No. 768,521. PATENTED AUG. 23, 1904.

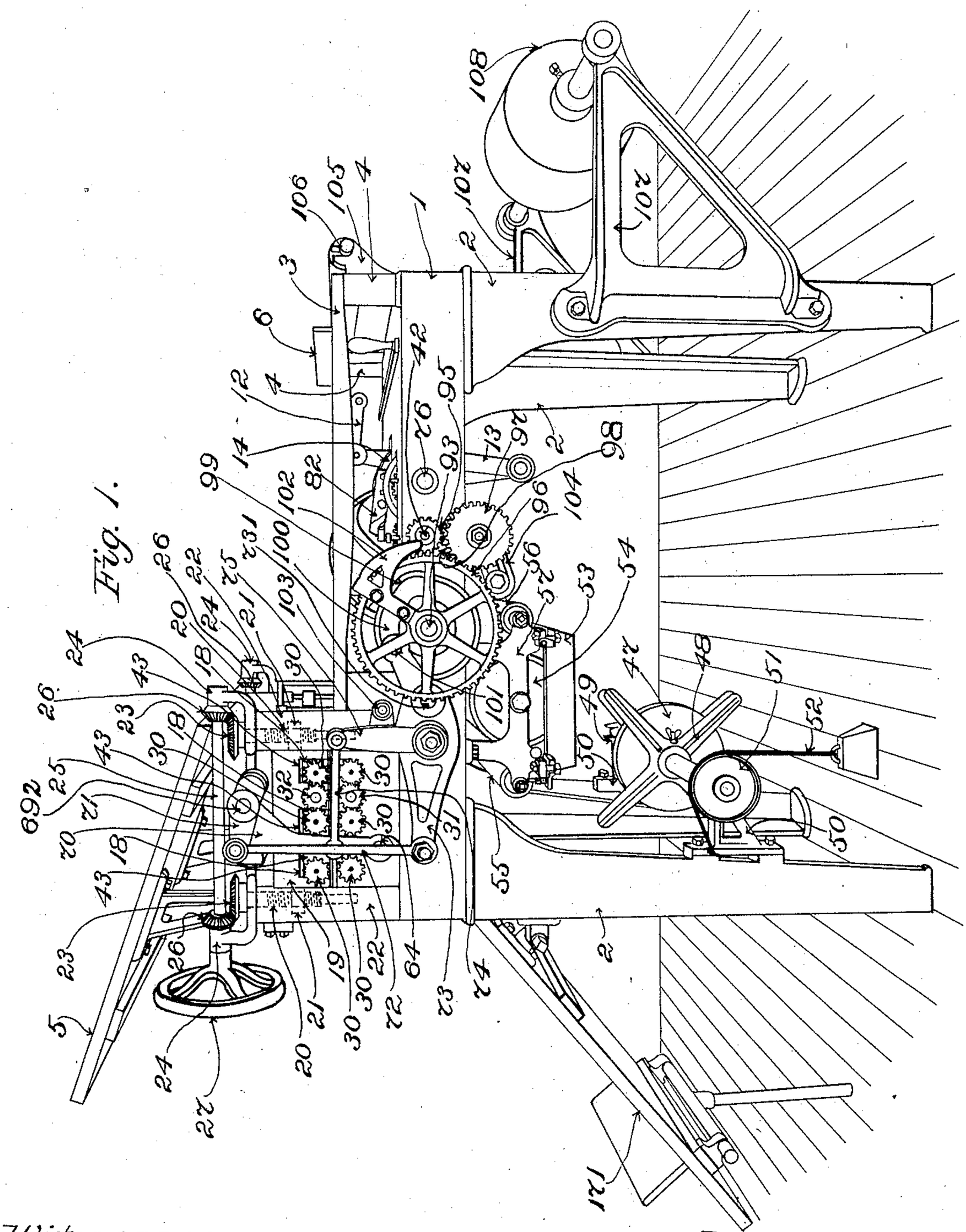
C. H. CROWELL & E. H. TAYLOR.

BOOKBINDING MACHINE.

APPLICATION FILED DEC. 6, 1898.

NO MODEL. 6 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 6 SHEETS—SHEET 2.

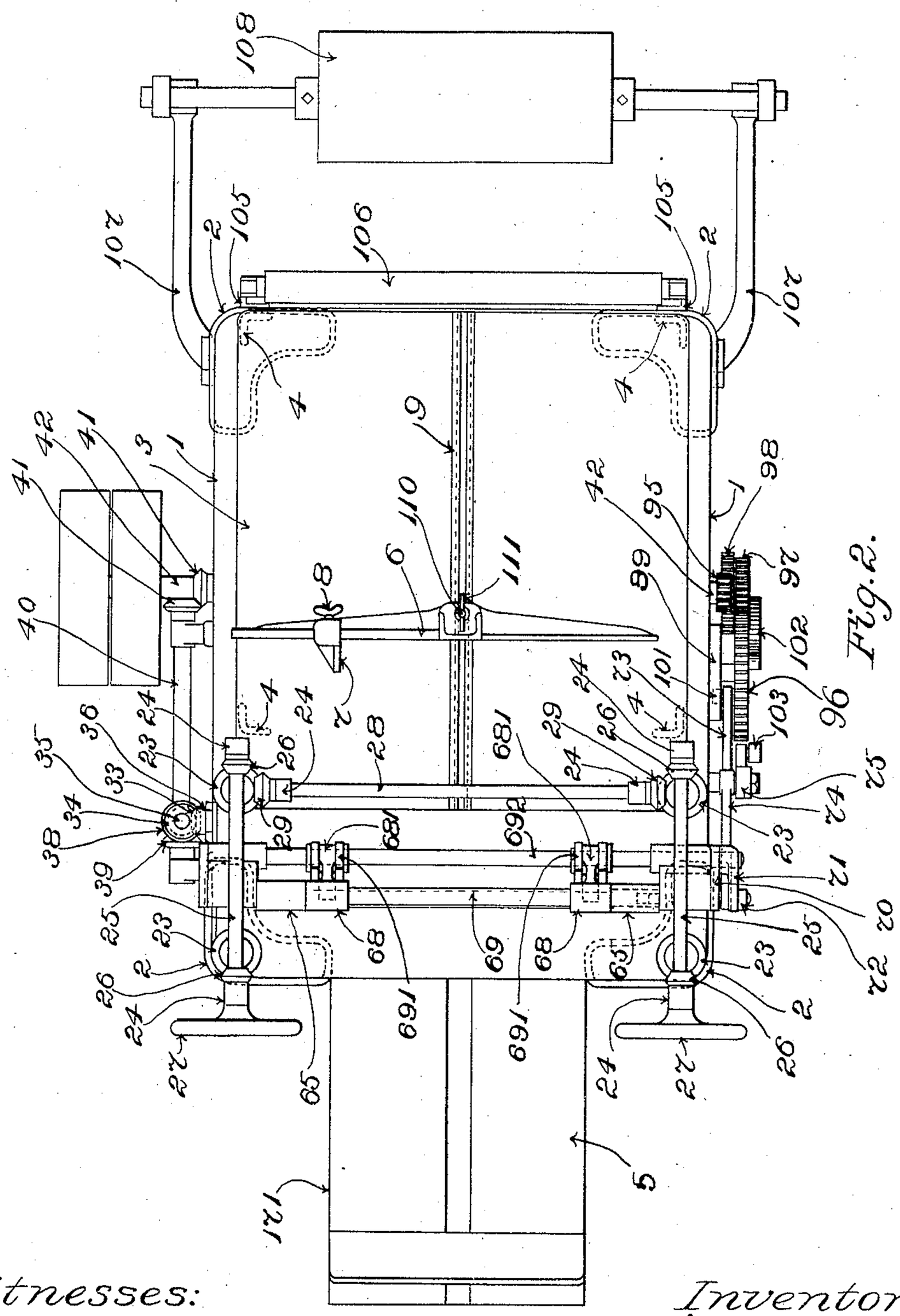

Fig. 2.

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NO MODEL. 6 SHEETS—SHEET 3.

Fig. 3

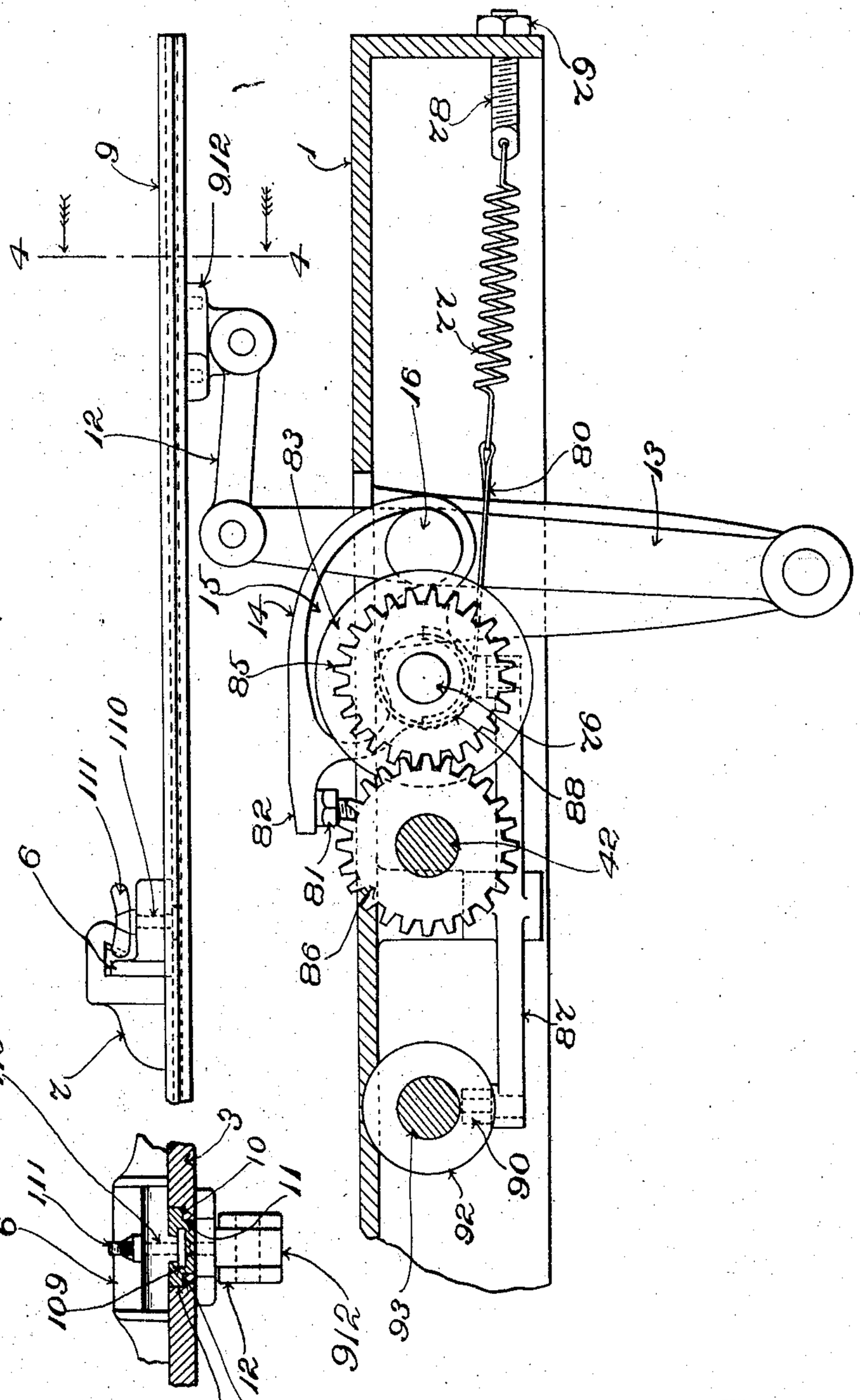

Fig. 4.

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NO MODEL. 6 SHEETS—SHEET 4.

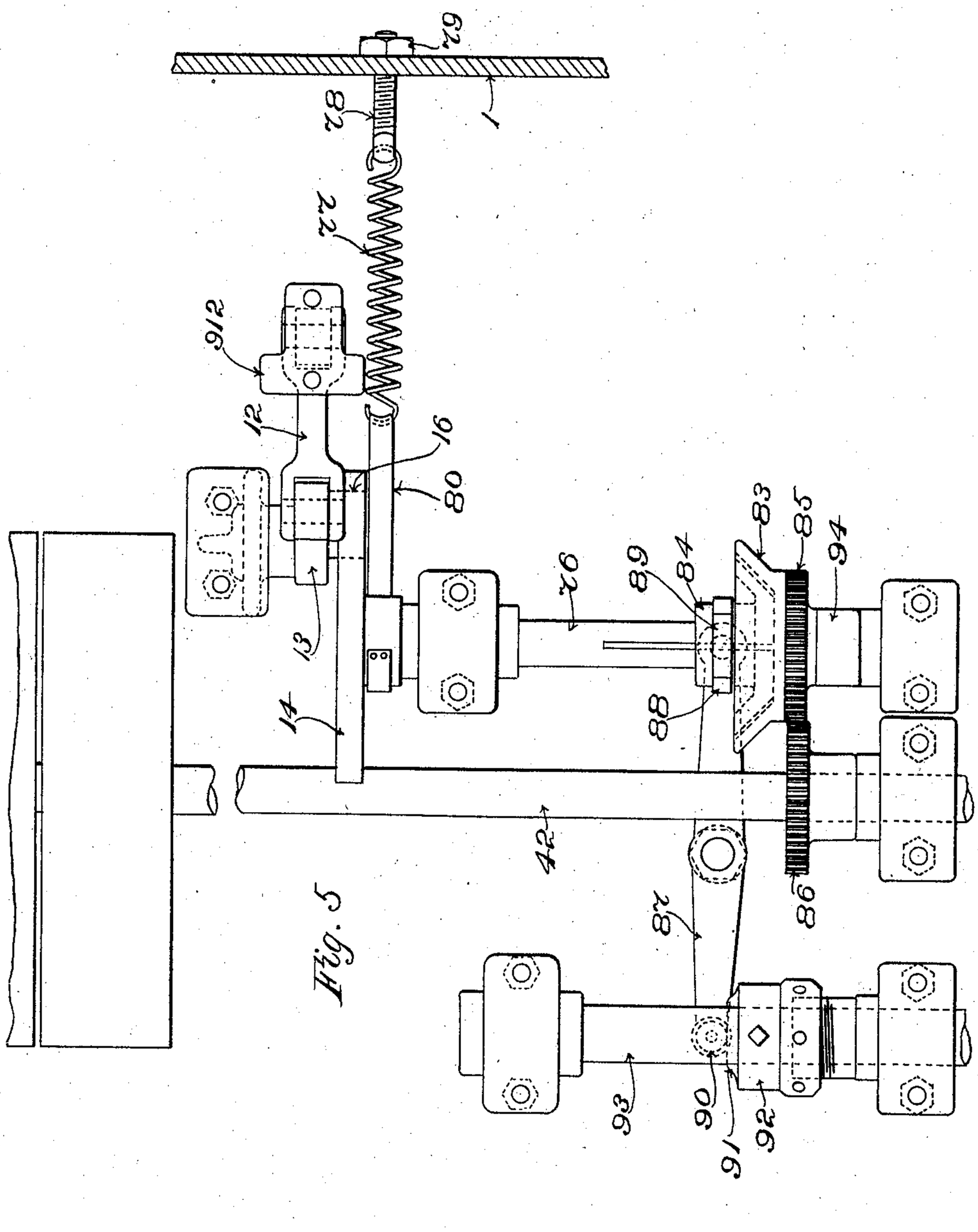

Fig. 5

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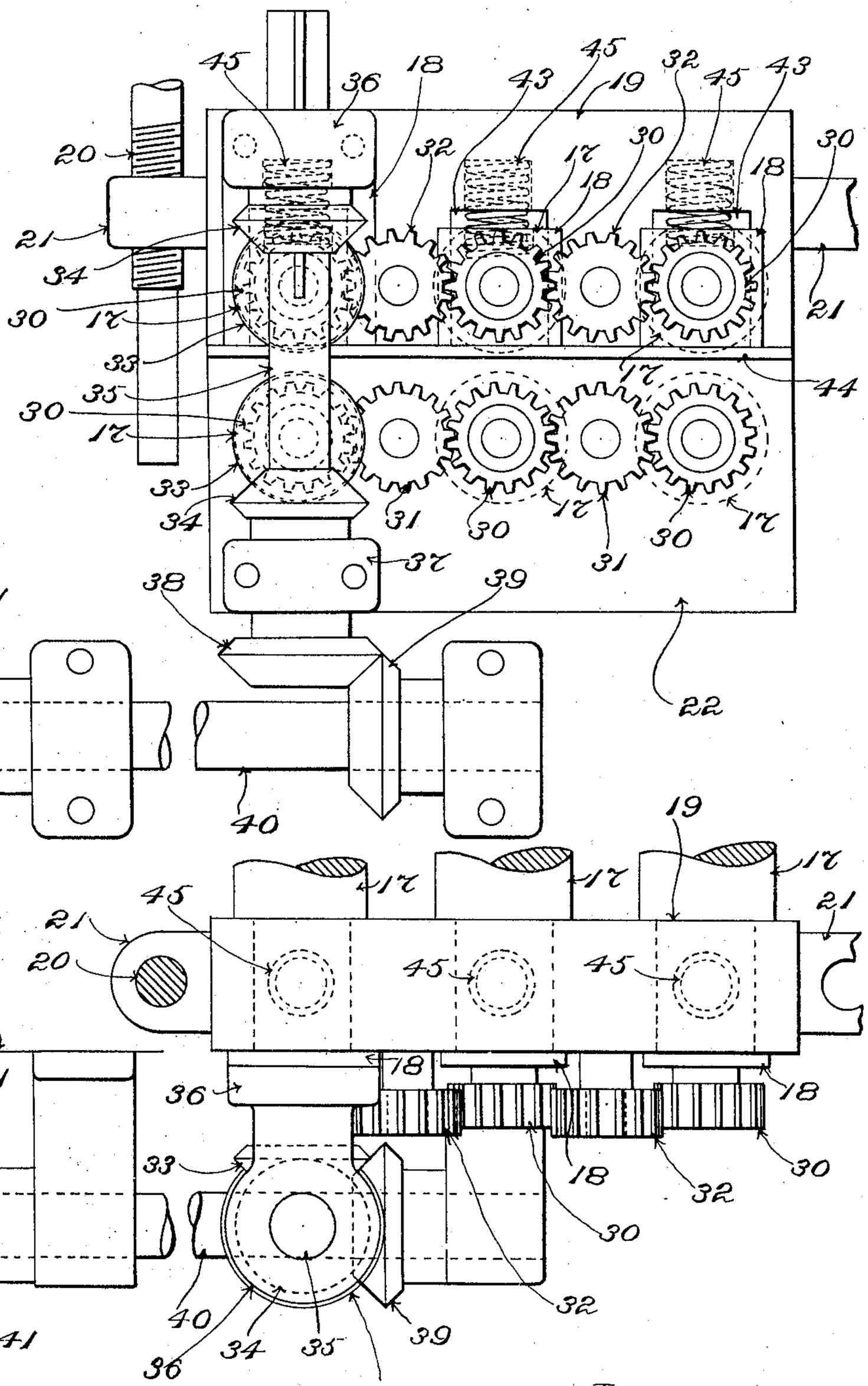
NO MODEL. 6 SHEETS—SHEET 5.

Fig. 6.



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NO MODEL. 6 SHEETS—SHEET 6.

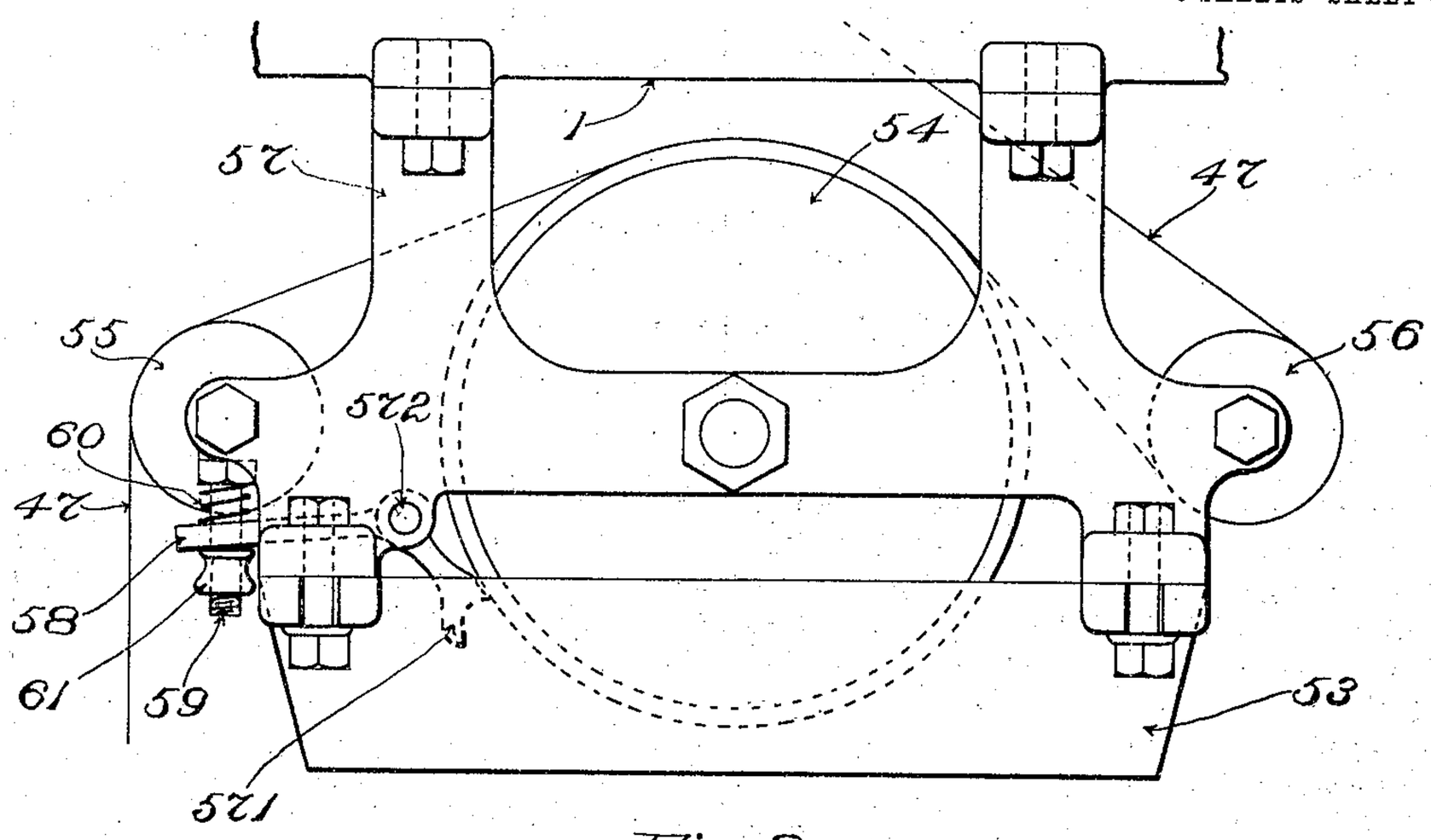

Fig. 8.

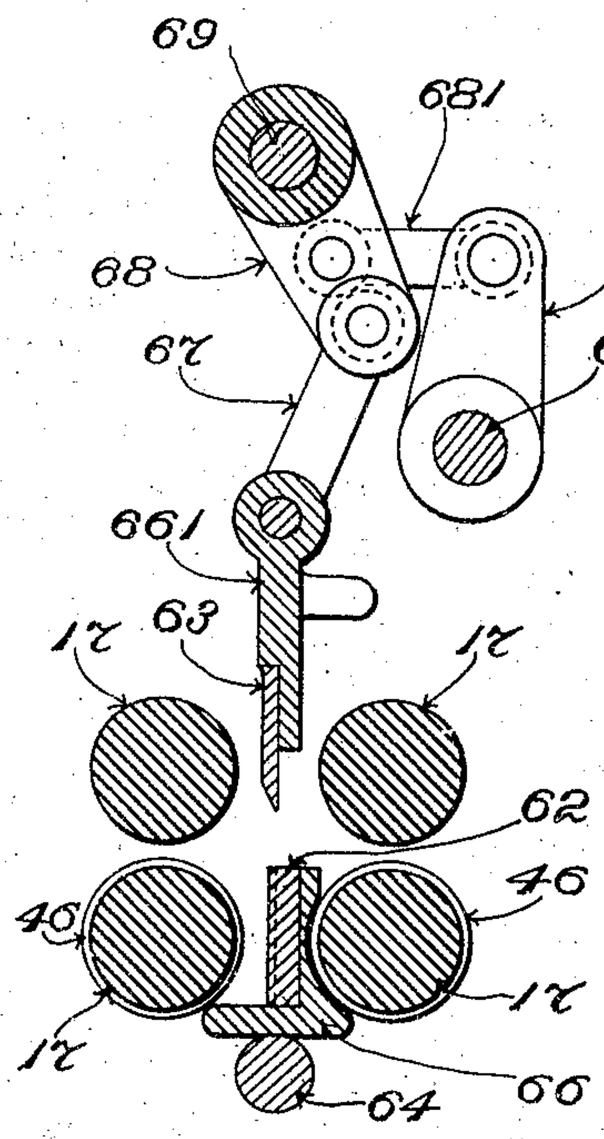

Fig. 10.

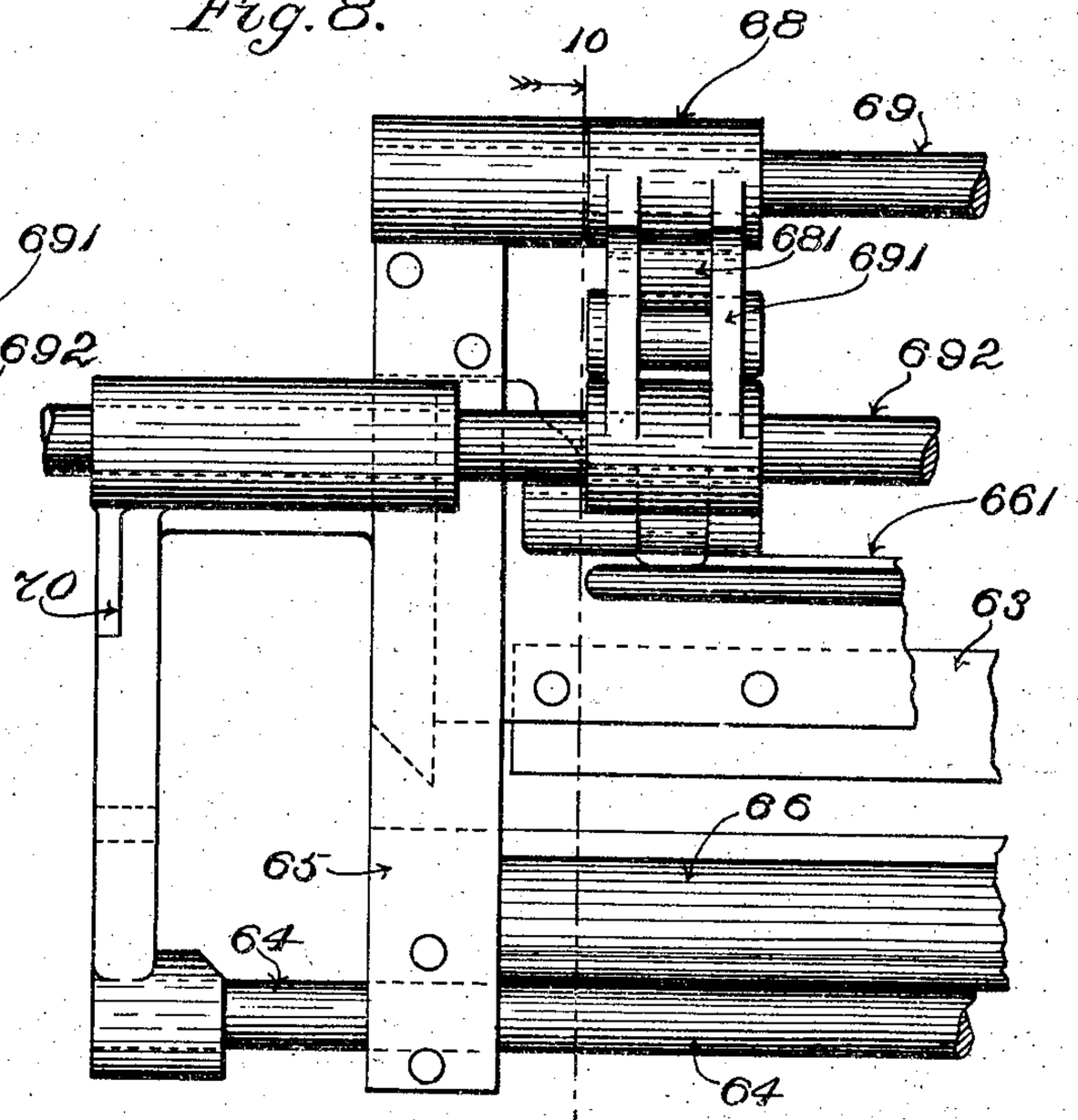

Fig. 9.

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No. 768,521. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

CHARLES H. CROWELL AND EUGENE H. TAYLOR, OF LYNN, MASSACHUSETTS, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO CARTER, RICE & COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

BOOKBINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 768,521, dated August 23, 1904.

Application filed December 6, 1898. Serial No. 698,410. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. CROWELL and EUGENE H. TAYLOR, citizens of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Bookbinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Certain classes of memorandum or blank books, as well as other books, are stitched along the line of the fold and then have applied to the exterior of the fold a strip of gummed cloth or other material. Usually in practice, so far as we are aware, up to the date of this our present invention the operation of applying the gummed strips has been performed by hand. Machinery has been devised for the purpose; but it is large and cumbrous, expensive, and unsatisfactory in its working, &c. In making application of the gummed strips a narrow strip of suitable cloth of continuous length is taken. If this strip has been prepared beforehand by coating it with an adhesive, such as glue, it is moistened to render it capable of adhering to the surface to which it is applied. If not previously coated with an adhesive, then a suitable adhesive is applied thereto at the time of using it. In making application of the strip by hand the strip either after or before having been moistened or coated with adhesive in a moist state is cut into sections of the required length, and the respective moistened or gummed sections are applied to the books or the like which are in course of being manufactured and are smoothed and pressed down into place. This mode of performing the work is comparatively slow and expensive.

It is the object of our invention to provide a simple, compact, and inexpensive machine of large output which shall perform automatically and expeditiously the various operations which are required to be performed in making application of the gummed strips, as aforesaid, for the purposes of bookbinding and the like.

The invention consists in the improved machine which we will now proceed to describe with reference to the accompanying drawings, in which last we have represented the best embodiment of the invention which we have thus far contrived. The invention first will be described fully with reference to the said drawings in treating of the said embodiment thereof, after which the essential and distinguishing characteristics of the invention will be particularly pointed out and distinctly defined in the claims at the close of this specification.

Figure 1 of the drawings is a view showing in perspective a machine containing the embodiment aforesaid of our invention. Fig. 2 is a view showing the said machine in plan, but with the work-supporting table removed in order to show parts which would be covered and concealed by the said table. Fig. 3 is a view of a portion of the machine in longitudinal section, showing chiefly the feeder and its actuating mechanism. Fig. 4 is a view in section on line 4 4 of Fig. 3 looking in the direction that is indicated by the arrows at the ends of such line. Fig. 5 is a view showing in plan the feeder-actuating devices of Fig. 3, the feeder itself being omitted. Fig. 6 is a view, partly in vertical section, looking from the far side of the machine in Figs. 1 and 2 of the series of rollers, their supports, and their actuating mechanism. Fig. 7 is a partial plan of the devices and mechanism of Fig. 6. Fig. 8 is an elevation of the moistening or gumming devices. Fig. 9 is a partial elevation of the cutting devices. Fig. 10 is a view in section on the line 10 10 of Fig. 9, showing also two pairs of rollers.

The framework of the machine is shown as comprising chiefly the bed 1, its legs 2 2, (which may be replaced by other forms of supports,) and the table 3, which last is located above the bed 1, parallel with the latter, and is supported and spaced therefrom in any suitable or convenient manner, as by means of blocks or the like, herein designated 4 4. The bed 1 serves to uphold or support the

various working and other essential parts of the machine, while the table 3 in the present instance serves chiefly to receive the blank when it is about to have the gummed strip applied thereto, to support and guide the blank as it is being delivered or fed by the action of the machine to the devices which apply the gummed strip, and to support the feeder for the blank.

5 designates a table or platform that is provided for the convenience of the operator who attends the machine. This table is located above the left-hand side of the machine, as viewed in Fig. 1, and serves to receive and hold a number of blanks, (each blank consisting of a collection of sheets stitched together and in readiness to receive the gummed strip.) The operator stands adjacent to this table and at the side of the machine which is turned to the front in Fig. 1 and taking a blank therefrom lays it on the upper surface of the table 3.

6 designates a feeder against the forward (left-hand) edge or surface of which the blank is laid by the operator. The said edge or surface extends crosswise of the table 3, and to the said feeder is applied an end gage 7, against which last one end of the blank is caused to take bearing by the operator, the said end gage 7 being designed to position the blank properly, so that in the subsequent operations of the machine the gummed strips shall be applied to the desired portion of the blank. The end gage 7 should be capable of adjustment along the feeder in a direction extending transversely with reference to the width of the machine in order to provide for the handling of blanks of various lengths. To this end it is made capable of movement upon the feeder in the direction of the length of the edge or surface of the feeder, against which the side edge of the blank is caused to bear by the operator, and it is secured in the desired position of adjustment upon the feeder in some suitable or convenient manner—as, for instance, by means of the clamping-screw, which is designated 8.

The devices by means of which the gummed strip is applied and caused to become firmly and closely attached to the blanks are located at the left-hand side of the machine, as viewed in Fig. 1. For the purpose of carrying to the said strip applying and attaching devices the blank which has been laid in position against the feeder and end gage movement is communicated to the feeder. In the present case the feeder is caused to reciprocate in a plane that is parallel with the upper surface of the table 3. Various arrangements for supporting and operating the feeder may be adopted in practice. For some reasons we prefer the arrangement which is shown in the accompanying drawings. In the said drawings the feeder 6 is mounted on a slide-bar or carrier-bar 9, Figs. 2, 3, and 4, that is fitted to slide in guideways 10 10, which are provided at or adjacent to a slot 11, extending in the direction of the length of the table 3, at or near the mid-width of the said table. As a means of imparting reciprocating movement to the slide-bar 9 we connect to a block 912, secured to the said slide-bar, one end of a rod 12, Figs. 1, 3, and 4, which last is joined also to a lever 13, the said lever being vibrated at the proper times in the working of the machine by means hereinafter to be described.

At the left-hand end of the table 3 we provide a series of pairs of rollers 17 17, &c., Fig. 6, the rollers of each pair being separated from each other to an extent sufficient to permit of the entrance of the blank between them. The first pair of these rollers receives the forward edge of the blank as it is moved toward the rollers by the feeder, and by the rotation of the rollers the blank then is drawn in between the rollers and fed from one pair of rollers to the next in succession through the series until it is finally discharged from the last pair of rollers. A table 171, Figs. 1 and 2, may be provided to receive the blanks as they pass away from the last pair of rollers. In order to fit the machine for use in connection with blanks of different thicknesses, we make provision for varying as required the spaces between the rollers of the respective pairs. We effect this conveniently by rendering the upper rollers of the respective pairs adjustable toward and from the lower rollers of said pairs. In the present instance the boxes or bearings 18 18 for the upper rollers are all applied at each end of the set of rollers to a head 19, which is adjustable vertically with reference to the lower rollers.

20 20 designate screws which we show for the purpose of enabling the vertical adjustment of the heads 19 19 to be effected when it is desired to render the distance separating the upper set of rollers from the lower set of rollers suitable to the thickness of the blanks. We employ two adjusting-screws in connection with each head 19, the said screws fitting threaded holes or openings which are made through projecting portions 21 21 of the head and plain portions of the stems of the screws being fitted to bearings in upwardly-extending portions of the adjacent fixed head 22, Fig. 1. The fixed heads 22 22 are bolted to the bed 1. To couple the two adjusting-screws 20 for each head 19 together, so that both ends of the said head shall be adjusted in unison and to the same extent, we attach to each screw 20 a bevel-gear 23, and in bearings 24 24, applied to the said upwardly-extending portions of the corresponding fixed head 22, we mount a shaft 25, extending at right angles with the rollers 17·17, the said shaft 25 having fast thereon bevel-pinions 26 26 in mesh with the bevel-gears 23 23. The shaft 25 has thereon also a hand-wheel 27 or its equivalent. By turning the shaft 25 by means of power applied to the said hand-

wheel the screws may be rotated, and the head thereby adjusted as desired in order to place the upper and lower feed-rollers 17 17 at the required distance apart. In order to enable the adjustment of the two heads to be effected simultaneously at the opposite ends of the series of feed-rollers 17 17, we couple together the two sets of adjusting devices, so as to cause the said two sets to operate in unison, whereby when power is applied at any suitable point in the train of connections all of the adjusting-screws 20 20 are turned to the same extent, and the two adjustable heads 19 19 are adjusted simultaneously, both to the same extent. Thus we have shown in Fig. 2 (but for the sake of clearness have omitted from Fig. 1) a shaft 28, extending from one adjustable head 19 to the other, the said shaft 28 being supported by one of the bearings 24 at each side of the machine and having affixed to its opposite ends bevel-pinions 29 29, meshing with two of the bevel-gears 23 23. The described arrangement causes simultaneous adjustment of both of the movable heads 19 19 to be effected whenever either of the shafts 25 is rotated by means of its hand-wheel.

For the purpose of driving the feed-rollers 17 17 each of the latter has fast on each end thereof a spur-pinion 30. The lower feed-rollers are all connected together, so as to cause them to rotate in unison by means of idle or carrier pinions 31 31, which are supported on the fixed heads 22, the said pinions 31 being in mesh with the pinions 30 on the said lower feed-rollers. Similarly the upper feed-rollers are connected to rotate in unison by means of carrier-pinions 32 32, which are mounted on the adjustable heads 19, the said pinions 32 being in mesh with the pinions 30 on the said upper feed-rollers. For the purpose of driving the various pairs of feed-rollers bevel-gears 33 33 are made fast on the upper and lower rollers, respectively, of one pair of the said feed-rollers, and like bevel-gears 34 34 are mounted on a vertical shaft 35 at the side of the machine. The lower bevel-gear 34 is made fast on said shaft 35, while the upper bevel-gear 34 is splined thereto, these bevel-gears 34 34 meshing, respectively, with the bevel-gears 33 33, which are mounted, as aforesaid, on the said pair of feed-rollers. The said vertical shaft 35 is fitted to bearings 36 and 37, which are secured to respectively the box 18 for the first upper feed-roller and the fixed head 22 at the side of the machine on which the said shaft is located. The bearing 36 moves up and down along the shaft 35 as the said adjustable head 19 is adjusted. Vertical support is afforded the shaft 35 by reason of the fact that the lower bevel-gear 34 rests on the upper side of the bearing 37, affixed to the fixed head 22. On the lower end of the vertical shaft 35 is made fast a bevel-gear 38, which is in mesh with the bevel-gear 39 on a horizontal shaft 40, which is driven by bevel-gears 41 41 from the main or driving shaft 42 of the machine.

In order to compensate automatically for differences in the thickness of the blanks which pass between the upper and lower sets of feed-rollers and for inequalities in the said blanks, the boxes or bearings 18 18 for the upper feed-rollers are made movable vertically in the recesses 43 43 in the adjustable heads. (See Fig. 6.) The said boxes or bearings are prevented from descending too low by means of the cap-plate 44, which is secured to the under side of each adjustable head 19 and bridges the said recesses. The boxes or bearings 18 18 when in their lowest positions in the said recesses 43 43 are supported by the cap-plates 44 44. They are pressed toward the said plates, so as to carry the upper set of feed-rollers toward the lower set by means of springs 45 45, which are compressed within the recesses and act downwardly against the tops of the said boxes or bearings 18 18.

As the blanks are presented successively to the feed-rollers by the action of the feeder they encounter the gummed strip, the latter having been prepared for application thereto. The gummed strip in a continuous length is guided so as to become applied to the portion of each blank which it is desired shall receive the same, and the said continuous length of gummed strip passes or advances through the series of pairs of feed-rollers in unison with the blanks and attached to the latter. It is possible to introduce the gummed strip from above and to apply the same to those portions of the blanks which are turned upwardly. It enables a better and more convenient arrangement of the parts of the machine to be secured, however, to introduce the said gummed strip into the feed-rollers from below and to apply it to portions of the blanks which are at the under sides of the latter. We have therefore in the present case arranged to introduce the gummed strip from below. The said strip therefore passes in between the first pair of feed-rollers below the blanks, which are carried forward to the said feed-rollers by the action of the feeder, and by the compression of the successive pairs of feed-rollers the gummed strip is caused to become firmly united to the blanks. In order to insure that the gummed strip shall be pressed into close and intimate contact with all portions of the surfaces of the blanks, we cover the lower feed-rollers with rubber or other elastic material, as at 46 46, Fig. 10.

47 designates a roll of material in strip form, the same being wound on a reel 48, the shaft of which latter is supported in bearings 49 in brackets 50, carried by the lower part of the machine-frame. 51 is a brake-wheel that is fast on the said roller, and 52 is a weighted brake-band in contact with the said brake-wheel and coöperating therewith to act as a

drag to prevent the too free unwinding of the strip from the roll. 53, Figs. 1 and 8, is a trough. 54 is a cylinder or roller which is mounted above the said trough, with a portion of its surface dipping into the latter. 55 and 56 are guide-rolls on opposite sides of the said cylinder or roller 54, and 57 is the support on which the said trough, cylinder, and guide-rollers are mounted. From the supply-roll 47 the strip passes over the guide-roller 55 and the cylinder or roller 54, under and partly around the guide-roller 56, and thence to the feed-rollers 17 17. If the material contained in the supply-roll 47 is in the form of a previously-gummed strip, then the trough 53 contains water, and the water which is taken up by the surface of the cylinder or roller 54 is transferred to the gummed surface of the strip as the latter travels over the cylinder or roller. If the material in the supply-roll 47 is in an ungummed condition, then the trough 53 will contain a suitable adhesive, and the said adhesive will be applied by the cylinder or roller to the strip as the latter advances to the feed-rollers.

571 is a scraper or doctor working in connection with the surface of the cylinder or roller 54 and operating to remove therefrom the excess of water or adhesive taken up by the periphery of the said cylinder or roller 54. The said scraper or doctor is journaled in the support 57 at 572, and from one of its journals projects the arm 58. A hole in the free end of this arm receives a threaded stud or bolt 59, projecting from the said support 57, and a spring 60, surrounding the stud 59 above the arm, acts with a tendency to bear the doctor or scraper 58 toward the periphery of the cylinder or roller 54. A nut 61 on the said stud 59 below the said arm 58 serves as an adjustable means of limiting the approach of the doctor or scraper to the said periphery.

In some cases we contemplate allowing the series of blanks to be discharged from the last pair of feed-rollers while remaining still connected by the continuous strip, the disconnection or separation of the blanks from one another being effected subsequently. Usually, however, we shall combine with the feed-rollers cutting devices operating to sever the strip between successive blanks, thereby separating or detaching the blanks from one another.

62 and 63 (see, for instance, Figs. 9 and 10) designate, respectively, a fixed cutter and a moving cutter which in the illustrated embodiment of our invention we locate intermediate the discharging pair of feed-rollers and the pair of feed-rollers next preceding the same. By the closing of the said movable cutter against the said fixed cutter the severance of the strip between each two blanks is effected, so that as the blanks pass out from between the discharging pair of feed-rollers they are disconnected and separated. The cutters act as customary in similar connections to occasion a shearing cut. This consumes, ordinarily, an appreciable period of time in its accomplishment—that is to say, although the actual cutting operation is in reality performed very quickly and in an exceedingly small fraction of time, there is, nevertheless, a period of time between the instant when the cutters close upon the gummed strip between two blanks and the instant when the complete severance of the said gummed strip is effected, which period is so short that it hardly admits of being measured and yet is of such duration that the hold of the cutters upon an incompletely-severed moving strip would or might occasion an objectionable drag, this drag acting in opposition to the pull of the feeding-rollers which succeed the cutters in the line of travel of the blanks. Furthermore, during the time that the cutters are closed together and until they subsequently have become separated sufficiently they are in position to constitute an obstruction in the path of the portion of gummed strip which is advancing toward them or in the path of the advancing blank which is nearing them. No difficulty in these respects will be experienced when the machine is being run at a low rate of speed and with continuously-rotating feed-rollers or even when the machine is being run at a fairly high rate of speed with continuously-rotating feed-rollers, provided the blanks do not succeed one another too closely in passing through the feed-rollers, nor when the feed-rollers are actuated with an intermittent motion, as contemplated by us in some cases. We desire that the machine shall be prepared and fitted in all respects to yield a large output of work, and the machine is, in fact, intended to be worked at a rate of speed which shall be limited only by the capacity of the operator to place the blanks successively in proper position upon the table 3 against the feeder 6 and the end gage 7. Therefore we prefer to employ continuously-operating feed-rollers, inasmuch as they are fitted for a greater output, and in order to enable such feed-rollers to be utilized advantageously we make provision in the shape of means whereby at the time of the closing of the cutters the said cutters are advanced in unison with the travel of the blanks and gummed strip. This obviates any drag on the partially-severed gummed strip. It obviates any tendency to obstruct the path of the gummed strip or blanks. It also enables the successive blanks to be spaced more closely together than would otherwise be possible, and thereby enables a considerable economy to be effected in the amount of gummed strip which is consumed by reducing the distance between adjacent blanks, and consequently reducing the length of the portions of gummed strip intervening between the blanks, such portions having subsequently to be trimmed off, and hence being of course wasted. We

show herein for the purpose of actuating the cutters a rock-shaft 64, extending across the machine beneath the feed-rollers and mounted in bearings in the fixed heads 22 22. At each side of the machine we clamp upon the said rock-shaft, near to the end of the latter, an arm 65. The two arms 65 65, which together form a carrier or support for the cutters, have secured to them the fixed knife-bar 66, it having attached thereto the lower cutter 62. The said arms are formed with guideways, receiving the end of the upper or moving knife-bar 661, to which last is attached the upper cutter 63. For the purpose of causing the movable cutter to be moved toward and from the fixed cutter we join the movable knife-bar 661 by short links or connections 67, Fig. 10, to arms 68 68 on a rock-shaft 69, the said rock-shaft being supported in bearings that are formed in projecting portions of the arms 65. The arms 68 are connected, respectively, by links 681 681 to arms 691 691, made fast on a second rock-shaft 692, which is mounted in bearings on the arms 70 70, which are made fast on the ends of the rack-shaft 64. The free extremities of the arms 70 70 have attached thereto the free extremities of the arms 65 65, so as to afford support to the latter and prevent the cutters from springing with relation to each other. On one end of the said rock-shaft 692 is an arm 71, (see Figs. 1 and 2,) which is connected by a rod 72 with the lever 73, which last is pivoted to the table 1 at 731, Fig. 1, and moved at the required times in the operation of the machine to effect the cutting of the portions of gummed strip connecting successive blanks. For the purpose of causing the cutters at the time of the cutting operation to advance in unison with the travel of the blanks and gummed strip the cutter-supports in the present case are swung around the axis of rock-shaft 64. This is effected by imparting movement to the arms 65 and 70. Herein the arm 70 is shown connected by a rod 74 with an arm 75, pivoted upon lever 73. At the time when lever 73 is moved to close the cutters the arm 75 is acted upon by a suitable moving device, as explained hereinafter, to press it toward the left in Figs. 1 and 2, thus moving the cutter-supports and cutters in the same direction, this being the direction of the feed of the gummed strip and blanks, while as lever 73 is moved to open the cutters again the arm 75, cutter-supports, and cutters are permitted to swing back into their original positions.

The feeder 6 has been described herein as connected by rod 12 with the vibrating lever 13, Figs. 1, 3, and 4. As a means of vibrating the lever 13 we show herein a cam 14, Figs. 3 and 5, the said cam having a slot 15, which receives a pin or roller 16, carried by the lever 13. The cam 14 constitutes an actuator for the feeder. It is arranged and constructed herein to have an intermittent motion and also to reciprocate, so as by the movement thereof in one direction to advance the feeder and by the movement thereof in the other direction to return the feeder to its starting position. Cam 14 herein reciprocates or rocks about an axis, it being shown herein fast upon a rock-shaft 76, to which latter is applied the power by means of which the cam is moved to advance the feeder. The rock-shaft and cam are held normally in the position in which they are shown in Figs. 3 and 5, which corresponds with the normal retracted position of the feeder, and are returned to that position after having been actuated to advance the feeder by means of a spring 77, one end of which is connected to a screw-threaded bolt 78, that is applied to a threaded hole in a depending flange of bed 1 of the machine, the said bolt having a check-nut 79 applied thereto. To the other end of the said spring 77 is connected a strap, as 80, which extends from the spring to and is wound around a convenient portion or attachment of the shaft 76—as, for instance, the hub of the cam 14—the end of the said strap being attached to the said hub. An adjustable stop, as 81, herein constituted by a screw set in a convenient portion of the bed, is engaged by a projecting part, as 82, of the cam 14, and thereby determines the position to which the cam and the parts which are operated therefrom are returned by the action of the spring 77. For the purpose of rocking the shaft 76 and cam 14 in order to cause the feeder 6 to be advanced I apply to the said shaft 76 the members 83 and 84 of a clutch, the latter being herein constituted conveniently by a well-known form of friction-clutch. The member 83 is free to turn on the said shaft and has combined or connected therewith a spur-gear 85, meshing with a spur-gear 86, fast on the driving-shaft 42. The said member 83 thereby is rotated continuously from the said driving-shaft. The member 84 of the friction-clutch is splined to the shaft 76. Normally it is disengaged from the member 83. It is moved along shaft 76 by a shifting or closing means, herein constituted of a lever 87, which is pivoted to the bed of the machine, one arm of the said lever carrying a fork 88, which enters a groove 89 in the hub of the member 84, and the other arm of the said lever carrying a pin, roller, or other projection 90, which lies in the path of rotation of a cam projection 91 on a hub 92 of shaft 93. In the rotation of the shaft 93 the cam projection strikes the pin, roller, or other projection aforesaid and turns the lever so as to press the member 84 of the friction-clutch into engagement with the member 83. This locks the member 83 to the shaft 76, so as to cause the said shaft 76 and its cam 14 to be turned through the driving connection of

member 83 with the main driving-shaft, thereby occasioning through the connections which have been described an advance of the feeder 6. The cam projection 91 immediately passes away from the pin, roller, or other projection on the lever 87, permitting the member 84 of the friction-clutch to move sufficiently from the rotating clutch member 83 to become disconnected therefrom, whereupon the spring 77 occasions the reverse movement of the cam 14, shaft 76, and feeder. The said cam projection we designate the "controller-cam," inasmuch as it controls the working of the feeder. To prevent movement of the member 83 of the friction-clutch lengthwise of the shaft 76 when the splined member 84 is pressed against the said member 83, a collar, as 94, is placed upon the said shaft 76 at the side of the clutch member 83. The shaft 93 is rotated from the main or driving shaft 42 by suitable gearing connections, herein shown as comprising a pinion 95, Fig. 1, on the said main or driving shaft 42, a gear 96 on the shaft 93, and intermediate, idle, or carrier gears 97 and 98, Figs. 1 and 2. For the purpose of operating the lever 73 we mount a cam-disk 99 on the shaft 93, the said cam-disk being formed with a cam-slot, as 100, receiving a pin or roller, as 101, which is carried by the lever 73. For the purpose of operating the arm 75 we mount a cam 102 on the shaft 93, the said cam acting against a pin or roller 103 on the said arm 75.

It will be observed that the feed-rollers are operated by driving connections intermediate the same and one rotating shaft in the machine and that the actual movements of the feeder are communicated to the latter through intermediate operating devices from the same shaft. Also that the time of working of the said feeder and the times at which the vertical and horizontal movement of the cutting devices shall take place are determined by cams on a second rotating shaft of the machine. This second shaft in virtue of the control which it exercises over the working of the feeder and cutting devices may be termed a "master-shaft." It will be obvious that by varying the speed of rotation of the second or master shaft 93 relative to the speed of rotation of the shaft 42 the timing of the feeder and cutting devices may be varied to suit blanks of any desired length. For longer blanks the shaft 93 will be required to rotate more slowly relatively to the shaft 42, and vice versa. In order conveniently to vary the speed of the shaft 93 relatively to that of the shaft 42, we provide for the use of change-gearing by making one or both of the carrier-gears 97 and 98 replaceable by others of different diameters. The stud on which the said change-gears are mounted is fixed to an adjustable carrier or bracket, as 104, as customary in the case of change-gears.

In adapting the machine for a given width of blank the feeder 6 is shifted on its carrier-bar 9 toward or from the feed-rollers. In order to enable the shift of the feeder upon the said carrier-bar 9 to be made whenever desired, the said carrier-bar is formed in the direction of its length with an undercut slot 109, Fig. 4, and through the rearwardly-projecting part of the feeder is passed the stem of a bolt 110, the latter having its head seated in the said undercut slot beneath the overhanging side edges of the slot and the stem of the bolt receiving the wing-nut or clamp-nut 111.

In some cases it is desired to unite a continuous gummed strip to one side of a continuous sheet of paper or other material. To enable this to be accomplished with the aid of our machine at such times as the machine is not employed for applying the gummed strip to memorandum-books or similar blanks, we apply to the right-hand end of the machine in Figs. 1 and 2 brackets 105 105 to receive the journals of a guide-roller 106. To the legs 2 2 we apply brackets 107 107, having bearings to receive the journals of a roller 108, containing or having wound thereon the continuous sheet of paper or other material to which it is desired to apply the gummed strip. The said sheet of paper is led over the guide-roller 106 and in the direction of the length of the table, it then being passed between the rollers of the successive pairs of feed-rollers in company with the gummed strip. When the machine is utilized for this purpose, the feeder and cutters are rendered inoperative by disconnecting the gearing, which is located intermediate the driving-shaft and the shaft 93. By leaving the cutters in action the sheet may be divided into short lengths of any required size, the size thereof being provided for through the proportions of the gearing which rotates the cutter-operating cam.

We claim as our invention—

1. The improved machine for applying binding-strips to blanks for books and the like, comprising, essentially, means to prepare the strip for adhesion to the blanks, means to apply said strip to the blanks and compress the same against the latter, automatic devices acting with predetermined timing to feed the blanks successively to the said applying means, automatic strip-severing devices adapted to sever the strip between successive blanks to which the strip has been applied, and means to actuate said severing devices acting to operate the latter as each connecting portion of the strip between successive blanks reaches the cutting-point, substantially as described.

2. The improved machine for applying binding-strips to blanks for books and the like, comprising, essentially, means to prepare the strip for adhesion to the blanks, means to apply said strip to the blanks and compress the

same against the latter, automatic devices acting with predetermined timing to feed the blanks successively to the said applying means, automatic strip-severing devices adapted to sever the strip between successive blanks to which the strip has been applied, and means to actuate said severing devices timed with reference to the action of the feeding devices to operate the cutting devices as each connecting portion of the strip between successive blanks reaches the cutting-point, substantially as described.

3. In an organized machine for applying binding-strips to blanks for memorandum-books and the like, the combination with suitable strip applying and compressing instrumentalities, of a feeder to deliver the blanks to said compressing instrumentalities; an actuator for said blank-feeder in operative connection therewith; means for imparting intermittent movements to said feeder, comprising a continuously-rotating clutch member, a second clutch member operatively connected with said feeder-actuator and normally disconnected from the said continuously-rotating clutch member; a cam for controlling the relation of said second clutch member to said continuously-rotating clutch member; means for operating said controlling-cam and said rotating clutch member and a device operated by said clutch-controlling cam to bring the said clutch members into operative relation to impart a movement to the feeder, substantially as described.

4. The combination with the feeder, the actuating-cam in operative connection with the feeder, the continuously-rotating clutch member, the clutch member operatively connected with said cam, and means to return the feeder and cam to their starting positions, of the controller-cam, operating connections for the same and the said continuously-rotating clutch member, and a lever operated by said cam and serving to close the clutch to occasion the operation of the feeder, substantially as described.

5. The combination with the feed-rollers, the fixed and movable cutters, a carrier for said cutters, the links 67 connected with the movable cutter, the arms 68 with which said links also are connected, the shaft mounted on the carrier and having the said arms mounted thereon, the rock-shaft operatively connected with said arms, and means to operate the said rock-shaft, of means to move said carrier in the direction of the feed of the blanks as the cutters are closed, substantially as described.

6. The improved machine comprising the feeder for blanks to which binding-strips are to be applied, means to prepare the strip for adhesion to the blanks, the feed-rollers, the cutters, the driving-shaft, means to operate the feed-rollers from the driving-shaft, a second or master shaft in operative control of the feeder and cutters, and means, including change-gearing, to drive such second or master shaft from the driving-shaft, whereby by making change in the said change-gearing the timing of the feeder and the cutters may be varied to suit the desired size of blanks, substantially as described.

7. The improved machine comprising the feeder for blanks to which binding-strips are to be applied, an intermittingly-moving actuator in operative connection with the feeder, means to prepare the strip for adhesion to the blanks, the feed-rollers, the cutters, the driving-shaft, means to operate the feed-rollers from the driving-shaft, means normally inoperative, to operate the actuator from the driving-shaft, a second or master shaft in operative control of the actuator and the cutters, and means, including change-gearing, to drive such second or master shaft from the driving-shaft, whereby by making change in the said change-gearing the timing of the feeder and the cutters may be varied to suit the desired size of blanks, substantially as described.

8. The improved machine comprising the feeder for blanks to which binding-strips are to be applied, an intermittingly-moving actuator for said feeder in operative connection therewith, a continuously-rotating clutch member, a clutch member operatively connected with said actuator and normally disengaged from the continuously-rotating clutch member, means to prepare the strip for adhesion to the said blanks, the feed-rollers, the cutters, the driving-shaft, means to operate the feed-rollers from the driving-shaft, a second or master shaft in operative control of the actuator and the cutters, and means, including change-gearing, to drive said second shaft from said driving-shaft, whereby by making change in the said change-gearing the timing of the feeder and cutters may be varied to suit the desired size of blanks, substantially as described.

9. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, and means for compressing the said strip upon the blanks and feeding the latter forward, comprising, essentially, a series of pairs of rollers, means for supporting the lower rollers, movable heads supporting the opposite ends of the upper rollers, adjusting-screws in connection with opposite portions of each of the said heads, and means for operating the screws of a given head simultaneously, substantially as described.

10. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, and means for compressing the said strip upon the blanks and feeding the latter forward, comprising, essentially, a series

of pairs of rollers, means for supporting the lower rollers, a movable head at each side of the machine for supporting the upper rollers, adjusting-screws in connection with opposite portions of each of the respective movable heads, and means for operating all of said screws in unison to adjust both movable heads simultaneously, substantially as described.

11. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, and means for compressing the said strip upon the blanks and feeding the latter forward, comprising, essentially, a series of pairs of rollers, means for supporting the lower rollers, a movable head at each side of the machine for supporting the upper rollers, means to adjust said heads vertically to correspond with the thickness of the blanks, gearing to connect the lower rollers together, gearing to connect the upper rollers together, an upright driving-shaft and means for driving the lower rollers therefrom, and a gear in operative connection with the gearing of the upper rollers, splined upon the said shaft, and moving lengthwise thereof in unison with the adjustment of the movable heads, substantially as described.

12. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, and means for compressing the said strip upon the blanks and feeding the latter forward, comprising, essentially, a series of pairs of rollers, means for supporting the lower rollers, a movable head supporting the upper rollers, means for adjusting said movable head to vary the distance between the upper and lower series of rollers, and yielding bearings on said movable head for the upper series of said rollers, substantially as described.

13. The combination with the feeder, the actuating device in operative connection with the feeder, the continuously-rotating clutch member, the clutch member operatively connected with said device and means to return the feeder and device to their starting positions, of the controller-cam in operative control of the clutch and acting to close the latter to occasion the operation of the feeder, and operating connections for the controller-cam and the said continuously-rotating clutch member, substantially as described.

14. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare the strip for adhesion to the blanks, means to apply said strip to the blanks and compress the same against the latter, means to feed the blanks successively to the said applying means, a power-shaft, a second or master shaft in operative control of the feeding means, and means, including change-gearing, to drive such second or master shaft from the power-shaft, whereby by making change in the said change-gearing the timing of the feeding means may be varied to suit the desired size of blanks, substantially as described.

15. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare the strip for adhesion to the blanks, means to apply said strip to the blanks and compress the strip against the blanks, the feeder for the blanks, an intermittingly-moving actuator in operative connection with the feeder, a power-shaft in operative connection with the said applying means, means, normally inoperative, to operate the actuator from the said power-shaft, a second or master shaft in operative control of the actuator, and means, including change-gearing, to drive such second or master shaft from the driving-shaft, whereby by making change in the said change-gearing the timing of the feeder may be varied to suit the desired size of blanks, substantially as described.

16. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare the strip for adhesion to the blanks, means to apply said strip to the blanks and compress the strip against the blanks, a feeder for the blanks, an intermittingly-moving actuator for said feeder in operative connection therewith, a continuously-rotating clutch member, a clutch member operatively connected with the said actuator and normally disengaged from the continuously-rotating clutch member, a power-shaft in operative connection with the applying means, a second or master shaft in operative control of the actuator, and means, including change-gearing, to drive said second shaft from the power-shaft, whereby by making change in the said change-gearing the timing of the feeder may be varied to suit the desired size of blanks, substantially as described.

17. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, means for compressing the said strip upon the blanks, a feeder to advance the blanks successively to receive binding-strips, operating connections for the feeder embracing a clutch and acting to transmit movement intermittingly to the feeder, a controller-cam in operative control of the clutch and acting to close the latter to occasion the required intermittent operation of the feeder, and means for operating the said controller-cam, substantially as described.

18. In a machine for applying binding-strips to blanks for books and the like, in combination, means to prepare a strip for adhesion to the blanks, means for compressing the said strip upon the blanks, a feeder to advance the blanks successively to receive binding-strips, operating connections for the feeder embrac-

ing a clutch and acting to transmit movement intermittingly to the feeder, a controller-cam in operative control of the clutch and acting to close the latter to occasion the required intermittent operation of the feeder, and means for operating the said controller-cam, said means having provision for varying the relative speed of the movement transmitted to the controller-cam to thereby vary the timing of the movement of the feeder to suit the desired size of blanks.

In testimony whereof we affix our signatures in presence of two witnesses.

CHAS. H. CROWELL.
EUGENE H. TAYLOR.

Witnesses:
LEPINE HALL RICE,
WILLIAM A. COPELAND.