H. A. SPILLER.

PRINTING AND CUTTING MACHINE.

APPLICATION FILED DEC. 23, 1907.

1,098,060.

Patented May 26, 1914.

6 SHEETS—SHEET 1.

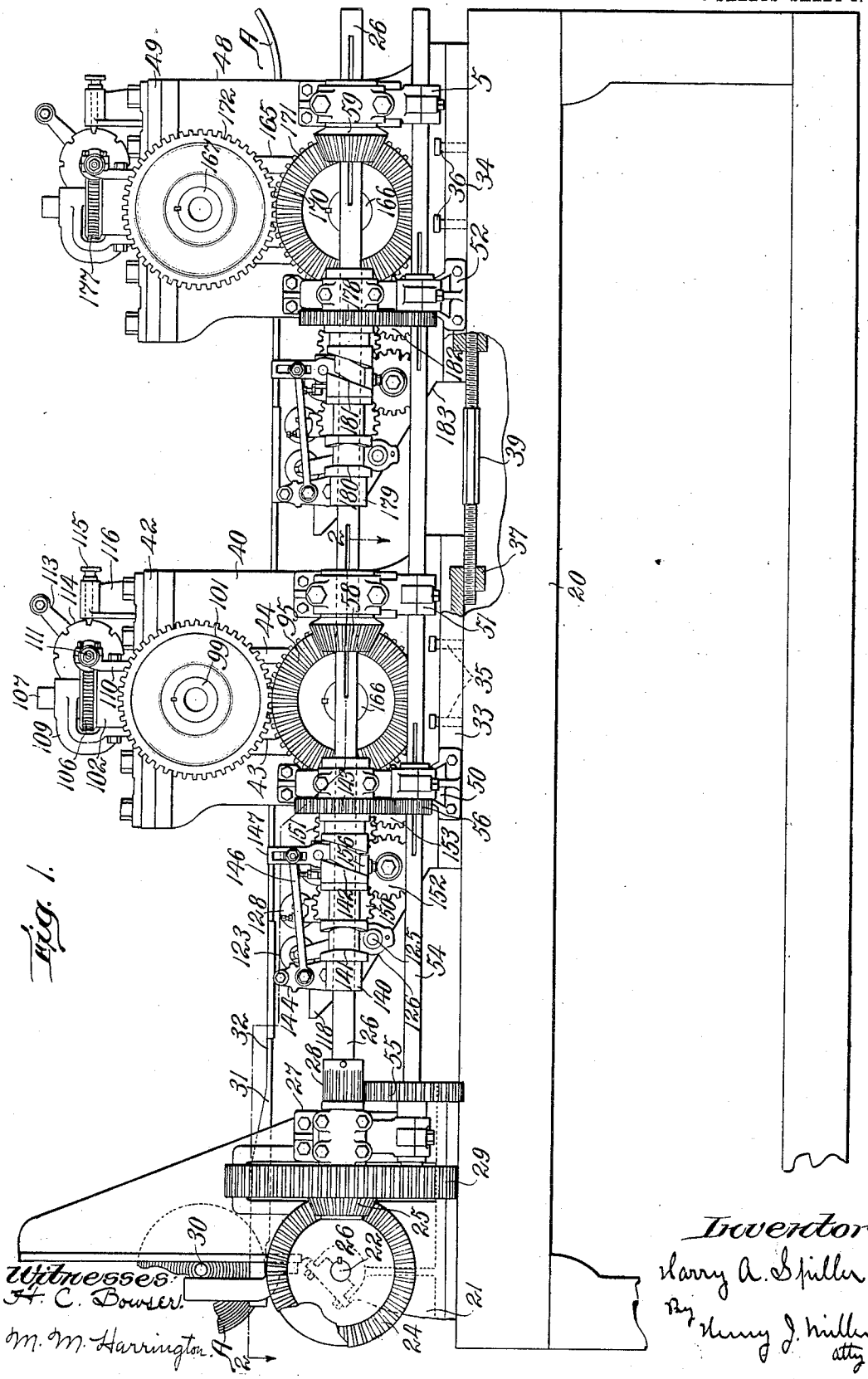


Fig. 1.

Witnesses:
F. C. Bowser.
M. M. Harrington.

Inventor:
Harry A. Spiller
By Henry J. Miller
atty.

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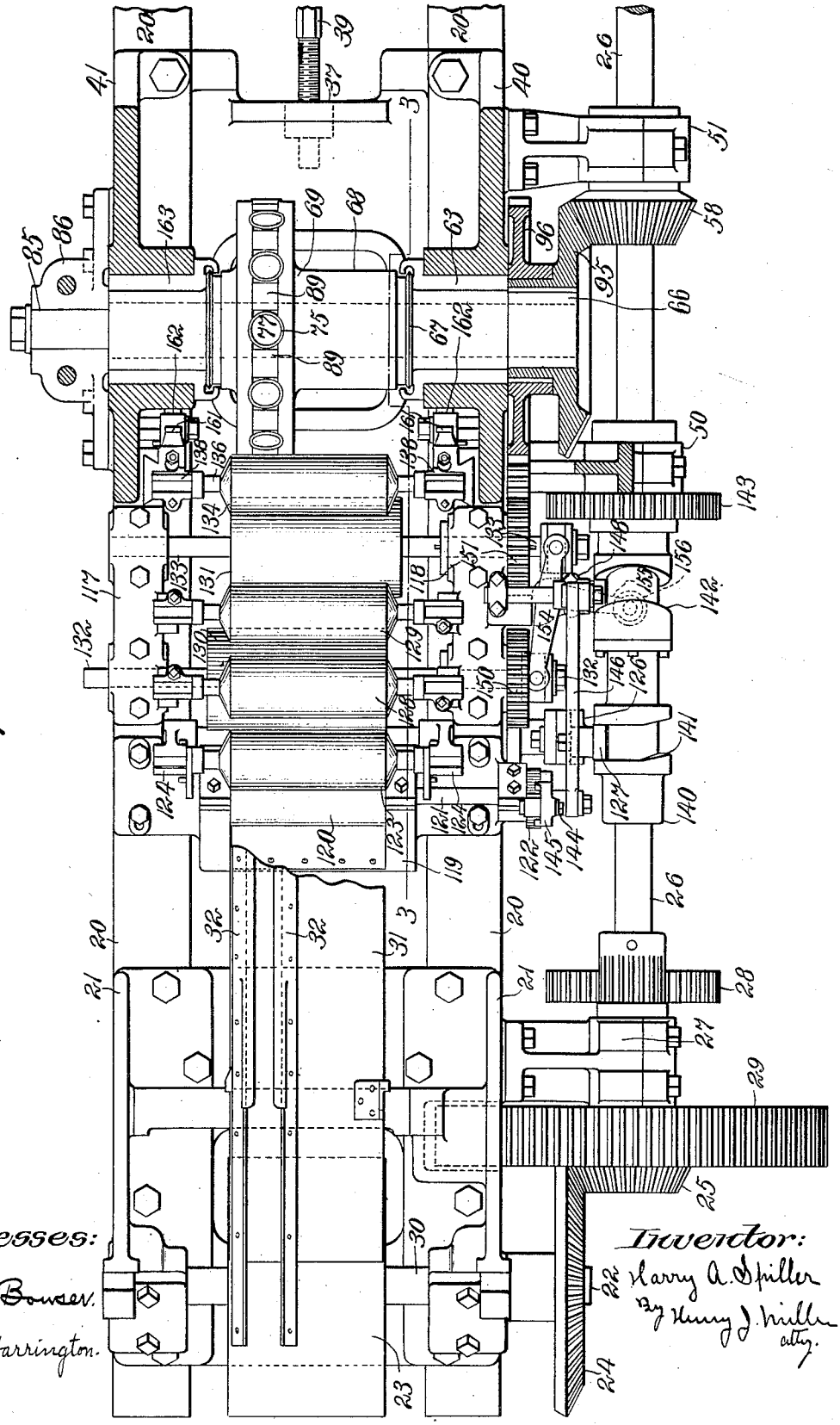


Fig. 2.

Witnesses:
H. C. Bowser.
M. M. Harrington.

Inventor:
Harry A. Spiller
By Henry J. Miller
atty.

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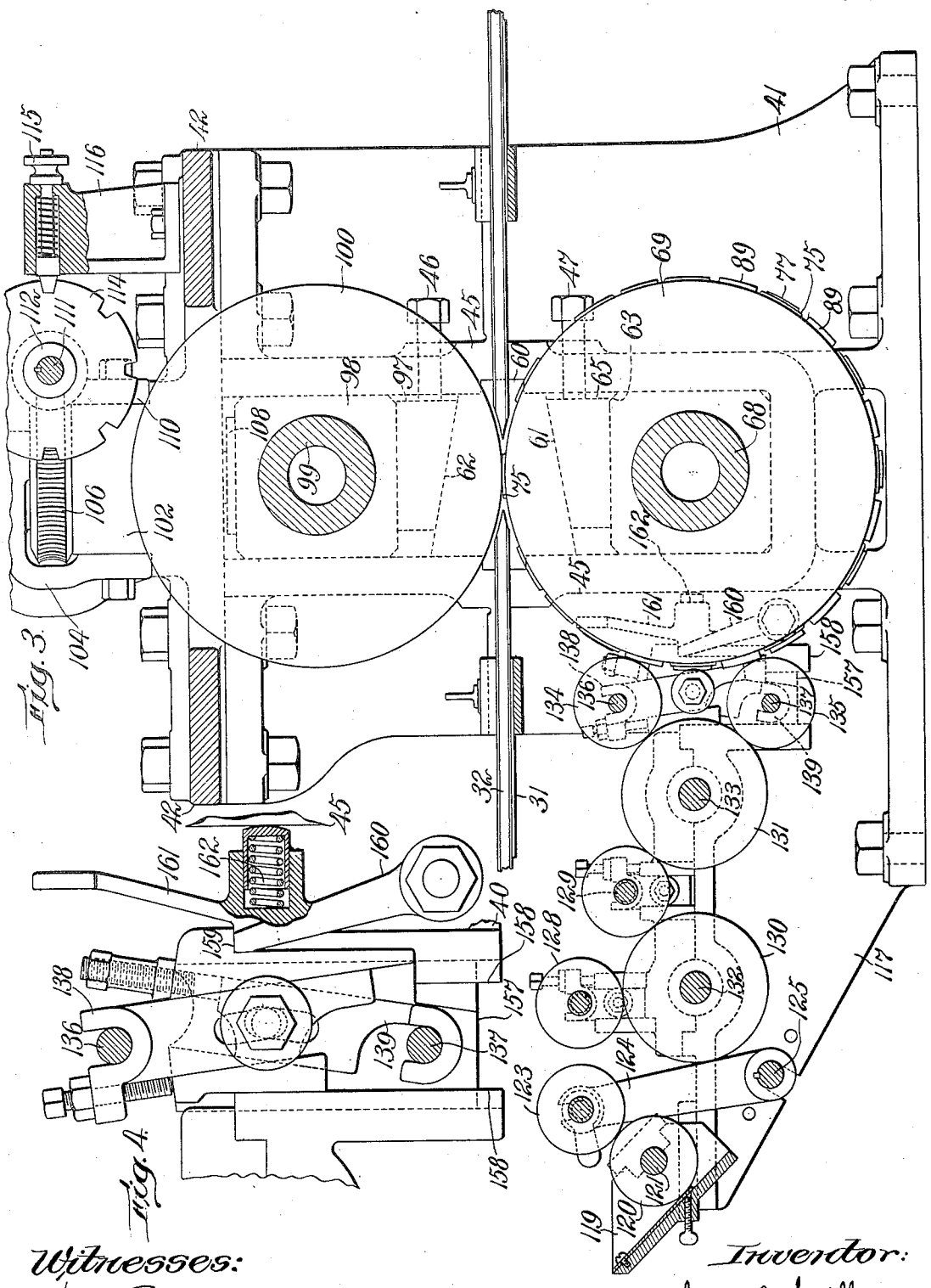


Fig. 3.



Fig. 4.

Witnesses:

H. C. Bowser.

M. M. Harrington.

Inventor:

Harry A. Spiller

By Henry J. Miller

atty.

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6 SHEETS—SHEET 4.

Fig. 5.

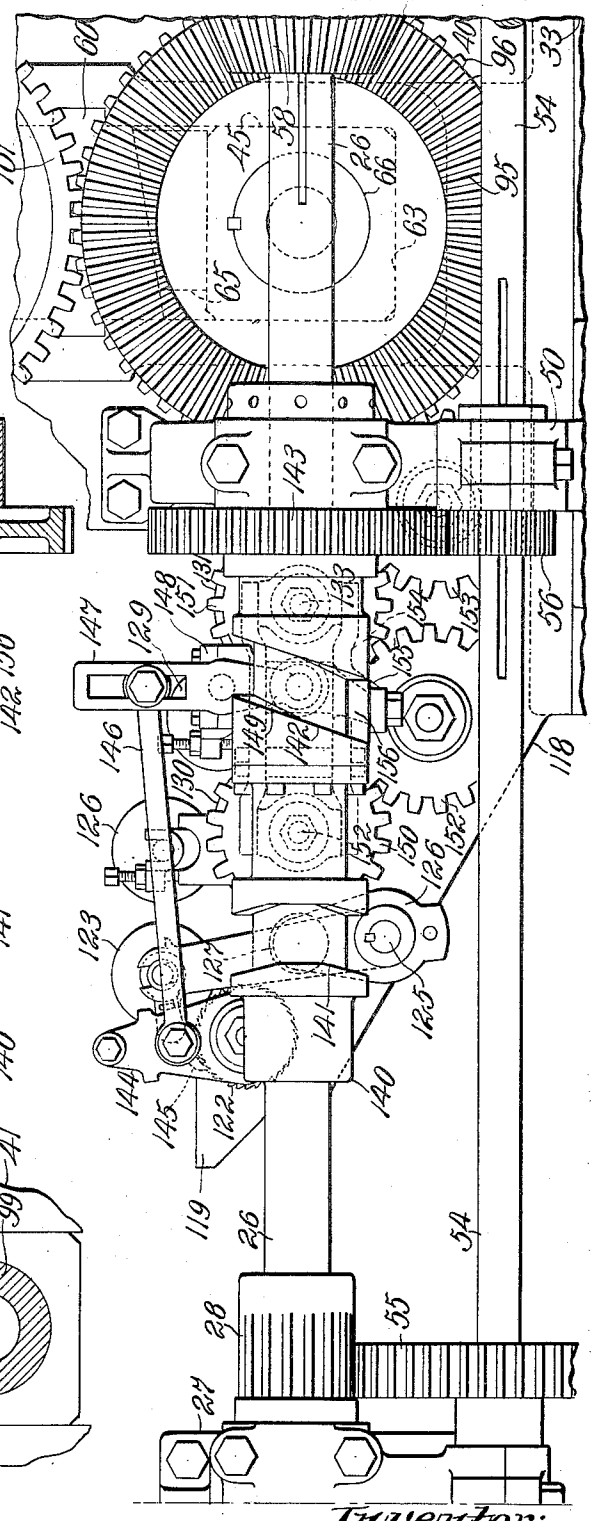


Fig. 6.

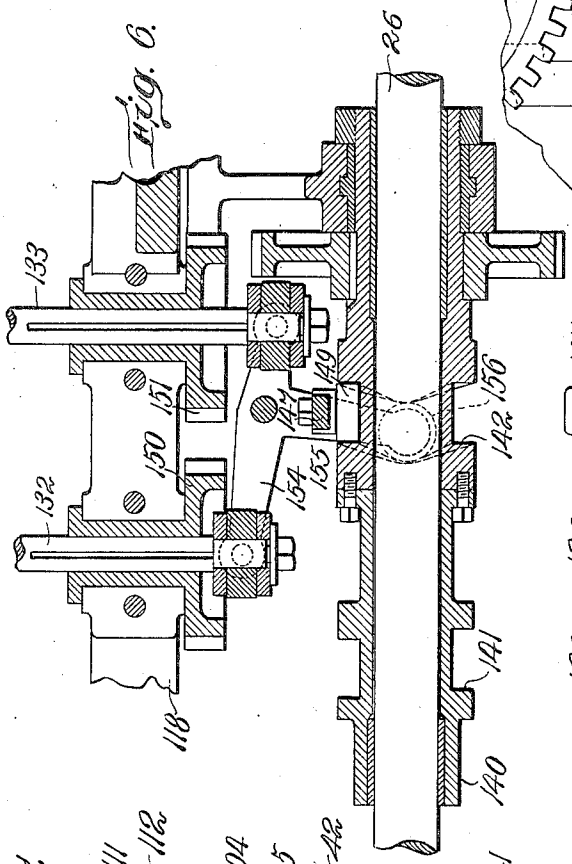
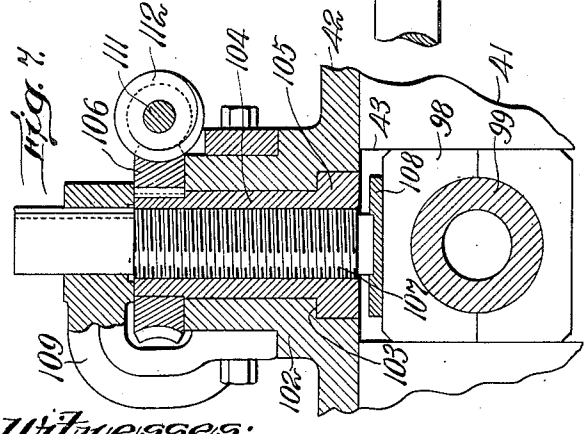


Fig. 4.



Witnesses:

H. C. Dawer

M. M. Harrington.

Inventor:

Harry A. Spiller

By Henry J. Miller

atty.

H. A. SPILLER.

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6 SHEETS—SHEET 5.

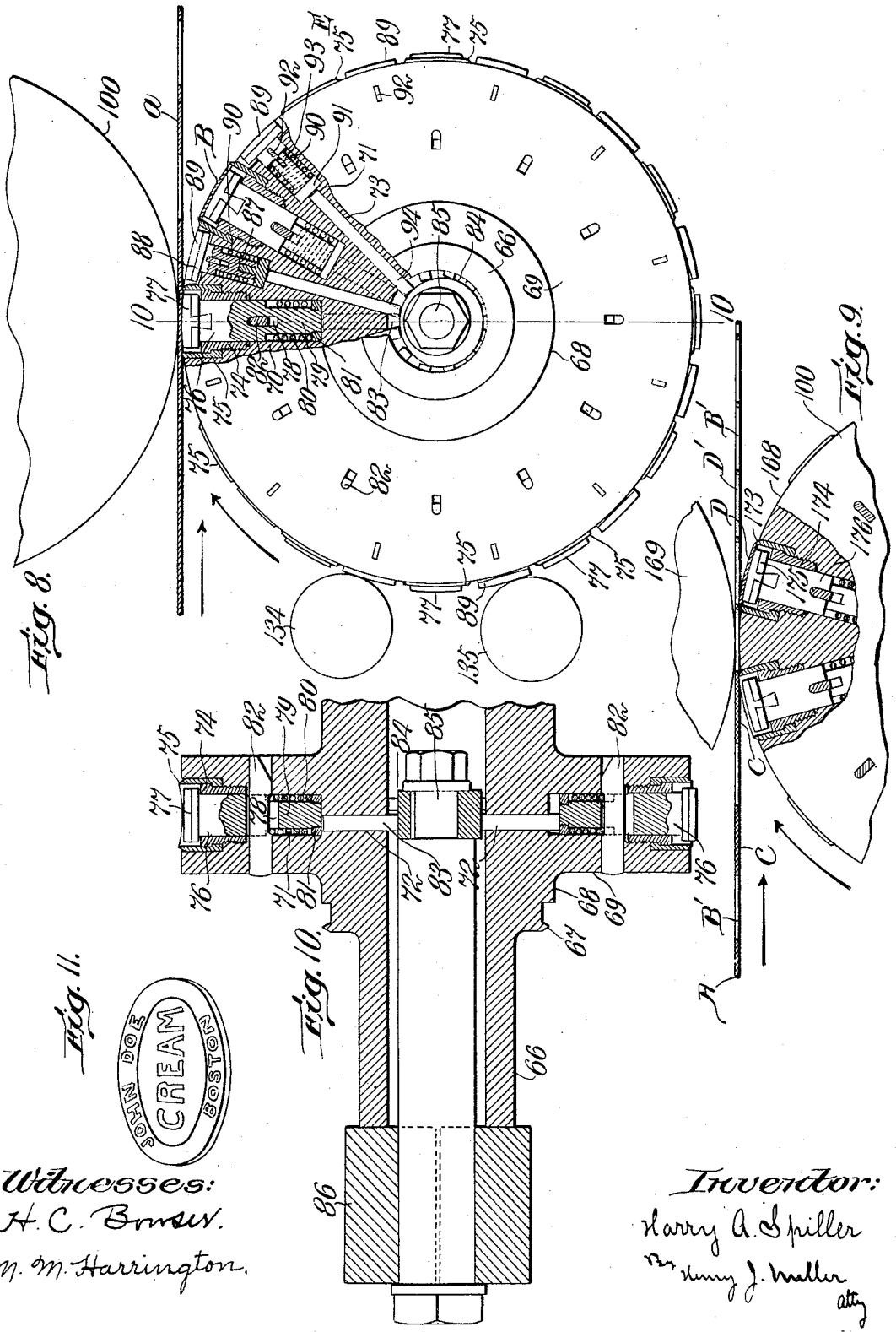


Fig. 8.



Fig. 9.



Fig. 10.




Fig. 11.

Witnesses:
H. C. Brown.
M. M. Harrington.

Inventor:
Harry A. Spiller
by Henry J. Miller
atty

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6 SHEETS—SHEET 6.

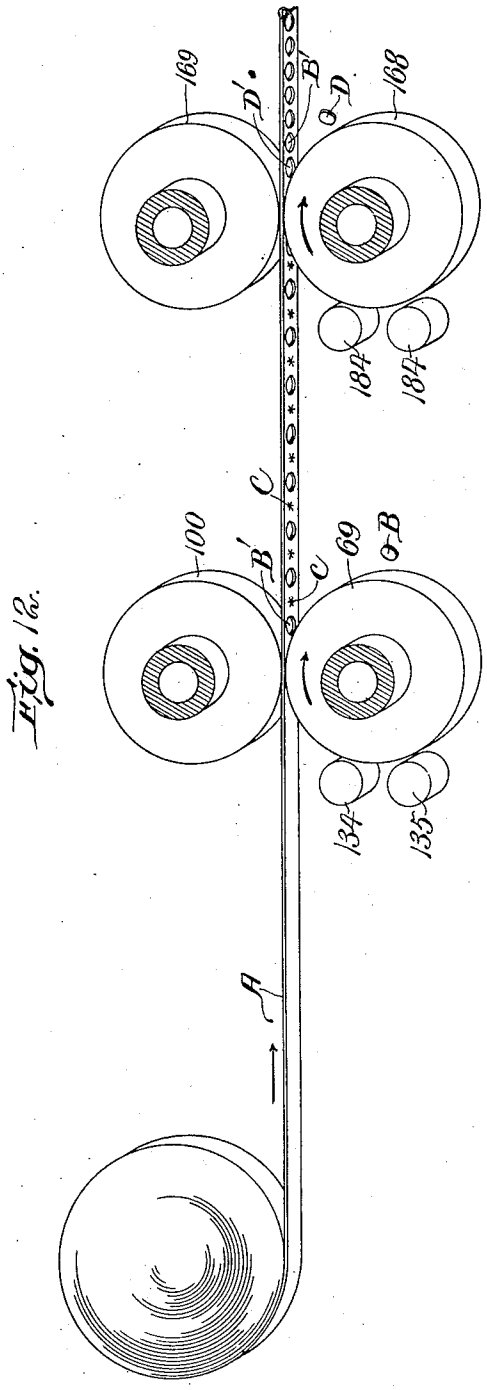



Fig. 12.

Witnesses:

H. C. Bowser.

Wm. M. Harrington.

Inventor:

Harry A. Spiller

By Henry J. Miller atty.

# UNITED STATES PATENT OFFICE.

HARRY A. SPILLER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO BROWN-BINNIAN COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## PRINTING AND CUTTING MACHINE.

1,098,060. Specification of Letters Patent. Patented May 26, 1914.

Application filed December 23, 1907. Serial No. 407,676.

*To all whom it may concern:*

Be it known that I, HARRY A. SPILLER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Printing and Cutting Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in printing and cutting machines and particularly to such machines adapted to simultaneously print and cut designs from strip material.

The machine in its practical application as described herein is designed to print and cut out disk closures for bottles, jars and other receptacles but no limitation as to the uses of the machine or of any of its constituent parts or combinations is intended by reference herein to specific uses.

The invention consists in a printing and cutting machine comprising a pair of rotatable cylinders the peripheries of which coact to feed forward a strip of material and to simultaneously print and cut portions of the same.

The invention also consists in a printing and cutting machine comprising a pair of rotatable impression cylinders having smooth peripheries, and a pair of rotatable printing and cutting cylinders complemental to said impression cylinders whereby the material fed forward by the complemental action of said cylinders may be simultaneously cut and printed.

The invention also consists in the peculiar features of construction of the various groups of mechanism and in the combinations of operative elements as shall hereinafter be described.

The invention consists in such other novel features of construction and combination of parts as shall hereinafter be more fully described and pointed out in the claims.

Figure 1, represents the improved printing and cutting machine in side elevation parts of the same being broken away. Fig. 2, represents an enlarged sectional plan view of portions of the same taken on line 2—2 Fig. 1, parts of the mechanism being shown in full lines above said section. Fig. 3, represents a vertical sectional view of one of the printing and cutting heads and its inking mechanism taken on line 3—3 Fig. 2. Fig. 4, represents a similar view, on enlarged scale from that of Fig. 3, of details of the mountings for the inking rolls. Fig. 5, represents an enlarged side elevation of parts of the driving gear and its connection with the first printing and cutting devices and the inking means therefor. Fig. 6, represents a sectional view taken on line 6—6 Fig. 5, showing details of the oscillating means for the doctor rolls of the printing ink distributing means. Fig. 7, represents a vertical sectional view showing details of the impression cylinder adjusting means. Fig. 8, represents a side elevation of portions of the first printing or impressing and cutting cylinder, and impression cylinder, shown in relation to the ink applying rolls, parts of the printing and cutting cylinder being shown in section in order to illustrate the operation of its printing cutting and ejecting mechanism, and their operation on the material. Fig. 9, represents a similar view of portions of the second printing and cutting and ejecting cylinder and of its impression cylinder. Fig. 10, represents a sectional view of one of the printing, cutting and ejecting cylinders taken on line 10—10, Fig. 8, parts of the printing forms being shown in full. Fig. 11, represents a view of one class of product for which this machine is designed. Fig. 12, represents an isometrical diagrammatic view partially illustrating the operation of the machine on material passing therethrough to produce articles of the class shown in Fig. 11.

Similar numbers of reference designate corresponding parts throughout.

As shown in the drawings in its preferred form 20—20 represent the longitudinally extending base members of a substantial main frame designed to support the operating mechanism. At one end of the base members 20—20 is mounted the frame 21 in which is journaled the shaft 22 having the friction feed roll 23 and the bevel gear 24 which meshes with the bevel gear 25 of the main drive shaft 26 journaled in a bearing of the bracket 27, and other bearings to be hereafter described, and furnished with the gears 28 and 29 to the latter of which power may be applied in any well known manner to drive such gear and its shaft. In slots of the frame 21 the shaft 30, carrying the

material A, usually in strip form, is free to move vertically so that the periphery of its rolled material may contact with the friction roll 23. The frame 21 also acts to support the first section 31 of the strip support on which the material is fed forward to the first printing and cutting head between guides 32—32.

Slidably mounted on the members 20—20 are the bases 33 and 34 which are furnished with clamping screws 35 and 36 respectively by means of which said bases may be secured in place on said members and said bases 33 and 34 respectively have the depending ears 37 and 38 in screw threaded perforations of which the oppositely extending screw threaded stems of the bolt 39 are engaged whereby, when one of said bases is clamped to the members 20 and the other of said bases is free to move, rotation of the bolt 39 will effect the adjustment of the movable base with relation to the fixed base.

On the bases 33 are mounted the side frames 40—41, of the first head, which are alike in construction, connected at their upper portions by the cross plate 42 and having vertical ways as 43 furnished with guides 44—45 provided with set screws as 46—47, Fig. 3. On the base 34 are mounted similar side frames as 48 connected by the cross plate 49. The side frames 40 and 48 are respectively furnished with brackets 50—51 and 52—53 in which brackets 50—52 is journaled the shaft 26 while, in the brackets 51 is journaled the shaft 54, also journaled in the bracket 27 and having the gear 55 which is driven from the gear 28. In bearings at the lower portions of the brackets 50—52 are journaled the sleeves of the gears 56 which are splined to the shaft 54 to permit the longitudinal movement of said gears with relation to such shaft. In bearings of the brackets 51 are similarly journaled the sleeves of the bevel gears 58—59 which are keyed to the shaft 26 to permit of the movement of said gears longitudinally of said shaft.

In the vertical ways 44—45 of the frames 40—41 are mounted spacing blocks as 60, Fig. 3, having inclined edges 61—62. Below such blocks are located in said ways the bearing blocks as 63 which have inturned lips at their inner ends are held in place by the adjusting blocks as 65 having inclined edges bearing against the similar edge 61 of the spacing blocks 60. Pressure being applied to the ends of said adjusting blocks as 64 by the set screws as 47. In this pair of blocks 63 is journaled the tubular shaft 66 having the beads 67—67, engaged in the lips of said blocks, and the hub 68 furnished with the printing and cutting cylinder 69 of which Figs. 8 and 10 show details. This cylinder has two series of radial sockets 70 and 71 arranged in its periphery and which sockets communicate with the open central portion of the cylinder by the bores 72—73. Mounted in the outer enlarged portions of the sockets 70 are the screw threaded collars 74 which engage and secure in place the annular cutters 75 the cutting edges of which project sufficiently from the periphery of the cylinder 69 to effect the cutting of the material. Slidably mounted in the sockets 70 and the collars 74 are the printing form carriers 76 which have at their outer ends the printing or impressing forms 77 and at their inner portion the transverse slots 78 and the reduced portions 79 carrying the springs 80 which bear against the rings 81, mounted on the ends of said reduced portions, and against the pins 82 which extend through openings in the wall of the cylinder and through the slots 78 of the carriers 76, these springs 80 being designed to retract the printing form carriers until the ends of the reduced portions 79 are seated on the inner ends of the sockets 70. Rods 83 are mounted to reciprocate in the bores 72 and bear against the inner ends of the carriers 76 and against the cam 84 located within the open center of the cylinder 69 and supported by the shaft 85 mounted in the hub 86 which is secured to the side frame 41, see Fig. 2.

The sockets 71 are located between the sockets 70, in the periphery of the cylinder 69, and the bores 73 of the sockets 71 are staggered with relation to the bores 72 of the sockets 70. In the sockets 71 are slidably mounted the printing form carriers 87 furnished with enlarged ends 88, on which the printing forms 89 are mounted, adapted to bear against the inner ends of the sockets 71 when the carriers 87 are retracted by the coiled springs 90 bearing against the enlargement 91 of the carriers and against the pins 92 which extend through openings in the cylinder 69 and through slots 93 in said carriers; these slots 93 being sufficiently long to permit suitable movement of the carriers 87 with respect to the pins 92. In the bores 73 are slidably mounted the rods 94 which bear against the cam 84 and against the carriers 87, at times.

On the outer end of the tubular shaft 66, of the cylinder 69, is mounted the bevel gear 95 which is driven from the bevel gear 58 and on the sleeve of the gear 95 is the spur gear 96.

Mounted on the upper inclined edge 62 of the spacing block 60 are the wedges 97 against which bears the adjusting screws 46. Supported on said wedges 97 are the rectangular bearing blocks 98 in which is journaled the tubular shaft 99 of the impression cylinder 100 which shaft 99 has the gear 101 which is driven by the gear 96. The periphery of the impression cylinder 100 is smooth and the office of this cylinder is to provide a smooth surface to resist the pres-

sure of the printing forms of the cylinder 69 on the material under operation and to afford a surface against which the material may be cut by the cutters 75.

The cross plates 42 are furnished with upwardly extending collars 102 having annular shoulders 103 at their inner lower ends and in said collars are journaled the sleeves 104 having enlarged lower ends 105, which are seated against the annular shoulders 103, and are furnished at their upper ends with the worm gears 106 keyed to said sleeves 104. In the screw threaded bores of the sleeves 104 are engaged thrust screws 107 the lower ends of which are supplied with plates 108 bearing on the upper portions of the blocks 98 while the upper ends of said screws 107 extend through the bores of the frames 109, mounted on said collars 102. The frames 109 carry vertical keys which engage with key seats in said screws 107, whereby said screws are free to slide under the rotative action of the sleeves 104 thereon but are prevented from rotating. On the collars 102 are mounted arms 110 in which are journaled the worm shaft 111 the worm 112, Fig. 7, of which is engaged with the worm gears 106. Rotation of this worm shaft 111 is effected by means of the crank arm 113 fixed to said shaft and the shaft is held in its adjusted position by means of the circular stop plate 114 having peripheral notches designed to be engaged by the spring pressed pin 115 slidably mounted in the bracket 116 with which the plate 42 is provided. By this system extremely fine adjustment of the pressure or thrust of the screws 107 on the plates 108 and blocks 98 may be effected.

The inking mechanism for the printing forms of the cylinder 69 when applied to this machine is supported by side frames 117—118 carried by the bases of the frames 40—41 and comprises the ink reservoir 119 furnished with the roll 120 the shaft 121 of which is journaled in the sides of said reservoir and has the ratchet 122, the transfer roll 123 having its shaft journaled in the upper ends of the arms 124 mounted on the rock shaft 125, and having a limited movement; which shaft has the lever arm 126 furnished with the stud 127, the ink transmitting rolls 128—129 having shafts journaled in bearings carried by the frames 117—118, the metal doctor rolls 130—131 mounted on the shafts 132—133 which are slidable and rotatable in bearings of the frames 117—118, and the ink delivery rolls 134—135 having shafts 136—137 journaled in bearings of the arms 138 and 139 respectively.

The actuating mechanism for the ink transfer and distributing mechanism comprises the sleeve 140 rotatable on the shaft 26 and having the cams 141 and 142 and the gear 143 which is driven from the gear 56 of the shaft 54. Mounted to swing on the shaft 121 of the roll 120 is the pawl arm 144 having the pivoted pawl 145 adapted to intermittently engage and actuate the ratchet 122 of said shaft 121 when the arm 144 is actuated by the connecting rod 146, pivoted to the arm 144 and to the lever 147, which latter is mounted to swing on a stud extending from the bracket 148, carried by the frame 118; the bearing 149 of said lever being engaged in the cam 142 to effect the swinging of said lever 147 under the rotation of the sleeve 140. The arms 126 are vibrated by the action of the cam 141 on the stud 127, with which cam said stud is engaged, to swing the transfer roll 123 back and forth between the rolls 120 and 128 whereby ink taken by the roll 123 from the roll 120 is transferred to the roll 128. The rolls 130 and 131 are rotated by means of the gears 150—151 on the shafts 132—133, and the gears 152 and 153 the latter of which is journaled on a stud extending from the frame 118 and meshing with the gear 96, of the printing cylinder shaft 66, and with the gear 151 while the gear 152, also journaled on a stud extending from the frame 118, transmits motion from the gear 151 to the gear 150. These gears 150—151 are so mounted on the shafts 132—133, by means of the usual feathers on the gears engaging in grooves in the shafts, that said shafts are rotated by the rotation of their gears while the shafts are free to move longitudinally with respect to said gears. This movement of the shafts 132—133 is effected by means of the bell crank lever 154 pivotally mounted on the bracket 148 and having the arm 155 the bearing stud 156 of which is engaged with and actuated by the cam 142. Under the rotation of the sleeve 140 the, preferably metal, rolls 130—131 and their shafts will be oscillated by the swinging of said bell crank lever 154—155 to distribute the ink between said rolls and the composition rolls 128—129 and at the same time the shafts 132—133 and their rolls will be rotated by the gears 150—151 and 152—153 from the gear 96 to effect the rotation of the composition rolls 128—129 by the frictional contact of the rolls 130—131 therewith. The ink taken from the roll 131 by the rolls 134—135 is delivered by said latter rolls to the printing forms carried by the cylinder 69.

In order to facilitate the removal and replacing of the delivery rolls 134—135 the shafts of these rolls are journaled in arms 138—139 which are adjustably mounted in blocks 157 slidably mounted in guides 158 on the frames 40—41 and furnished with shoulders 159. On the frames 40—41 are pivoted the arms 160 having upper ends, adapted to engage the shoulders 159, and upwardly extending thumb pieces 161 and

are supplied with spring pressers 162 which bear against projecting portions of the ways 45 and act to press the arms 160 outward to engage the shoulders 159 and support the blocks 157 and the mechanism carried thereby. When it is desired to drop the blocks 157 to positions where the rolls 134—135 can be conveniently removed and replaced the thumb pieces 161 are pressed to contract the spring pressers 162 and to disengage the ends of the arms 160 from the shoulders 159 whereupon the blocks 157 and the mechanism carried thereby will move downward in the guides 158.

Reference to Fig. 2 of the drawing will disclose the fact that the length of the inking rolls is considerably greater than is necessary for the purpose of inking the printing forms of a single cylinder 69. This is to emphasize the fact that the machine is not limited to the use of a single printing cylinder and that, the width of said cylinder is not necessarily limited to that shown herein.

The second printing and cutting head carried by the base 34 is similar in construction to the first printing and cutting head above described with the main difference that equivalents for the printing forms 89 and their carrying means are preferably omitted.

The side frames 48 of the second printing head are furnished with ways 165 in which are adjustably mounted means, as the blocks 63 and 98 in which the tubular shafts 166 and 167 of the printing cylinder 168 and the impression cylinder 169 are respectively journaled. The shaft 166 has the bevel gear 170, which is driven from the bevel gear 59, and the spur gear 171 from which the inking mechanism is driven while the shaft 167 has the gear 172 meshing with said spur gear 171.

Portions of the cylinders 168 and 169 are shown in Figs. 9 and 12 and reference to Fig. 9 will indicate that the cylinder 168 carries annular cutters 173 arranged in peripherally disposed sockets and secured by the sleeves 174 which are screwed into the threaded portions of said sockets and form seats for the heads 175 of the printing form carriers 176. These carriers are similar in all respects to the carriers 76 and are similarly actuated by means of a cam as 84.

The impression cylinder adjusting and resisting means designated as a whole by the numeral 177 is similar in all respects to the parts designated by the numerals 102 to 116 inclusive, and operates in a similar manner thereto to resist the pressure exerted by the printing and cutting cylinder and the interposed material, on the impression cylinder.

In like manner and construction to that of the first printing and cutting head, the inking mechanism for the second head is driven from the gears 57 and 171 similar to those marked 56 and 143, through the gear 178 on the sleeve 179 which is journaled on the shaft 26 and has cams 180—181, and through said gear 171 to the gear 182, whereby the inking mechanism carried by the frames 183 is operated. Such inking mechanism for the second head is designated as a whole in Fig. 12 by the numeral 184.

The first section of the strip support 31 extends partially between the cylinders 69 and 100 and the second section 31′—32′ of said support extends between the first and second heads and guides the material toward the second pair of cylinders 168—169. Beyond the second head any desired method of disposing of the material may be used.

The machine thus described is primarily designed to operate on strips of paper material of any nature suitable for subsequent use to produce articles similar to that shown in Fig. 11 of the drawings whereby such articles as disk closures for milk jars and similar receptacles may be manufactured. This machine is thus designed to operate on such material to simultaneously cut out, print, and impress the printing lines to an appreciable depth in such articles and, at the same time, to print and impress into the body of the remaining material color forms which are subsequently preferably printed and impressed with a second color and cut out by means of the second head.

After the mechanism of the machine has been suitably adjusted particularly as regards the feeding of the material, action of the cutting devices, impression and registration of the two sets of cylinders, as well as to the throw of the cams which actuate the printing form carriers and such other more or less important adjustments as are generally necessary in printing and cutting machinery, the strip material A is led forward between the guides 32—32 to the bite of the cylinders 69 and 100 and power is brought into action to operate the machine. It is to be assumed that during such preliminary adjustment ink has been supplied to the printing forms in the manner hereafter described if the printing is to be made in color.

As the cylinders 69 and 100 rotate the material A carried forward therebetween will receive the edges of the annular cutters 75 and the smooth periphery of the cylinder 100 will bear against the upper surface of said material and said cutters will cut through the material, at the same time the printing form carriers 76 will be in position to impress the inked form into the cut out disk B a distance depending largely upon the adjustment of the machine. After the impression of each of the cut out disks one of the printing forms 89 is brought to po-

sition to impress the material preferably with a block color C of suitable shape. By reference to Fig. 12 it will be noticed that as the material A passes from between the cylinders 69 and 100 such printed portions C, alternate with the openings B' from which the cut out disks have been removed.

As the cylinder 69 rotatively advances the printed disks B remain in the cutters 73 approximately until they reach the point E, Fig. 8, where the throw of the cam 84 acts sufficiently on the rods 83 to advance the same and the printing form carriers actuated thereby and to eject the disks from the cutters 77. From the point of ejection the throw of the cam 84 gradually increases to force outward the rods 83 and 94 of the respective printing form carriers to bring the printing portions of such forms into the path of the inking rolls 134—135 which supply ink to all of such forms. After the printing forms receive ink from said rolls the shape of the cam 84 permits the retractive strain of the springs 80 and 90 to move the printing form carriers 76 and 87 toward the axis of the cylinder 69 to bring the forms 77 and 89 into printing position with the form 77 below the edge of the cutter 75.

When the material A passes between the cylinders 168 and 169 the portions C—C register with the cutters 173 and disks D are cut therefrom and printed in manner similar to that in which the disks B have been cut with the exception that the ink supplied by the inking mechanism 184 to the printing forms of the cylinder 168 preferably differs in color to that supplied by rolls 134—135 to the forms of the cylinder 69 therefore the disks D are printed in two colors. Said disks D are ejected from the cutters 173 and the printing forms of the cylinder 168 are forced outward to the ink receiving position and subsequently retracted in similar manner to those of the cylinder 69.

Various modifications of this machine may be made without departing from the spirit of this invention. For instance the printing forms 89 may be removed from the cylinder 69 when all of the disks are to be printed in one color which color is supplied to the remaining printing forms of both cylinders. Where it is desired to cut out disks without printing them plain ejecting forms may be substituted for the printing forms. The machine is also designed for use in cutting or in cutting and printing other shapes than the disks shown and the pattern formed in the material by the cutters or pressers on the cylinders 69 or 165 or both in combination may be a pattern in the strip of material.

The cylinders 69 and 168 may be considered as printing form carriers as they are designed to carry or advance the printing forms in succession to the points at which the printing impression is made. The printing forms for some purposes may be considered to include the movable parts on which said forms are mounted.

It is of course obvious that the cylinders 69 and 100 may be supplied with additional rows of sockets in which printing cutting or printing and cutting means may be mounted and such rows of sockets may be arranged in any manner designed to reduce the amount of waste material between the printed or cut out portions to a minimum. It is also apparent that the shafts 66 and 166 or either of said shafts may be supplied with additional cylinders 69 and 100 and that the printing and cutting devices carried by said cylinders may be arranged in staggered relation to reduce the waste of material between the printed or cut out portions.

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

1. A printing and cutting machine comprising means for printing and cutting out forms from material fed through the machine, means for printing forms between the cuts of the first mentioned forms, and means for subsequently cutting out said second series of forms.

2. A printing and cutting machine comprising means for cutting out and printing a series of forms from material fed through the machine and for printing a second series of forms on said material, and means for printing a second impression on said second series of forms and for simultaneously cutting out said second series of forms.

3. A printing machine comprising a frame, printing heads adjustably mounted on said frame, printing means journaled in said heads and having gears, pinions journaled in said heads in driving relation to such gears, a drive shaft with which said pinions are slidably engaged, inking means for said printing means including doctor rolls mounted to reciprocate and rotatably driven from the gear of the printing means, cam sleeves on said drive shaft, reciprocating mechanism actuated by said cam sleeves, and means for rotating said cam sleeves.

4. A printing machine comprising a frame, printing heads adjustably mounted on said frame, printing cylinders journaled in said heads and furnished with bevel gears and spur gears, pinions journaled in said heads in engagement with said bevel gears, a drive shaft in sliding engagement with said pinions, cam sleeves journaled on said shaft in engagement with bearings of said heads and having gears, inking mechanism for the respective printing means comprising rotatable rolls having gear driving connection with the respective spur gears, one of

each of said sets of rolls being mounted to oscillate, means actuated by said cam sleeves for oscillating the respective rolls, a drive shaft, and pinions journaled in bearings of said printing heads and slidably engaging said shaft, said latter pinions meshing with the gears of the cam sleeves.

5. A printing machine comprising a printing head, a printing cylinder journaled therein and provided with peripheral printing forms, an impression cylinder journaled in blocks movably mounted in said head, means for adjusting said blocks, thrust resisting screws for said blocks slidably mounted but held from rotation, sleeves rotatably mounted and having screw threaded bores in which said screws are engaged, and means for rotating said sleeves.

6. A printing machine comprising a cylinder rotatably mounted and having a series of peripheral sockets, printing form carriers movably mounted in said sockets and having transverse slots, pins extending through said slots and fixed in the cylinder, springs bearing against members of said printing form carriers and against said pins, and means acting to move said form carriers, outward against the pressure of said springs.

7. A printing and cutting machine comprising a cylinder rotatably mounted and having an open center and a series of radial sockets having bores communicating with said center, cutters secured in the ends of alternate sockets, printing form carriers having slotted shanks slidably mounted in the sockets furnished with said cutters, pins secured in the cylinders and extending through said slotted shanks, springs bearing against said pins and against members on said shank, rods slidable in said bores of the sockets and bearing against said shanks, spring retracted printing forms slidably mounted in said sockets alternating with said cutters and furnished with rods slidable in the bores of said sockets, a cam fixed against rotation on which all of said rods bear, and means for rotating the cylinder.

8. A printing and cutting machine comprising a pair of rotatable cylinders between which material may be fed forward, one of said cylinders having a series of peripherally disposed annular cutters, printing forms slidably mounted within said cutters and adapted when retracted to print the material, and means for moving said printing forms outward to expel the printed portions from the annular cutters and to position said printing forms to receive ink, said pair of rotatable cylinders being constructed and arranged to feed the material independently of the cutters and printing forms.

9. A printing and cutting machine comprising a cylinder rotatively mounted and having sockets arranged in the periphery thereof, cutters adapted to be seated in said sockets, said cutters being formed with internal annular shoulders, hollow threaded members having external shoulders adapted to coöperate with the internal shoulders of said cutters, printing forms movably mounted within said hollow members, means for rotating said cylinder and means for actuating said printing forms.

10. A printing machine comprising a rotatable cylinder mounted upon a hollow shaft, journal bearings on each end of said shaft, means for rotating said cylinder, a cam member fixedly mounted within said hollow shaft, a series of printing forms movably mounted on said cylinder and operative means connecting said cam with said printing forms.

11. A printing machine comprising a rotative cylinder having radial sockets in its periphery, spring retracted printing forms mounted in said sockets and adapted to transmit printing pressure directly to their seats in said sockets, rods working in channels in said cylinder and bearing on said forms, and adjustable means for said rods to successively move outwardly the printing forms after they have passed the impression point.

12. A printing and cutting machine comprising a base frame, a plurality of mounts for printing and cutting heads, said mounts being adjustable longitudinally of the base of the machine, cylinders journaled in said mounts and furnished with printing and cutting means, a rotatable drive shaft extending longitudinally of said machine, pinions carried by said mounts and in sliding engagement with said drive shaft, and a double acting screw mechanism operatively connecting said mounts.

13. A printing machine including a frame, printing heads adjustably mounted on said frame, printing means on said printing heads, driving gear for said printing means, inking means therefor including doctor rolls mounted to reciprocate, means for reciprocating said doctor rolls in alternate opposite directions, said reciprocating means including a cam member, a single drive shaft for said reciprocating means, said cam member being slidingly mounted upon said drive shaft.

14. A printing and cutting machine comprising a movable carrier, printing forms mounted on said movable carrier, cutters mounted to surround each alternate printing form, and an impression cylinder having a continuous periphery substantially the width of said movable carrier and adapted to coöperate therewith to feed material over said printing forms and cutters.

15. A printing and cutting machine comprising a rotatable carrier having a smooth periphery, said carrier being provided with openings in the periphery, printing forms

mounted for radial movement in said openings, cutters surrounding each alternate printing form, an impression cylinder having a continuous smooth periphery substantially the width of said movable carrier and arranged to compress the material to be fed over the printing forms and cutters between the said movable carrier and the said impression cylinder.

16. A printing machine comprising a printing head, a printing cylinder journaled therein and provided with peripheral printing forms, an impression cylinder journaled in blocks movably mounted in said head, a thrust resisting screw mounted to bear against the journals, said resisting screw being provided with a smooth portion having a key way therein, a key coöperating with said head and said screw to prevent the rotation of said screw but to permit the same to slide in said head, a rotatable sleeve having a screw threaded bore coöperating with said resisting screw, a worm gear attached to said rotatable sleeve, and a worm for operating said worm gear.

HARRY A. SPILLER.

Witnesses:
H. J. Miller,
M. M. Harrington.