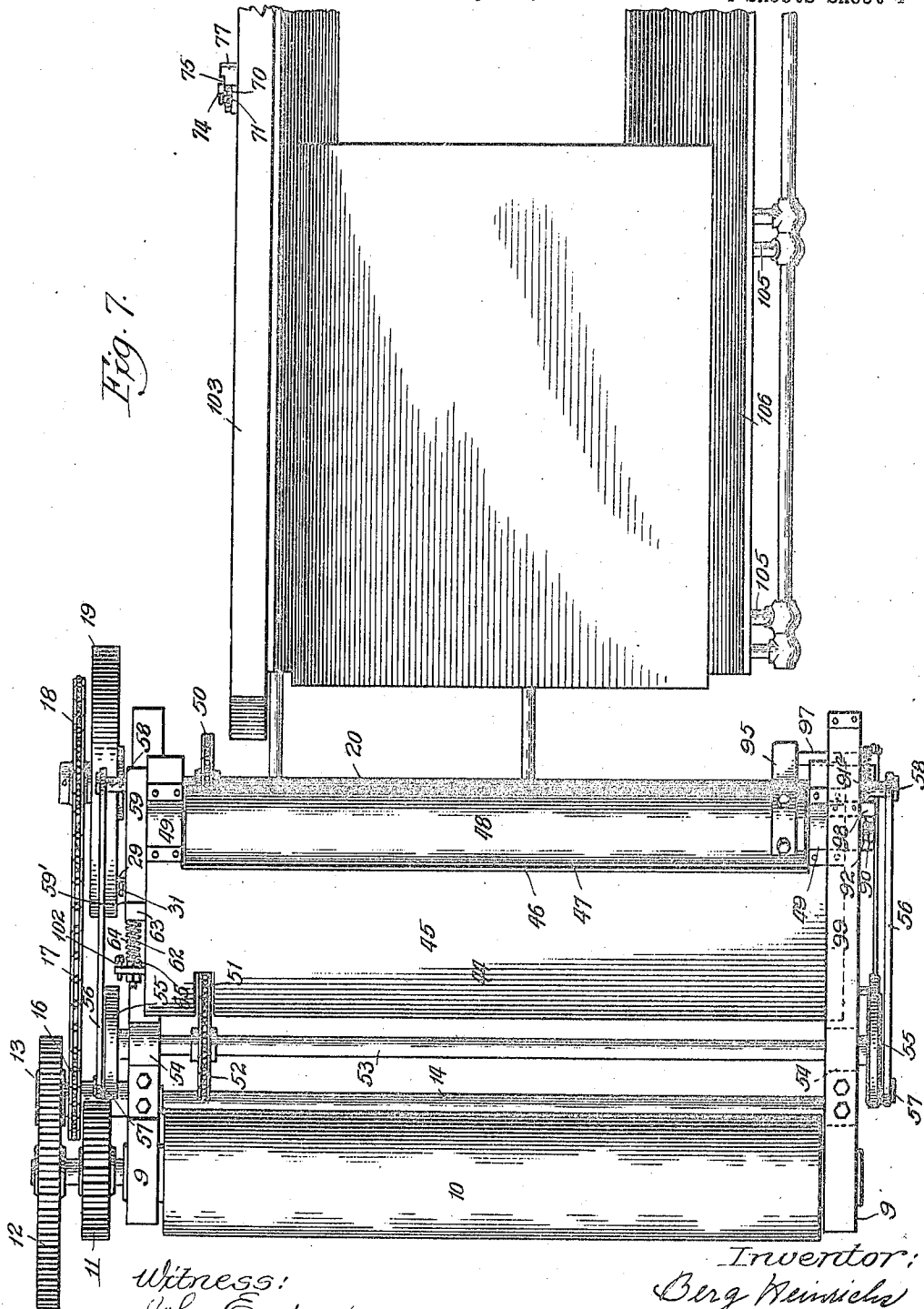
B. HEINRICHS

1,453,458

MACHINE FOR MAKING CORRUGATED BOARD

Filed July 16, 1920

4 Sheets-Sheet 4



Witness:
John Enders

Inventor:
Berg Heinrichs
by Fred J. Grlach
his Atty.

UNITED STATES PATENT OFFICE.

BERG HEINRICH, OF ANDERSON, INDIANA, ASSIGNOR TO MID-WEST BOX COMPANY,
OF ANDERSON, INDIANA, A CORPORATION OF INDIANA.

MACHINE FOR MAKING CORRUGATED BOARD.

Application filed July 16, 1920. Serial No. 396,826.

To all whom it may concern:

Be it known that I, BERG HEINRICH, a citizen of the United States, and a resident of Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Machines for Making Corrugated Board, of which the following is a full, clear, and exact description.

The invention relates to machines for making corrugated or other board and more particularly to the mechanism employed for cutting the continuous web into sheets of the desired size.

The object of the invention is to provide improved cutting mechanism. Another object is to improve the cutting mechanism set forth in an application filed by me August 18, 1919, Serial No. 318,088.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a side-elevation. Fig. 2 is an elevation viewed from the other side. Fig. 3 is a detail of the mechanism for rotating the cutter which is movably mounted on the reciprocating cutter-carriage. Fig. 4 is a section on line 4-4 of Fig. 1. Fig. 5 is a longitudinal section. Fig. 6 is a view of the mechanism for operating the rotatable cutter when it has been shifted to cut the web. Fig. 7 is a plan.

The machine comprises a frame 9 of any suitable construction. Rolls 10, which may be the final rolls acting on or feeding the web of corrugated board, are continuously driven by gears 11, one of which will be driven from the driving mechanism of the machine for making the board and in synchronism with the feed of the web to rolls 10.

A gear-wheel 12, fixed to the shaft of the lower roll 10, meshes with a pinion 13 on a shaft 14 which is mounted in bearings 15 on the frame 9. A sprocket wheel 16 on the shaft 14, a chain 17, driven by said sprocket, and a sprocket 18, fixed to a clutch-wheel 19, serve to drive said wheel continuously while the corrugated board machine is in op-

eration. Wheel 19 constitutes the continuously driven member of a clutch, the operation of which is controlled by the web, for intermittently operating the cutter mechanism. Wheel 19 is loose on a shaft 20 and serves to drive said shaft through a pair of dogs 21 which are connected by links 22 to a collar 23 fixed to said shaft. Springs 24, connected to said dogs respectively and to posts 25 on said collar, serve to normally pull the dogs into engagement with the internal friction-face 26 of the wheel 19. An equalizing bar 27 is connected to the dogs by links 28. This bar causes the dogs to be conjointly shifted into or out of engagement with the clutch wheel 19. A stop-pin 29 is fixed to one of the dogs and is adapted to be caught by a notch 30 in a stop-lever 31 which has its lower end pivoted to the frame, as at 32. In operation, when the pin 29 passes into the notch 30 and is arrested by stop-lever 31, both of the dogs will, through the equalizer bar 27, be held against rotation and disengaged from the clutch wheel 19. When the stop-bar 31 is withdrawn from the path of pin 29, springs 24 will draw the dogs into operative engagement with the friction face 26 of the clutch-wheel 19 and cause the shaft 20 to be driven. The stop-notch 30 and pin 29 are adapted to arrest the shaft at but one point, so that upon each operation of the stop-lever the shaft 20 will make one complete revolution. A spring 31^a tends to withdraw lever 31 from the stop-pin 29. A trip-lever 38 is pivoted to the frame at 38^a and is notched as at 38^b to engage a stud 31^b on lever 31 and lock the lever 31 in position to arrest the stop-lever 29.

The clutch is controlled to intermittently operate the cutter mechanism by the web through electro-magnetic means adapted to operate trip 38 to release the stop-lever 31. This means comprises a solenoid magnet 80 which has a helix 81 supported in a jacket 82 which is sustained above the frame by a support 83, and an armature 84. A link 85 connects the lower end of said armature to the trip-lever 38, so the said lever will be lifted to release lever 31 when the magnet

is energized. This magnet is included in an electric circuit comprising conductors 86, 87 and a switch comprising contacts 70 and 71. This switch is mounted on a block 72 which is adjustably secured on a bar 73 by a clamp-screw 74. Contact 71 is secured to block 72 and contact 70 is carried by a lever 75 which is pivoted as at 76 to said block and has an extension 77 normally disposed in the path of the end of the web. A spring 78 is applied to yieldingly hold lever 75 against a stop 78^a which is positioned so extension 77 will be held in the path of the web and to permit the lever to swing out of its path after it has operated the switch. As a result, when the end of the web strikes the extension 77, lever 75 will be swung to close the switch at contacts 70 and 71 which will close the electric-circuit and energize magnet 80. The armature 84 will then lift the trip-lever 38 to release the stop-lever 31 and spring 31^a will then withdraw the stop-lever to release the clutch. The block 72, on which the switch is mounted, is adjustable on the bar 73 to and from the cutter-mechanism, so that the length of the sheets severed from the web may be varied as desired. This construction exemplifies intermittent mechanism for operating the cutters herein-
after described, which is electro-magnetically controlled by the end of the web and is adjustable to sever sheets of different lengths from the web.

The cutter-mechanism comprises a carriage 44 which is slidably mounted on the frame 9 and comprises a bed 45 over which the web is fed by rollers 10. A cutter 46 is secured to the front end of the bed 45 and a rotary cutter 47 is secured to a mutilated roller 48 which is mounted to rotate in bearings 49 on the carriage 44. Normally, when the cutter-mechanism is at rest, the cutters are in the relative position shown in Fig. 3, so that the web will be free to pass between them until the rotary cutter is operated toward the cutter 46. A sprocket 50 on the clutch-shaft 20 drives a chain 51 which operates a sprocket 52 on a cross-shaft 53 which is mounted in fixed bearings 54. Crank-disks 55 are secured to the ends of shaft 53 respectively. This driving connection for the shaft 53 serves to operate this shaft a complete revolution every time that the clutch is rendered operative. Disks 55 serve to reciprocate the cutter-carriage 44 by means of links 56 which are pivoted, as at 57, to the crank-disks, and, as at 58, to bars 59 which are held on the sides of the carriage 44 by bolts 60 which pass through slots 61 in said bars and permit movement of the bars relatively to the carriage. The bars 59 operate the carriage through yielding connections consisting of rods 62 which are fixed to the bars 59 respectively and pass and slide through guides 63 which are fixed

to the carriage 44, and springs 64 which are engaged by members 65 on the rear end of rods 62, so that the power applied to the bars 59 will be yieldingly applied to the carriage during its forward movement. During retraction of the carriage, a shoulder 59⁷ on each bar 59 will engage guide 63 and positively shift the carriage. This yielding connection makes it possible to operate the carriage at a slightly differential with respect to, or greater speed than, the web, so that when the latter is gripped between the cutters, the yielding connections will permit the cutters to grip the corrugated board and keep it under a slight tension.

During the advance of the carriage with the web, the rotary cutter 47 will be operated to sever the sheet by a lever 90 which is fixed to one end of the shaft of roll 48. A dog 95 on the roll 48 is adapted to engage an adjustable stop-screw 96 which is carried by the inner end of a bar 97 fixed to the cutter carriage to normally position the rotary cutter so the web can pass under it. A one-way dog 92 is pivoted to the upper end of lever 90 and has a tail 93 adapted to engage a stop-pin 94 on the lever. An abutment or cam 98 supported above the frame by a bar 99 engages the dog 92 during the forward movement of the carriage 40 and lever 90 to rock said lever and cutter 47 to sever the sheet from the web as the carriage is moving forwardly with the web. A lug 100, which is adjustably fixed to the frame by bolts and slots 101, engages the lower end of lever 90 to pivotally retract the lever as it reaches the limit of its forward stroke and after the dog 92 has passed under and cleared abutment 98. A spring 91^a is applied to dog 92 and connected to bar 97 to yieldingly hold the lever 90 and dog in normal position.

An abutment 102 fixed to the carriage 44 is adapted to engage the upper end of stop-lever 31 as the carriage reaches the end of its forward stroke, so it will be locked by the trip-lever 38 and re-set in readiness for the succeeding operation.

That portion of the web which projects beyond the cutter-roll is supported at one side by a rail 103 whilst its other side is unsupported. A rail 103 is supported on legs 104 and an inclined support 105, consisting of rails between legs 104 and base-boards 106, is disposed to catch the sheets after they have been severed from the web, the sheets falling by gravity onto said support and forming a stack.

A cam 120 is fixed on the clutch-shaft 20 to operate a lever 121 which is pivoted to the frame, as at 122, and is connected by means of a rod 123 and lever 124, to operate a brake-band 125 adapted to engage one of the crank-disks 55. Lever 124 is pivoted to the frame, as at 126, and both ends of the brake-

board are connected to said lever. This cam is shaped to apply the brake-band to check the movement of the cutter-mechanism before it is arrested by the stop-pin 29 and lever 31 and to hold said mechanism while the clutch is inoperative. This brake and its operating mechanism exemplify automatic means for checking the cutter-mechanism in starting and stopping.

10 In operation, the finished corrugated web will be fed continuously from the rolls 10 and every time its front edge strikes and shifts the switch-lever 75, the circuit for the magnet 80 will be closed and the helix of said magnet will be energized. That will operate armature 84 to lift the trip-lever 38 and withdraw it from stud 31^b. Thereupon, spring 31^a will operate the stop-lever 31 to release the clutch-pin 29 to permit springs 24 to throw the clutch-dogs 21 into engagement with the constantly rotating wheel 19. Thereupon, the clutch will become operative to drive shaft 53 and crank discs 55 one complete revolution. Disks 55, during each revolution of shaft 53 and the clutch, will reciprocate the cutter-carriage 45 and the cutters thereon. During the forward stroke of the carriage, dog 92 on lever 90 will strike a stationary cam 98 and this will rock said lever and the rotary cutter 47, to sever the web. While the carriage is still moving forwardly, the dog 92 will pass under and clear cam 98. During the end portion of the forward stroke of the carriage, the lower end of lever 90 will encounter the stationary stop 100 to positively retract said lever and rotary cutter so the web may again pass between the cutters. During the retraction of the carriage, dog 92 will ride under cam 98, and the lever 90 will be held in its normal position by spring 91^a. Near the end of the retractile stroke of the carriage, dog 102 on the carriage will strike the upper end of stop-lever 31 and shift it into position to be locked by the trip-lever 38 in position to stop the clutch at the end of each revolution thereof. After the web operates the switch-lever 75, its extension 77 will pass under the web to permit it to continue its forward movement until the sheet has been severed. The magnet will be de-energized by the breaking of the circuit at contact 70, 71 during the retraction of the carriage and as soon as the switch-lever is released by sheets.

55 The brake-band 125 is automatically applied by cam 120 before the clutch-stop, to check the cutter-mechanism and prevent objectionable shock or displacement of the parts.

60 The invention exemplifies improved means for automatically operating the rotatable cutter on the reciprocable carriage and checking-means for the cutter-mechanism.

65 The invention is not to be understood as restricted to the details set forth, since these

may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage movable with the web, mechanism for reciprocating the carriage, a cutter pivotally mounted on the carriage and connected to rock said cutter, a one-way dog on said lever, a plurality of stationary elements for shifting the lever in opposite directions respectively, one of which is adapted to be engaged by the dog, and a spring applied to hold the lever so it will not be shifted by the engagement of the dog with the element during the retractile stroke.

2. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage movable with the web, mechanism for reciprocating the carriage, a cutter pivotally mounted on the carriage, a lever mounted on the carriage and connected to rock said cutter, a one-way dog on said lever, a plurality of stationary elements for shifting the lever in opposite directions respectively, one of which is adapted to be engaged by said dog, and a spring applied to the dog and the lever, so the latter will not be shifted by the engagement of the dog with the element during the retractile stroke.

3. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage, mechanism for operating the carriage, cutters on the carriage, automatic start-and-stop mechanism for said operating mechanism, and an automatic brake applied to check said carriage and its operating mechanism at the end of an operation.

4. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage, mechanism for operating the carriage, cutters on the carriage, a clutch for said operating mechanism, a brake for said operating mechanism, and means controlled by the clutch for setting the brake.

5. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage, cutters on the carriage, mechanism for operating the carriage, a clutch for said operating mechanism, a brake for said operating mechanism, and a cam rotatable with the clutch for setting the brake.

6. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage, mechanism for operating the carriage,

comprising a crank-disk and pitman, cutters on the carriage, a clutch on the carriage, a clutch for intermittently operating said disk, a brake for the disk, and clutch-operated means for setting the brake.

7. In a machine of the character described, the combination of mechanism for continuously feeding a web, a reciprocable carriage,

mechanism for operating the carriage, comprising a crank-disk and pitman, cutters on the carriage, a clutch for intermittently operating said disk, a brake for the disk and a cam operated by the clutch for setting the brake.

BERG HEINRICHS.