No. 757,560. PATENTED APR. 19, 1904.

M. MERIAM.

MACHINE FOR CUTTING SHEETS.

APPLICATION FILED MAY 29, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

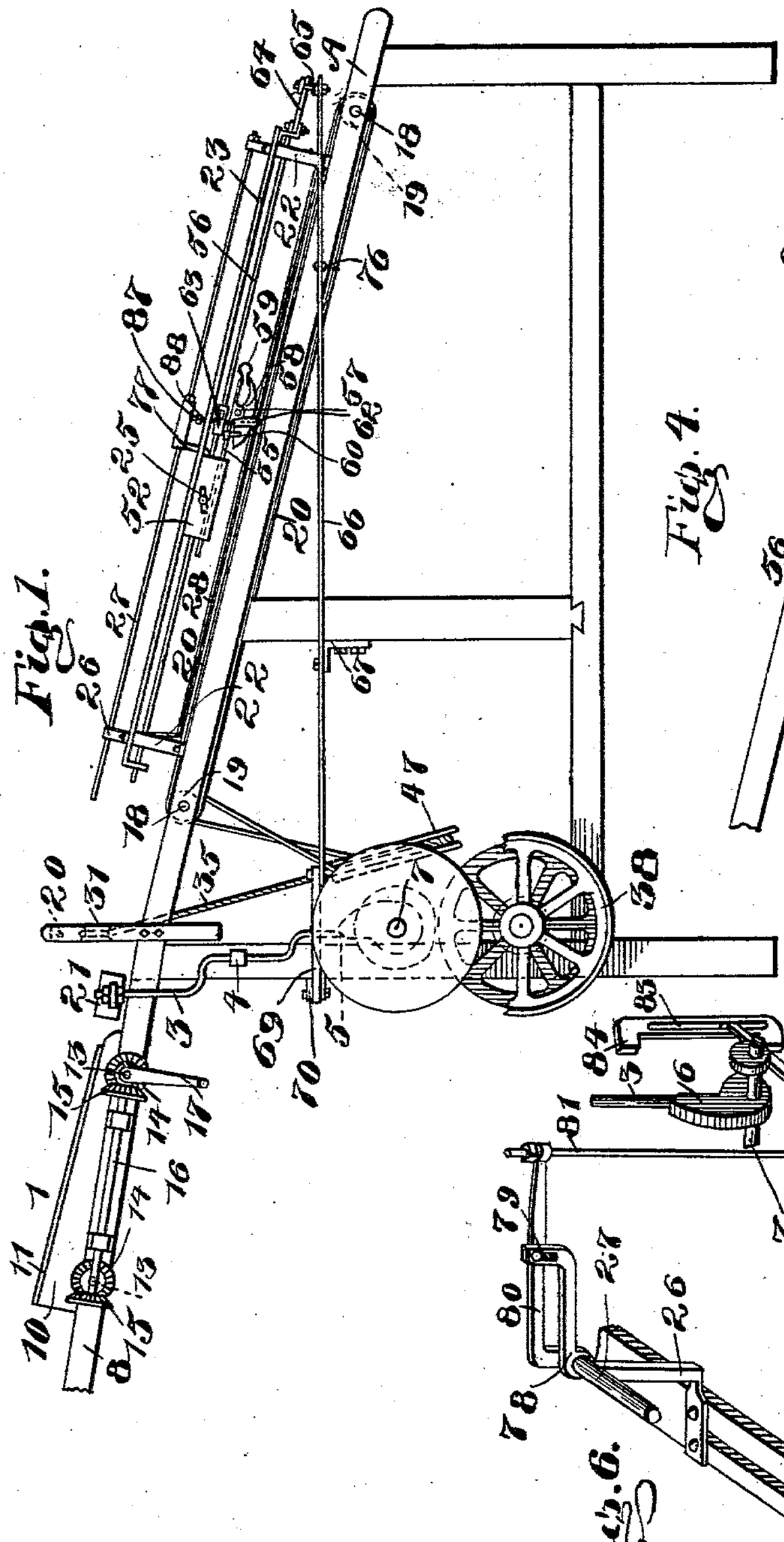

Fig. 4.

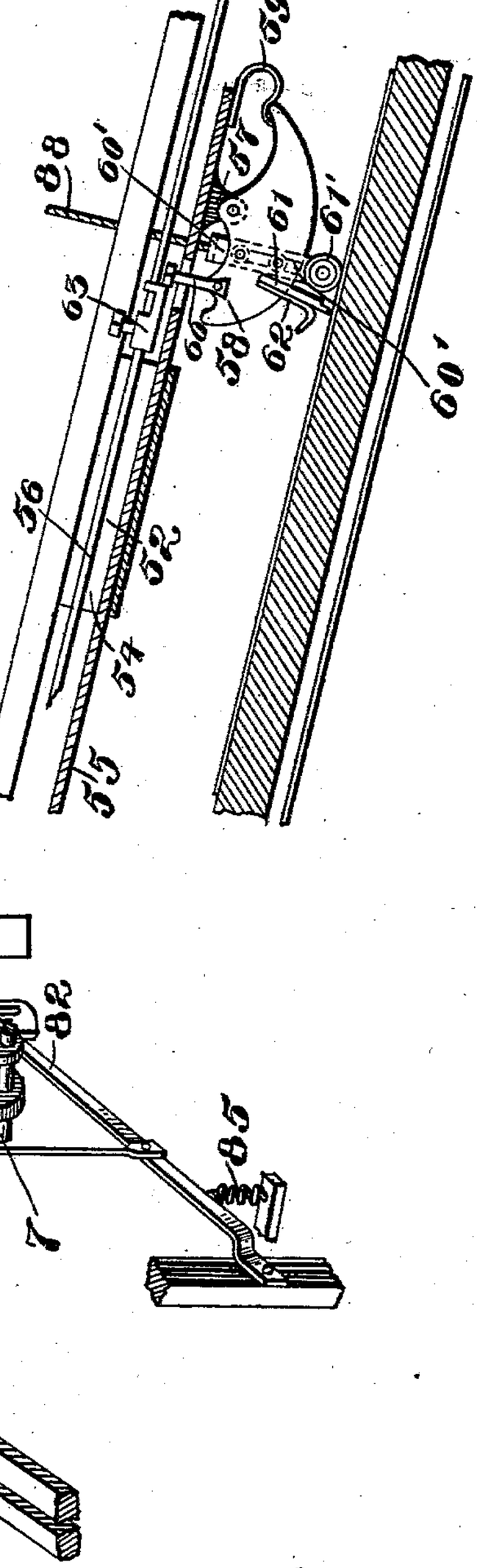

Fig. 6.

Witnesses
Berlin G. Brann
Milton Lenoir

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his Attorneys.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

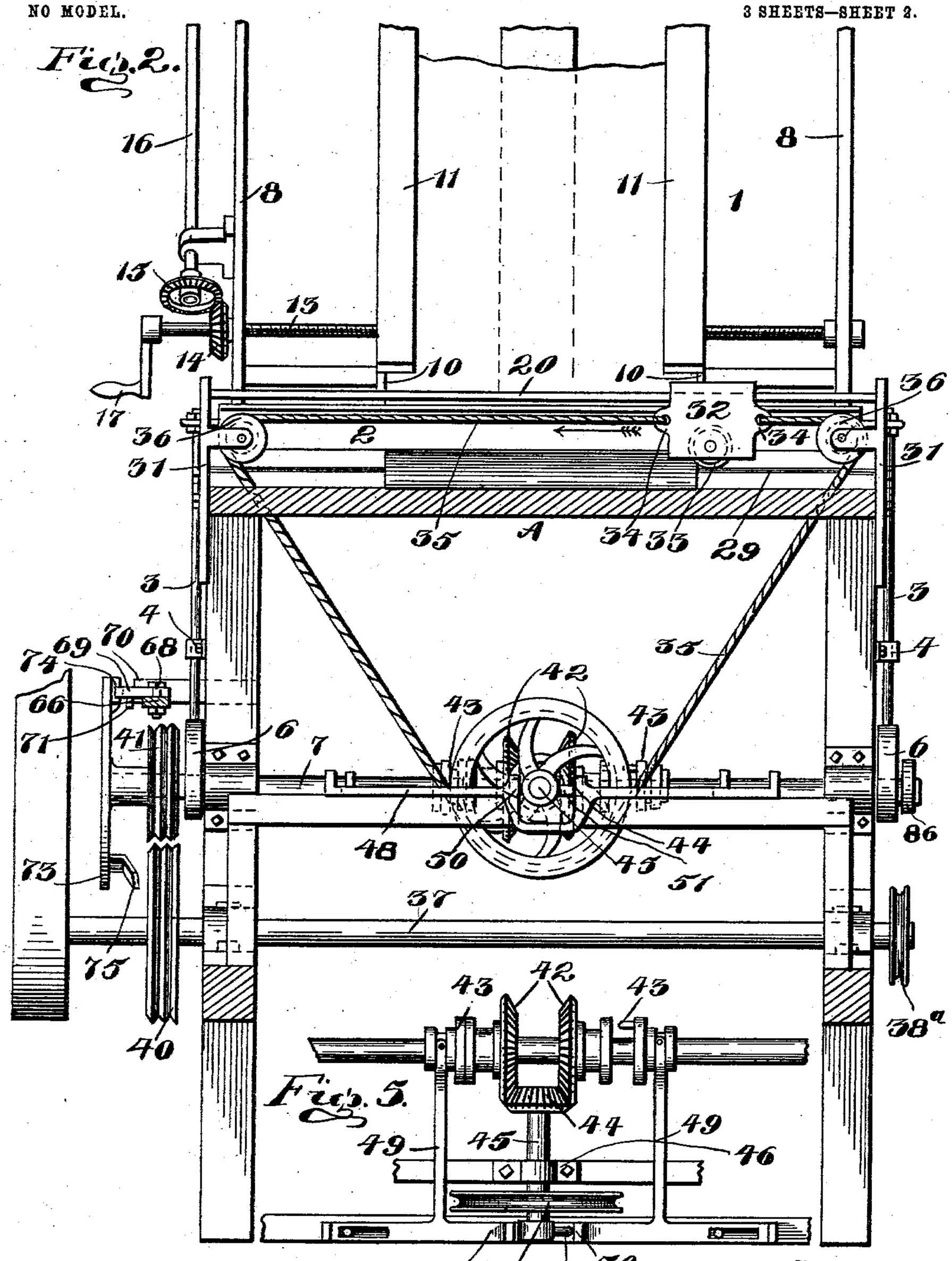

Fig. 5.

Witnesses
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NO MODEL. 3 SHEETS—SHEET 3.

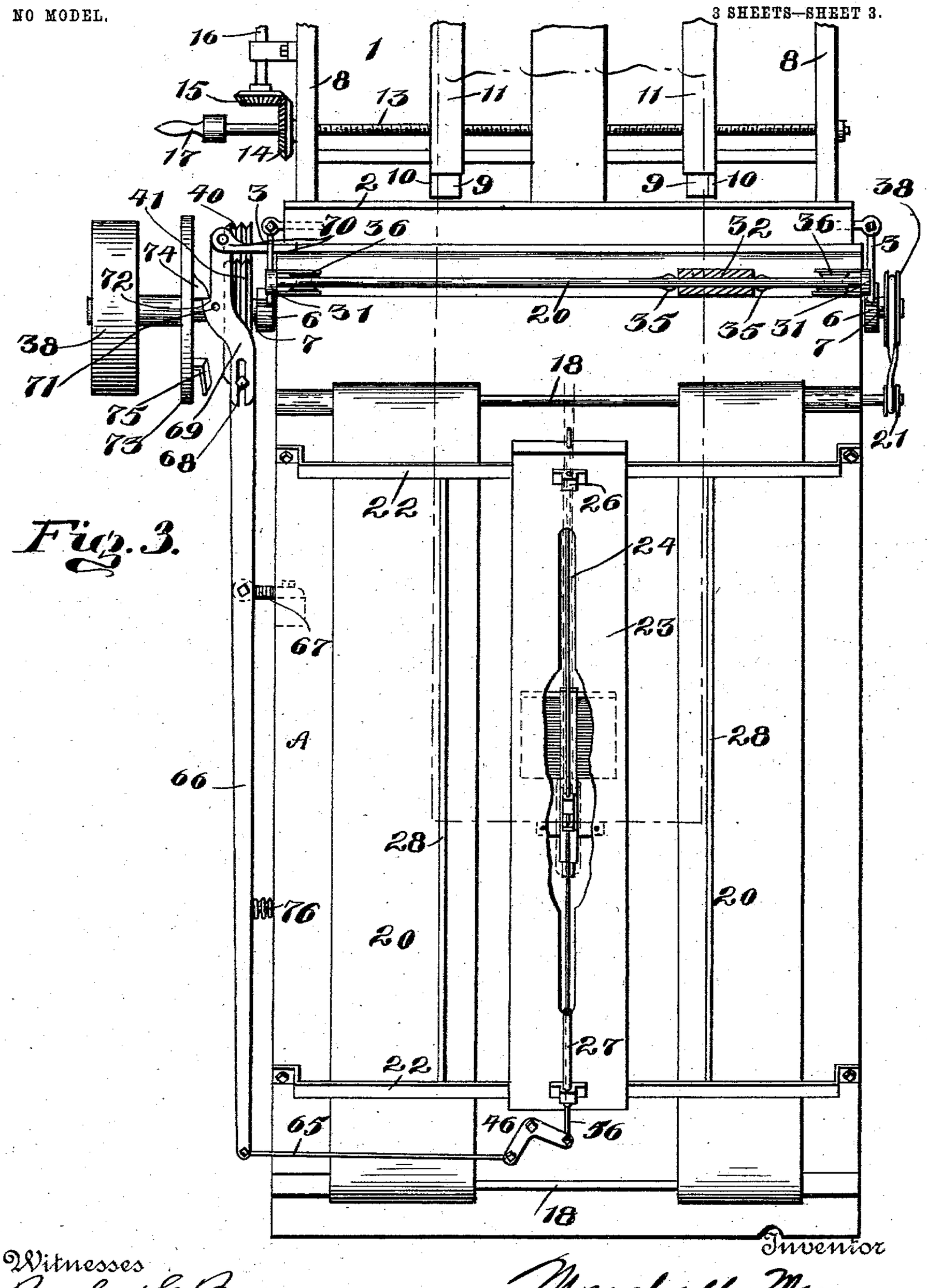

Fig. 3.

Witnesses
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No. 757,560. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

MARSHALL MERIAM, OF PEPPERELL, MASSACHUSETTS.

MACHINE FOR CUTTING SHEETS.

SPECIFICATION forming part of Letters Patent No. 757,560, dated April 19, 1904.

Application filed May 29, 1903. Serial No. 159,328. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL MERIAM, a citizen of the United States, and a resident of Pepperell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Machines for Cutting Sheets, of which the following is a specification.

My invention relates to an improvement in machines for cutting sheets, and is more particularly adapted for cutting paper, cardboard, box-board, or other sheets into suitable predetermined lengths.

My present structure is designed particularly as an improvement on my former patent, granted May 6, 1890, and numbered 427,098, and in this respect I have devised improved means for guiding the cardboard in the chute and on the table, in combination with improvements in the mechanism for operating the cutter, for adjusting the lengths into which a sheet is to be cut, and in the shaft-actuating mechanism, all of which will be more fully described hereinafter and particularly set forth in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of the machine with my improvements applied thereto. Fig. 2 is a view in front elevation, partly in cross-section, showing my improved means for operating the cutter and the guiding devices. Fig. 3 is a top plan view of the machine. Fig. 4 is a detail view, in side elevation, partly in section, of the means for adjusting the lengths into which the sheets are to be cut. Fig. 5 is a detail view, partly in section, of the shaft-actuating means; and Fig. 6 is a detail perspective view of the mechanism for automatically raising the catch.

A indicates a table inclined at a suitable degree and supported upon a framework. Secured to the upper end of the table is a chute 1, which may be curved, as shown, and adapted to receive the cardboard to be cut as supplied from any suitable mechanism. At the juncture of the lower end of the chute and the upper end of the table is located the cutting mechanism, which comprises a binder and a cutting-wheel suitably operated. The binder consists of a horizontally-extending cross-piece 2, the lower surface of which is adapted to engage and press upon the fed cardboards to retain them stationary during the operation of the cutter. The binder 2 is supported at either end by means of pitmen 3, securely attached thereto, the pitmen being received in guides 4 4, in which they are adapted to reciprocate. The lower ends of the pitmen are beveled to an edge 5, as shown, which bear upon the peripheries of cams 6 6, which may be weighted, if desired. These cams are keyed or otherwise secured upon a secondary shaft 7.

The chute 1 is provided with longitudinally-extending and parallel ways 8 8, in which are received the guides, consisting of troughs made up of floors 9 9, tapering pieces 10 10, and confining members 11 11. The floors of the guides extend some distance rearwardly of the side and confining pieces, and the taper of the side pieces gives the troughs a gradually-restricted area from the rear to the front thereof, the object of which is to receive and confine the sheets as they are fed and prevent them from curling or bending. Furthermore, the guides are of such length that the cardboard cannot cut into them, and thus be damaged.

Interiorly-threaded bearings are secured to the lower surfaces of the floors or base portions and are designed to receive threaded shafts 13 13, which are each provided with right and left threads. These shafts are journaled in the sides of the chute and are provided at their ends with gears 14 14, which gears mesh with pinions 15 15, keyed on a shaft 16, supported in suitable bearings on the side of the chute. One of the shafts is provided with a crank 17, as shown, which when actuated operates the screw-shafts 13 13 simultaneously by means of the shaft and gearing and adjusts the distance between the guides to the width of the sheet being cut.

Journaled in and transversely of the table are parallel shafts 18 18, carrying rollers 19 19, the rollers received in slots in the table, and passing over these rollers are the aprons 20 20, traveling longitudinally of the table. One of the shafts 18 is provided with a drive-wheel 21.

Secured to the table and extending trans-

versely thereof are the offsetsupporting-straps 22 22, which are raised above the traveling aprons and adapted to support a plate 23 centrally of the table and extending longitudinally thereof. This plate 23 is provided with a centrally-located longitudinally-extending slot 24. A plurality of runners 28 28, provided with upturned ends, are secured to the lower surface of the straps 22 22 as guides for the sheets during their travel on the table. These runners extend almost the entire length of the table and are located close to the surface of the traveling aprons. Brackets 26 26 are supported upon the upper surface of the plate 23, in the upper ends of which is journaled a rock-shaft 27.

A cutting-track 29 extends transversely of the table near its upper end. A guide-bar 20, stationarily held in suitable brackets 31 31, is supported above the cutting-track and in alinement therewith. A carriage 32, having a cutting-wheel 33 journaled in and projecting below its lower surface, is perforated and received upon the guide-bar. The carriage is provided with ears 34 34 for the attachment thereto of the flexible cables 35 35, whereby the carriage is actuated back and forth, the cables passing over pulleys 36 36, journaled in the brackets 31 31.

A drive-shaft 37 is suitably supported in journal-bearings affixed to the framework of the table and is provided with a wheel 38, driven from any suitable source. A pulley 38[a] is also keyed to this shaft, and passing over this pulley and the wheel 21 is a belt whereby the aprons 20 20 are constantly driven.

A friction-wheel 40 is secured to the shaft and is adapted to mesh with a mutilated friction-wheel 41, carried by the secondary shaft 7, carrying cams 6 6 and transmitting motion to the operative elements of the machine.

Loosely mounted upon shaft 7 are a pair of oppositely-located miter gear-wheels 42 42, each of which is adapted to be engaged by a clutch 43, slidingly keyed on the shaft 7. The gears 42 42 are each in mesh with a third gear-wheel 44, supported on the end of the stud-shaft 45, journaled in brackets 46 and having keyed thereon a grooved wheel 47, the periphery of which equals twice the distance the carriage 32 is required to travel. The flexible cables 35 35 pass around this wheel 47.

Located upon a brace or other suitable support is a sliding bar 48 from which extend spanners 49 49, their outer ends being received in grooves formed on the clutch members 43 43 and their inner ends being rigidly secured to the bar 48. The bar may be slidingly secured to the brace in any suitable fashion—as, for instance, by means of pins passing through slots in the bar, as shown—and the bar is provided with a centrally-located yoke 50, through which the stud-shaft 45 passes. The hub of the wheel 47 is provided with a pin 51, adapted to engage first one side and then the other of yoke 50 as the wheel rotates, thereby throwing first one clutch member and then the other into engagement with the respective gear-wheels 42 42 to rotate wheel 47 in alternately opposite directions and cause the forward and backward reciprocation of the carriage 32. This arrangement of mechanism for driving the cutter is not only more simple and efficient than is that shown in my former patent, but it also lessens the wear and friction on the cable.

Returning now to the plate 23, having the slot 24, I provide a block 52, which is secured to the plate 23 by means of a thumb-screw 25 at any point in the length of the longitudinal slot 24. The block is provided with a longitudinal groove 54, extending parallel with and beneath the slot 25, in which groove is received a strip 55 and a rod 56. The strip 55 is secured in the groove and projects past either end of the groove and of the block and is provided on its under surface with an ear 57, to which is pivotally secured a locking-cam 58, normally held in one position by means of the spring 59, which engages one end of the cam. The opposite end of the cam is adapted to have secured thereto a trip 60, which projects upwardly through an aperture in the strip 55, the upper end of the trip being enlarged and lying adjacent the rod 56. The cam-lever is provided with a depending standard 60′, slidingly secured thereto. Carried by this sliding standard and extending at right angles with the surface of the table, with which it very nearly engages, is a catch 61, the lower edge of the catch being beveled in such a manner that when the cam-lever is forced against the tension of the spring the beveled end will engage the surface of the table and prevent the sheet from passing thereunder. This catch carries a plate 62, the lower end of which is upturned, as shown, the object of which is to cause the positive engagement of the sheet and plate as the former is fed downward by the traveling aprons and cause the catch to move the cam-lever, as will be set forth, and operating to cause the sheets to be cut into equal lengths. The plate 62 also prevents the front edge of the sheet from running up on the catch 61, as it would otherwise do. Rearwardly of the catch 61 and likewise carried by the member 60′ is journaled a roller 61′. The purpose of this roller is to permit the cardboard to clear the catch 61 after being cut and while it is being run off the table by the aprons or belts. The rod 56, which passes through the groove 54 in block 52, has its ends journaled in bearings depending from the plate 23, and slidingly received upon this rod is a stop-nut 63, adjustably secured at any desired point on the rod by means of a set-screw accessible through slot 24 of the plate 23. This stop-nut is adapted to engage the trip 60. The lower end of the rod 56 is

secured to one end of a suitably-supported bell-crank lever 64, to the other end of which is secured a link 65, which in turn is pivotally connected to a lever 66, pivotally supported on a bracket 67, secured to the frame. This lever 66 extends longitudinally of the table and at its free end is provided with a headed stud 68, received in a slot in a short link 69, pivotally supported at 70. The lever 66 is normally retained in approximately parallel relation with the table by means of spring 76. Link 69 is provided with a depending pin 71 and also a shoulder 72. The secondary shaft 7 has keyed thereon a disk 73 adjacent the short link 69, and this disk carries a shoulder 74, adapted to engage the shoulder 72 on short link 69, and an obliquely-projecting offset 75, adapted to engage and embrace the depending pin 71 on the short link.

The operation of the foregoing described features is as follows: The operator adjusts the block 52 by means of the thumb-screw 25 at any distance from the cutting-track 29 in accordance with the lengths into which it is desired to cut the sheets. The block and its connected parts are thus held stationarily, with the catch 61 nearly engaging the surface of the table. The movable stop-nut 63 is then moved to such a position on rod 56 that it lies behind and is engaged by the trip 60 against the tension of spring 76, and to arrive at this position the stop is secured to the rod 56, which latter is then forced upwardly toward the cutting-track, thereby rocking bell-crank lever 64, which, by means of link 65, draws one end of the side lever 66 toward the table, consequently throwing the opposite end of lever 66, to which is connected short link 69, outward toward the disk 73. The connected end of the short link 69 is moved in the same direction, and the depending pin 71 is engaged by the slanting offset 75 on disk 73. The offset draws the short link 69 and the end of the lever farther toward the disk and against the tension of spring 76 until the shoulder 74 of the disk engages the shoulder 72 of the short link, the offset having passed on owing to the revolution of the disk. The side lever is retained in its outward position by means of the stop-nut 63, which lies behind and is engaged by the trip 60. In this position the mutilated portion of friction-wheel 41 is directly opposite the highest portion of the periphery of friction drive-wheel 40, and consequently will not be engaged by the friction-wheel 40, the shoulder 74 on disk 73, carried by the secondary shaft 7, being arranged upon the disk to effect this result. The cams 6 6, which cause the operation of the binder 2, are also at their highest point of rotation, thereby raising the binder 2 to its greatest elevation above the cutting-table, the lower edges of the pitmen supporting the binders resting upon the sloping portions of the cam-surfaces, as shown in Fig. 1 in dotted lines.

With the various elements of the device in the positions stated the machine is in readiness to operate upon the cardboard, which is fed onto chute 1 and is received in and between the adjusted trough-guides thereon, the cardboard passing over the cutting-track and resting upon the endless traveling aprons 20 20, to which motion is communicated by drive-wheel 38 through shaft 37, pulley 38^a, belt and pulley-wheel 21 to one of the shafts 18, carrying the rollers 19 19, over which the aprons are drawn. The aprons carry the cardboard beneath the straps 22 22 and guide-runners 28 28 until the cardboard abuts against the lower end of the depending catch 61, carrying the plate 62. This engagement and slightly-farther travel of the cardboard operates to force the beveled end of the catch against the surface of the table, thereby rocking the cam-lever 58 against the tension of the spring. This results in the withdrawal of the trip 60 from engagement with the stop-nut 63, which permits the tension of the compressed spring 76 to rock the side lever 66 back to its normal position, which may be approximately parallel with the longitudinal side of the table. The side lever 66 moves short link 69 away from the disk 73, thereby disengaging the shoulders 72 74. The weight of the binder 2 is now at liberty to force the cams 6 6 to make a partial revolution, thereby partially rotating the secondary shaft 7, which rotates the mutilated friction-wheel 41, so that the periphery thereof will be engaged by the friction drive-wheel 40. The binder is by this time resting upon the cardboard to be cut to retain it immovably in place and prevent its further feed to the table. The rotation of the secondary shaft 7 operates the miter-wheels 42 42, one of which is engaged by the clutch member 43, which causes a transmission of motion to gear-wheel 44 on stud-shaft 45, carrying the cables 35 35, the rotation of which wheel operates to draw the carriage 32, carrying the cutter-wheel 33 along the cutting-track 29, the carriage running on guide-bar 20 and cutting the sheet. The return movement of the carriage is accomplished by means of the pin 51, engaging the opposite side of the yoke 50, formed in the sliding bar 48, thereby forcing the opposite clutch member into engagement with its miter-gear and the former clutch member out of engagement to effect a reverse rotation of the wheel 47, which unwinds one side of the flexible cable while winding up the other side. The cams 6 6 now engage the lower ends of the pitmen 3 3 and operate to raise the binder 2. As the binder is raised so, also, is the catch 61 raised in the following manner: The block 52 is provided with a bracket 77, the upper end of which is sleeved and slidingly received upon the rock-shaft 27. The upper one of the brackets 26 26 is provided with an arm 78. The free end of this arm is provided with an

open slot 79, in which a lever 80 is received and guided, one end of the lever being secured to the rock-shaft and the opposite end of the lever provided with a rod 81. The lower end of this rod 81 is pivotally secured to a lever 82, one end of which is pivotally attached to the frame and the opposite end of which is received in and passes through a slot 83 in a plate 84, also secured to the frame, whereby the lever is guided in its reciprocations. The outer end of this lever may be provided with a handle whereby it may be manipulated against the tension of a spring 85, which normally holds the lever in raised position. The lever is ordinarily automatically operated by means of a cam 86, secured upon shaft 7, the spring 85 serving to retain the lever in constant engagement with the periphery of the cam, which as it rotates rocks lever 82 and by means of the rod 81 and lever 80 causes the rock-shaft to make a partial rotation.

A depending T-shaped lever 87 is secured to the sleeved upper end of the bracket 77, from the free ends of which T-shaped lever depend cords 88 88, the lower ends of which are secured to the sliding standard 60′. Thus it will be seen that when the rock-shaft 27 is partially rotated the catch 61 is raised and the tension of spring 59 causes the locking-trip 60 to rise, and the operation of the parts is so timed that the locking-trip will rise in time to engage with the stop-nut 63 as it has been forced back by the disk 73, side lever 66, link 65, and bell-crank 64. The continued rotation of the disk 73 has by this time brought the offset 75 into engagement with the depending pin 71, thereby moving side lever 66 against the tension of the spring 76 and causing the shoulder 72 on the short link 69 to be brought into position for its engagement by shoulder 74 on disk 73. As soon as the two shoulders engage the auxiliary or secondary shaft 7 is brought to a standstill, the mutilated portion of friction-wheel 40 being opposite the friction drive-wheel 41. This is the position of rest occupied by the parts and hereinbefore set forth. The cardboard is now fed forward again to trip the catch and cause a repetition of the cutting operation.

It is evident that many changes might be made in the form and arrangement of the parts described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact construction herein set forth; but,

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for cutting sheets, a sheet-guide comprising a bottom, adjustable sides, and means for simultaneously adjusting the sides, the means comprising a threaded rotatable shaft connected with the sides, the threads preventing movement of the sides after adjustment.

2. The combination with a cutting-machine and a cutter, of a chute leading thereto, guides mounted on the chute, a plurality of oppositely-threaded shafts connected with the guides, gears located on the ends thereof, an intermediate shaft, gears mounted on the intermediate shaft and meshing with the gears on the threaded shafts, and means for operating one of the gears to simultaneously operate each threaded shaft and the guides.

3. A cutting-machine comprising a table, a cutting device, means for actuating the cutting device and a binder for the material being cut, the binder comprising a retaining means, pitmen secured thereto, a rotatable shaft, cams keyed on the shaft, the lower ends of the pitmen bearing on the cams the pitmen and binder adapted to actuate the cams when the binder is in its raised position.

4. A cutting-machine comprising a table, a cutting device thereon, means for actuating the cutting device, a binder for the material, and runners superposed above the table, the material passing beneath the runners which serve to retain it in position.

5. A cutting-machine comprising a table, and a cutting device, a wheel, flexible means extending from the cutting device to the wheel, and means actuated by the rotation of the wheel for automatically reversing the direction of such rotation.

6. A cutting-machine comprising a suitable support, and a cutting device, a wheel, flexible means connecting the cutting device and wheel, means for rotating the wheel, clutch members, a movable bar connected with the clutch members and means on the wheel adapted to engage the movable bar to reverse the direction of rotation of the wheel.

7. A cutting-machine comprising a table and a cutting device, a wheel, flexible means connecting the wheel and cutting device, a train of gears, the wheel connected with one of the gears, clutch members adapted to engage the remaining gears, a movable bar, a yoke formed therein, the bar rigidly connected to the clutch members and a pin carried by the wheel, the pin adapted to alternately engage the sides of the yoke and reverse the rotation of the wheel.

8. A cutting-machine comprising a suitable support, a cutting device, means for operating the cutting device, a catch, driving means, mechanism connecting the catch and driving means, the material adapted to engage the catch whereby to trip the latter to cause the actuation of the driving means and a plate carried by the catch, the plate provided with an upturned end to cause the positive engagement of the material and catch.

9. The combination with a cutting-table, of a cutting device, means for operating the cutting device, a driving means, mechanism for temporarily retaining the driving means out of operation, the mechanism including a pair

of friction-gears, one of the gears being mutilated, and a trip, a pivoted member with which the trip is connected, a catch depending from and rigidly secured to the pivoted member, the catch adapted to be struck and actuated by the material.

10. A cutting-machine comprising a table, adjustable means for regulating the lengths into which the material is to be cut, a trip carried by the adjusting means, a rocking member, driving means, means connecting the rocking member and the driving means and means connecting the adjusting means and the rocking member to operate the trip.

11. A cutting-machine comprising a table, means for regulating the lengths into which the material is to be cut, a trip carried by the adjusting means, a rocking member, driving means, a cam on the driving means, mechanism connecting the cam and the rocking member and means connecting the rocking member and the adjusting means to cause the actuation of the trip.

12. A cutting-machine comprising a table, a cutter, means for adjusting the lengths into which the material is to be cut, a suitably-journaled rocking member, a lever secured thereto, a driving-shaft, a cam secured thereon, a suitably-supported lever, means for constantly retaining the lever in engagement with the cam, a rod connecting the two levers, and means connecting the rocking member and the adjusting means whereby to actuate the latter.

13. A cutting-machine comprising a table, a cutter, means for operating the cutter, movable means for retaining the cutter-operating means out of operation, a block carried by the retaining means, a trip for engaging the block and means, the operation of which is so timed with relation to the cutter-operating means as to cause the engagement of the trip and block at the completion of the travel of the cutter.

14. A cutting-machine comprising a table, a cutter, means for operating the cutter, and an adjustable catch, the catch provided with an upturned plate to cause the positive engagement of catch and material and prevent the latter from running up the catch.

15. A cutting-machine comprising a table, a cutter, means for operating the cutter, a catch, a locking-cam, the catch adapted to be engaged by the fed material to cause its depression and means for automatically raising the catch, the means comprising a pair of supports, a rocking bar journaled therein, means connecting the rocking bar and locking-cam, a lever secured to the rocking bar, a second lever secured to the frame of the machine, a cam for operating the last-named lever and a rod connecting the two levers.

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

MARSHALL MERIAM.

Witnesses:
WALTER H. DRURY,
VAN V. MERSEREAU.