Jan. 6, 1942. H. HERMANN 2,268,657

DUPLICATING MACHINE

Filed March 16, 1940 4 Sheets-Sheet 1

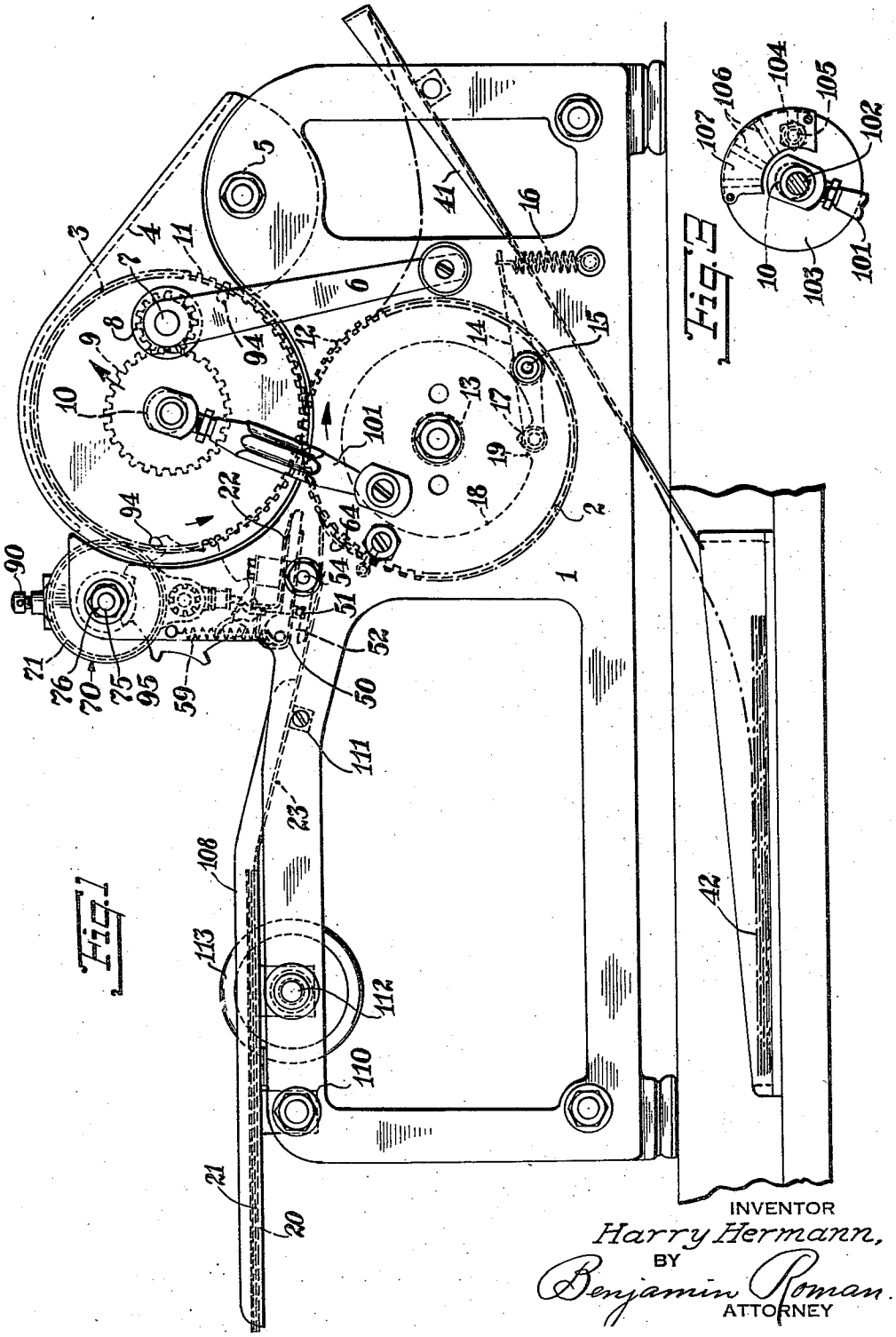


Fig. 1

Fig. 2

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DUPLICATING MACHINE

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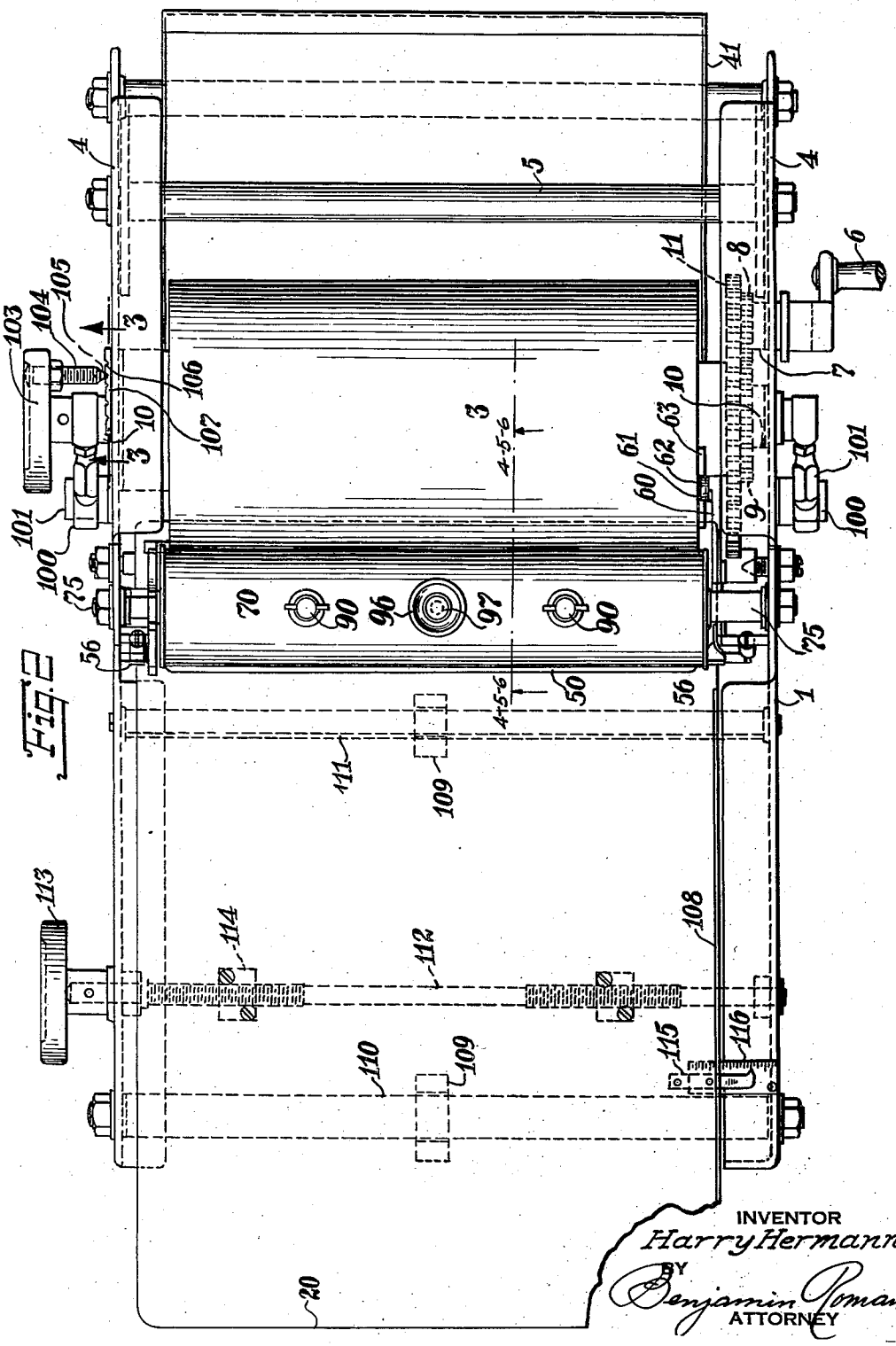


Fig. 2

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DUPLICATING MACHINE

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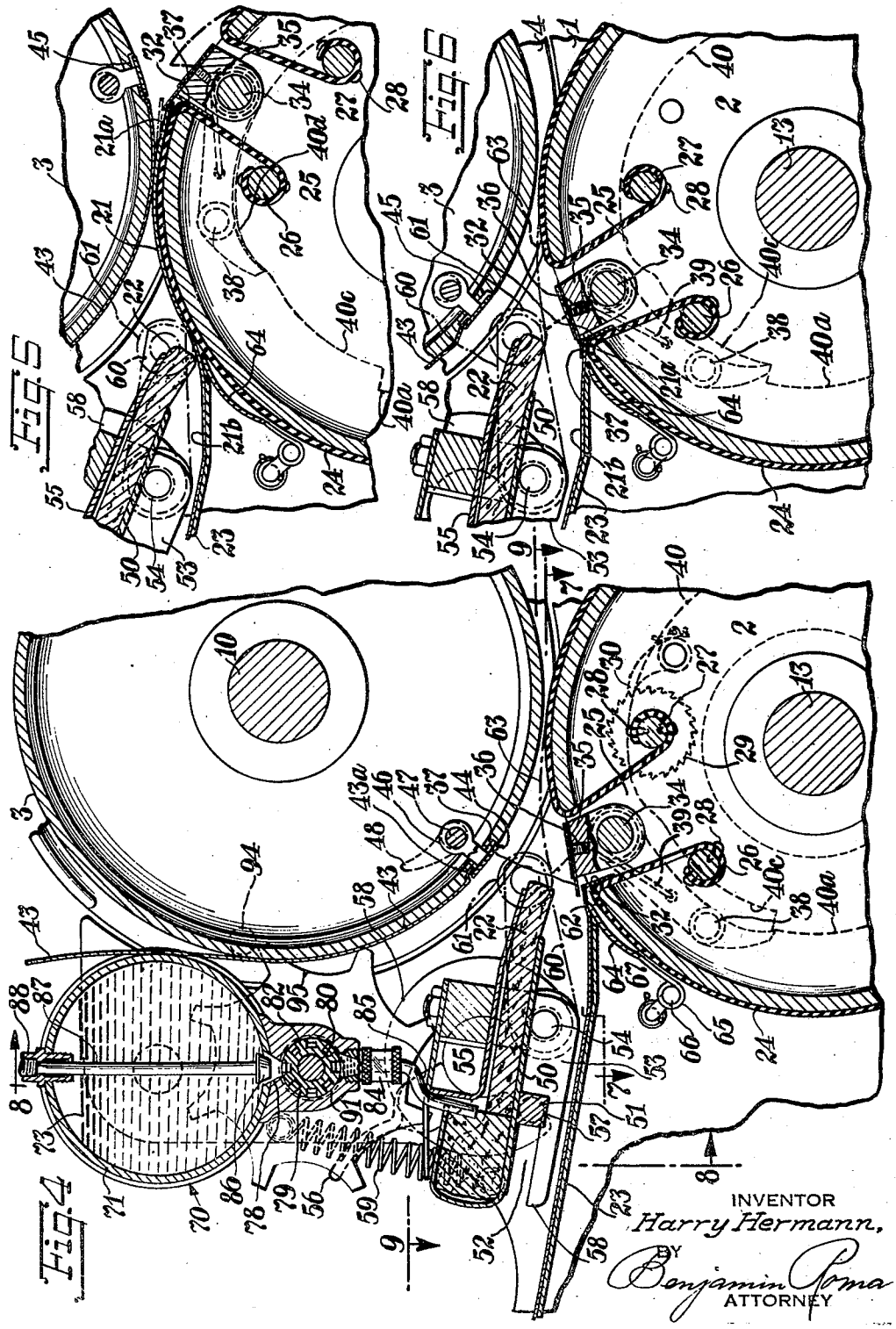


Fig. 4

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DUPLICATING MACHINE

Filed March 16 1940 4 Sheets-Sheet 4

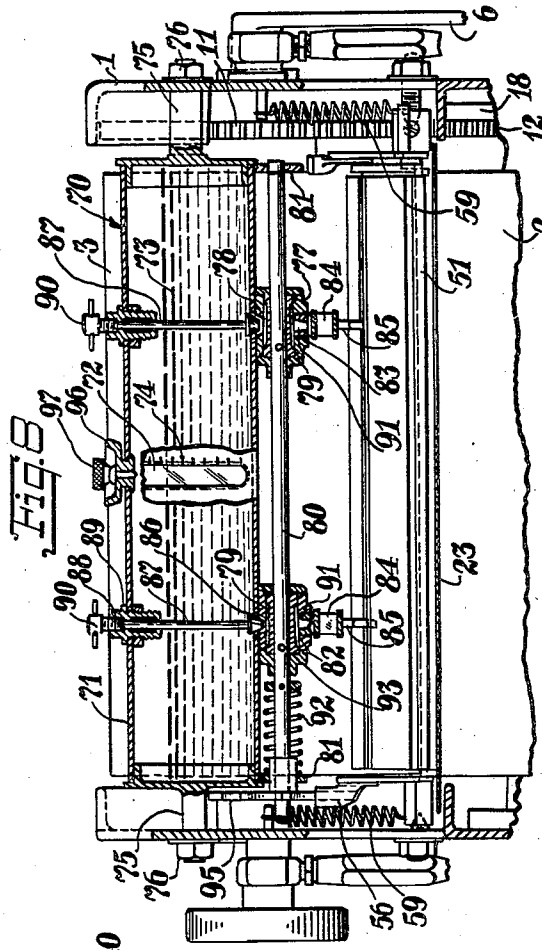


Fig. 8

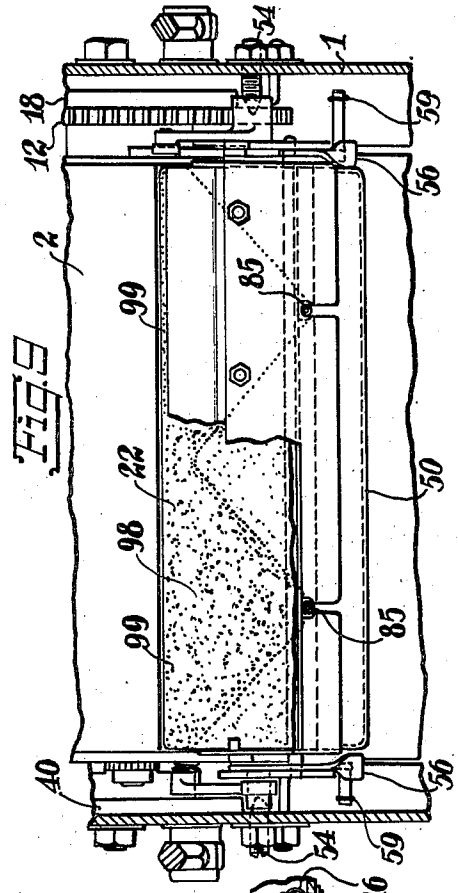


Fig. 5

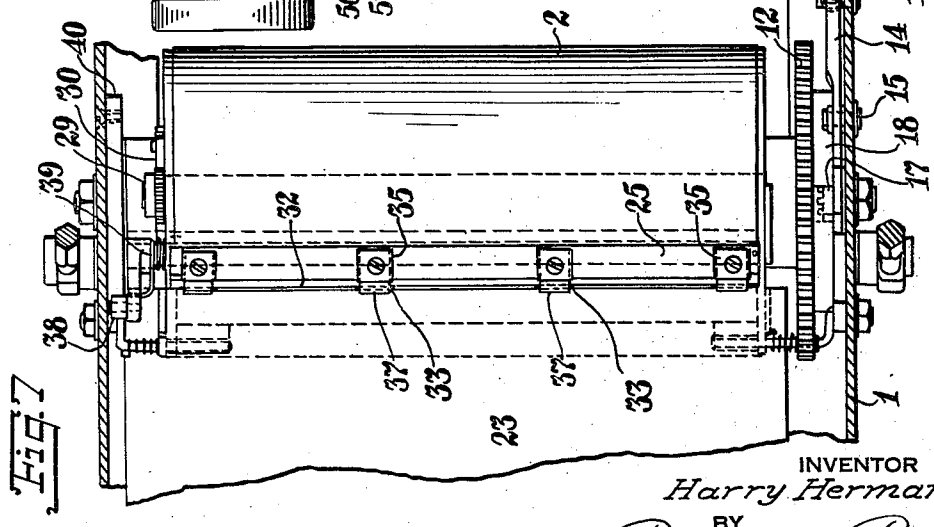


Fig. 7

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2,268,657

UNITED STATES PATENT OFFICE

2,268,657

DUPLICATING MACHINE

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Application March 16, 1940, Serial No. 324,291

31 Claims. (Cl. 101—132.5)

This invention relates to duplicating machines, and particularly to the type wherein a master leaf coated with a requisite printing compound is mounted over a rotatable impression cylinder, an alcoholic compound is preliminarily applied over the blank sheet, and the treated sheet is then fed in printing contact with said master carrying cylinder.

The principal object of the invention is to provide a duplicating machine of the above type having improved efficiency and enhanced automatic performance, with increased speed and finer printing.

Another object is to provide the machine with means to print on many stocks of varying sizes, thicknesses, and grades, and to perform the printing on such stocks with fineness, improved accuracy of alignment, and extreme closeness to the very edges of the sheet.

A further object is to provide the machine with means whereby work on any of said stocks will leave the sheets without impairment of their original flatness.

A still further object is to provide an improved feeding table for the machine, with improved means for the initial lateral alignment of the sheets preliminary to printing.

Another object is to provide the impression and contact cylinders of the machine with improved means for altering, adjusting, and setting the relative distance between them to conform to the thicknesses of said various stocks, and to interchange such settings rapidly and with convenience to conform with frequent change of work on different stocks.

Another object is to provide the contact cylinder with means for renewal of its peripheral lining, and with convenient and ready means for restoring the tautness of said lining.

Another object is to provide the machine with improved automatic means for applying the alcoholic solvent to the sheets, preliminary to the printing step, and to guard against said solvent reaching unwonted parts of the machine.

Another object is to provide the machine with an improved solvent applying pad for the sheets, having improved uniform impregnation, with means for selectively controlling the impregnation of partial areas of the pad.

Another object is to provide the machine with improved automatic means for supplying the solvent to the applying pad, and to perform the supply over selected areas of the pad.

Other objects and advantages will hereinafter appear. In the accompanying drawings,

Fig. 1 is a general side elevation of the duplicating machine of the invention.

Fig. 2 is a plan view of the machine shown in Fig. 1.

Fig. 3 is an elevation showing a detail of the machine, as seen from the arrows 3—3 in Fig. 2.

Figs. 4, 5, 6 are fragmentary transverse-sectional elevational views, taken on lines indicated in Fig. 2, in an enlarged scale, illustrating several steps in the operation of the machine with corresponding relations of the parts of the machine.

Fig. 7 is a fragmentary plan view, similar to Fig. 2, with some of the machine-parts removed to illustrate certain mechanism of the machine, as seen from line and arrows 7—7, Fig. 4.

Fig. 8 is a cross-sectional front elevation of the machine, showing its solvent supplying devices for the impregnated applying pad, taken on the line 8—8 in Fig. 4.

Fig. 9 is a plan view illustrating the solvent applying pad of the machine, as seen from line and arrows 9—9 in Fig. 4.

In the machine frame 1 proper is rotatably mounted a lower contact cylinder 2 having a diameter equal to that of the upper impression cylinder 3 which is in turn rotatably mounted in a secondary frame 4 pivoted on a shaft 5 secured to the frame 1, whereby the frame 4 together with the cylinder 3 are swingable upwardly and downwardly for fine adjustments of the peripheral gap between cylinders 3, 2, as will be hereinafter more fully described. An operating crank 6 is fixed to a stud 7 which is rotatable in machine frame 4 and carries a gear 8 that meshes with a pinion 9 keyed upon the axle journal 10 of the cylinder 3, and said journal in turn carries a large transmission gear 11 that meshes with a similar gear 12 keyed on journal 13 of the lower cylinder 2, the ratio of gear 8 and pinion 9 being such that when the crank 6 is revolved clockwise twice the upper impression cylinder 3 performs a single rotation, in a counterclockwise direction as viewed in Fig. 1, while the geared lower contact cylinder 2 performs a similar opposite rotation, both of said cylinders thereby rotating at equal peripheral speeds. On the frame 1 is fulcrumed a lever 14 at 15, one end of which is drawn by a spring 16 depending from said frame, while its opposite end carries a roller 17 riding under tension upon the rim of a disk 18 provided with a notch 19 and keyed upon the journal 13 of cylinder 2, whereby on termination of each complete revolution of the cylinder 2 the roller 17 enters the notch 19 and thereby arrests

both of the geared cooperating cylinders 3, 2, for performing the various functions of the machine, as will be seen.

In front of the cylinders 3, 2 is provided a table 20, mounted on the frame 1, on which are stacked the sheets 21 to be printed, and a directing chute 23 for said sheets slopes downwardly from said table to a location close to the periphery of cylinder 2, near the bight of the cylinders. Directly above the end portion of the sheet director 23 is located a saturated pad 22, for the duplicating process, which will be hereinafter fully described.

The contact cylinder 2 is lined with a blanket 24 of rubber or similar material, and is provided with a gap 25 through which the ends of the blanket pass inwardly and are fastened to a pair of rods 26, 27 by means of screws 28, which rods are carried by the cylinder, whereby when the blanket 24 becomes inoperative through use it may be readily removed from the cylinder and a new blanket therefor substituted. The rod 27 is rotatably mounted and carries a ratchet 29 which cooperates with a spring-pressed pawl 30, by which means said rod may be rotated to draw the entire blanket to requisite tautness and to restore any impaired tautness to it. By means of these provisions, therefore, the peripheral contacting function of the cylinder 2 is at all times conveniently maintained in proper condition.

In gap 25 and to cylinder edge 31 thereat is secured a plate 32, against which the leading edges of sheets 21 abut when directed toward the cylinders 3, 2, this stopping location of said gap and plate occurring when the cylinder 2 is arrested by the action of spring-actuated roller 17 and disk-notch 19, Fig. 1, and said plate is provided with a series of notches 33, Figs. 4, 7. In gap 25 and to the heads of the cylinder is mounted a rock shaft 34 to which are keyed a plurality of hubs 35, to each of which is secured by a screw 36 a blade 37. When the shaft 34 is rocked to swing the hubs 35 toward the right, as viewed in Fig. 4, the blades 37 are actuated to a position off the periphery of cylinder 2, while when swung backwardly the blades 37 enter the notches 33 of abutting plate 32 and thereby grip the leading edge 21*a* of directed sheet 21*b* firmly to the face or periphery of the cylinder, as illustrated in Fig. 6. The rock-shaft 34 carries a pawl 38 drawn by a spring 39 to a cam 40 secured to the machine frame 1. During rotation of the cylinder 2 the pawl 38 is held under tension against the rim 40*a* of said cam, until the cylinder assumes its resting period, but on commencement of rotation of the cylinder said pawl is drawn into the depression 40*c* of said cam and thereby rocks the shaft to actuate its blades 37 to perform their gripping of the sheet-edge 21*a*, Figs. 4, 6. Further rotation of the cylinder 2, therefore, causes the gripping blades 37 to draw the sheet 21*b* onto contact with the periphery of the cylinder and between both cylinders 3, 2, Fig. 5. During this interval the pawl 38 is held against the low region 40*c* of cam 40, to thus maintain the gripping blades 37 in operative hold on the sheet, but when the sheet 21*b* leaves the rear bight of the cylinders 3, 2, Fig. 5, the pawl 38 is returned by the ridge 40*d* of the cam to its high or normal rim 40*a*, whereupon the shaft 34 is rocked backwardly to actuate the gripping blades 37 to release the sheet, as illustrated. Said sheet is then conveyed by the printing operation of the cylinders 3, 2, and as it emerges from their rear it is dropped upon a chute 41 which deposits it upon a stack 42, Fig. 1. The printing is performed by utilization of any master leaf 43 mounted on the impression cylinder 3 by any suitable means, as by gripping its leading edge 43*a* with a flat bar 44 in an indentation 45 in the periphery of the cylinder, and the terminals of bar 44 carrying arms 46 pivoted in eccentric shanks 47 forming part of levers 48 in turn pivoted on the ends of the cylinder.

The solvent saturated pad 22 is maintained in a casing 50 carrying a bar 51 which is removably mounted into and out of slots 52 formed in a framing 53 fixed to a rock-shaft 54 journaled in the machine frame 1, a roofing 55 of said framing covering up the pad for protection of the impression cylinder 3 and master leaf 43. The casing 50 and the pad 22 are thus removable from the framing 53 for the examination or replenishment of said pad, and are reinsertible thereinto in operative position. When thus replaced the casing 50 is locked to framing 53 by levers 56 pivoted on the rock shaft 54 having notches 57 which bind upon rounded terminals 58 provided for the bar 51, Figs. 1, 9. The framing 53 is drawn upwardly at its left end, as viewed in Fig. 4, by a spring 59 joined thereto and depending from the machine frame 1, and the rock-shaft 54 is provided with an arm 60 carrying a roller 61 that rides upon the extreme edge 62 of the cylinder 2, Figs. 5, 2, while the cylinders 3, 2 are rotating, in which manner the casing 50 and pad 22 are maintained in operative position, with the working edge 62 of the latter contacting with feeding sheet 21*b* for applying the alcoholic solvent thereon while it travels into the machine, as required by this duplicating printing process. As, however, the cylinder 2 assumes its next arrested period, a cam-plate 63 secured to said cylinder strikes the roller 61 and thereby rocks the shaft 54 with depending framing 53, casing 50, and pad 22, to elevate the operative edge 62 of the latter, as shown in Fig. 4, to permit the next directed sheet 21*b* to be moved forwardly with its leading edge 21*a* in abutment with plate 32, for subsequent gripping of said sheet by the blades 37. As the next rotation of cylinder 2 commences the roller 61 leaves the cam 63 and drops to the periphery of the cylinder, thereby restoring the pad 22 to operative contact with the advancing sheet 21*b*. At the location of this contact the underside of the feeding sheet 21*b* is backed by an apron 64 urged under tension thereagainst by a spring 65 wound around a shaft 66 bearing upon arms 67 which support the apron and are in turn carried by said shaft, Fig. 4. The apron 64 is positioned in a gap between the terminal of chute 23 and cylinder 2 and thereby protects the latter against accidental reaching of solvent thereto, as well as preventing solvent from reaching said directing chute. The rockable framing 53 and casing 50 maintain the pad 22 in the sloped position illustrated in Fig. 4, for vital reasons which will be hereinafter described.

Directly above the pad 22 with its operating parts and in front of the impression cylinder 3 are situated a reservoir 70 for alcoholic solvent, together with devices and mechanism for supplying and particular feeding of the solvent to said pad. This mode of disposition of the reservoir and devices enables the operative to maintain regular and convenient observation and control of the solvent supply and feed, which is

highly conducive to the efficient operation of the duplicating machine.

The reservoir 70 consists of an elongated horizontal tank 71, Figs. 4, 8, equipped with a window 72 for therethrough noting the existing level of the content of alcoholic solvent 73, and graduation marks 74 are provided along said window, showing the volumes of existing contents, wherewith the operative is at all times aware of the amount of available solvent content in the apparatus, and accidental or sudden absence of the solvent is prevented. The reservoir 70 is secured to the machine frame 1, by lugs 75 thereof and bolts 76, and to its underside are secured bearing-like parts 77 having inlets 78 leading directly to outlets 79 in tank 71. A shaft 80 is rotatably mounted in framing 81, depending from the tank 71 and carries cylinders 82 that are located within the bearing fittingly and are in turn rotatable therein. The bearings 77 are provided with outlets 83 leading to transparent cups 84, joined to said bearings, and said cups are in turn connected to lengths of hose 85 which terminate within the casing 50 and over particular places of the pad 22, as shown in Figs. 4, 9. Each outlet 79 forms a seat for a valve 86 carried on a spindle 87 having a shank 88 that threads in a tapped guide 89 secured to the top of tank 71 and terminating in a finger-piece 90. By turning the finger-piece 90, therefore, the valve 86 may be closed or opened to any desired degree, to regulate the flow of solvent through outlet 79 accordingly. On rotation of either cylinder 82 a series of longitudinal indentations 91 thereof successively fill with small quantities of the solvent fed thereinto by the conjoint outlet 79 and inlet 78, and accordingly pour these quantities into the hose 85, through outlet 83 and cup 84, which solvent thereby reaches the pad 82. The bearings 77 and fitting cylinders 82 are conical, and a spring 92 wound around shaft 80 presses on a collar 93, secured to said shaft, and on framing 81, whereby a tensional fitting contact is produced between said cylinders and bearings, to guard against possible leakage between these parts. The shaft 80 carries a star-wheel 95, Fig. 4, with which meshes one or more pins 94 carried by the impression cylinder 3, as the latter rotates during operation of the machine. The tank 71 is equipped with an inlet 96 and plug 97 for filling the alcoholic solvent thereinto.

During operation of the machine in the duplicating work, the impression cylinder 3 rotates the wheel 95, shaft 80, and cylinders 82 fractionally and intermittently, and small quantities of the solvent are accordingly taken up by said cylinders and directed into the conducting hose 85, which feed the solvent over the two places of the pad 22, as shown in Fig. 9. As this feed proceeds the solvent dripping can be observed through the transparent cups 84, and the extent of the feed regulated by opening the valves 86 to the degree required by manipulating the finger pieces 90, so as to in turn maintain the saturation of the pad 22 in accordance with requirements. Due to the inclination of the pad 22, as seen in Fig. 4, and the discharge of the solvent at a plurality of places in the rear regions of the pad, as illustrated in Fig. 9, the solvent spreads spreads through the pad by absorption plus gravitational action in the fan-like manner illustrated by the darker shaded areas 98, with the consequence that the leading operative edge 99 receives the requisite and uniform degree and mode of saturation needed for application upon the fed sheets 21. In case work is required by the machine on only the right or left hand halves of said sheets, either of the handles 90 may be turned to close the valve 86 entirely to completely shut off the feed of solvent to a corresponding lateral half portion of the pad 22, which selectivity and fractional saturation of the pad is obviously very advantageous for the duplicating work.

In order to provide for working with the machine on different thicknesses and grades of paper stock, and to regulate the pressure between the cylinders 3, 2 for varying conditions of the master leaf 43, the impression cylinder 3 may be set to a higher or lower degree in the following manner. Studs 100 secured to both sides of the machine frame 1, Figs. 1, 2, carry toggle bolts 101 that are in turn pivoted on shanks 102 that form part of and are eccentric to the extremities of the journals 10 of upper cylinder 3, as illustrated in Fig. 3, and to one of the shanks 102 is secured a knob 103 that carries a bolt 104 terminating in a spring-pressed detent 105, Figs. 2, 3. A sectoral plate 107 is secured to the machine frame 1 opposite to the bolt 104, and said plate is provided with a series of grooves 106 that are radial to the mean centers of shank 102 and journal 10, whereby on turning the knob 103 fractionally it will be set to a plurality of positions by the spring-pressed detent 105 dropping into a selected groove 106 and interlocking said knob with the plate 103 at such groove. By turning the knob 103 fractionally, therefore, the eccentric terminal shanks 102 bearing upon the pivots of toggles 101 cause the journals 10 and cylinder 3 to rise and fall in parallelism with the lower cylinder 2, whereby the distance and pressures between said cylinders may be altered, and locked in such selected positions by the coaction of detent 105 with radial grooves 106.

The paper table 20 and directing shute 23 for the sheets to be fed is provided with guiding rail 108 positively secured thereto or forming an integral part thereof, and to the underside of said table are secured lugs 109 that are laterally slidably mounted on shafts 110, 111 carried by the machine frame 1. A threaded shaft 112 rotatably mounted in frame 1 as shown carries a knob 113 and passes through tapped lugs 114 secured to the underside of table 20, whereby on turning said knob the entire table 20 with its rail 108 may be moved laterally to adjust said rail to precise marginal printing requirements, by which means a very fine and accurate alignment of the printing work may be secured, free from any accidental dislocation. An index 115 carried by table 20 indicates on a scale 116 the extent of lateral setting of rail 108.

The similarity of the diameters of both cylinders 3, 2, their consequently similar peripheral speed, being both positively driven, result in the printed stock leaving the machine in its initial flat state, as well as speedier and superior printing results.

By virtue of the blades 37, coacting with the abutting plate 32, gripping the sheet extremely close to its very edge and conveying the fed sheet in this condition into the very bight of cylinders 3, 2, whereat the printing commences, there is acquired printing work which reaches very sharply to the edge of the stock.

The above described provisions for improved pad saturation, regulation for solvent feed, promoted conditions for observation of the latter, and automatic operation of the solvent supplying

apparatus, also conduce to speedier and improved superior duplication printing work.

In similar manner, it will be evident that all the mentioned advantages of the invention, as well as others, hereinabove alluded to, are fully carried out by this duplicating machine.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, a table in front of said cylinder for thereupon directing sheets under the cylinder a lower rotatable cylinder for pressing said sheets against said master leaf, said table having thereon a fixed lateral guide for said sheets to insure permanence of position of said guide relatively to said table, said table being shiftable laterally relatively to said cylinders to effect the lateral setting of said guide relatively to said cylinders, and means to maintain said table in shifted position.

2. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a fixed axis, a diameter equal to that of said upper cylinder, and being intergeared and positively driven with said cylinder, and manually actuated means to set said upper cylinder in a motion of translation to positions toward and away from and in parallelism with said lower cylinder for duplicate printing on varying thickness of stock.

3. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a fixed axis, a diameter equal to that of said upper cylinder, and being intergeared and positively driven with said cylinder, manually actuated means to shift the axis of said upper cylinder in parallelism toward and away from the axis of said lower cylinder to a plurality of selected positions, and means to set said upper axis in shifted selected position for duplicate printing on varying thickness of stock.

4. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder and being intergeared and positively driven therewith, a stationary frame carrying said lower cylinder with its axis in a fixed state, a frame carrying said upper cylinder being pivoted relatively to said other frame for shifting said upper cylinder in parallelism toward and away from said lower cylinder to a plurality of selected positions, and manually actuated means for setting said pivoted frame in a plurality of pivoted positions for duplicate printing on varying thickness of stock.

5. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder and being intergeared and positively driven therewith, a stationary frame carrying said lower cylinder with its axis in a fixed state, a frame carrying said upper cylinder being pivoted relatively to said other frame for shifting said upper cylinder in parallelism toward and away from said lower cylinder to a plurality of selected positions, and manually actuated means to set said pivoted frame in a plurality of predetermined pivoted positions for duplicate printing on varying thickness of stock.

6. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder and being intergeared and positively driven therewith, said lower cylinder having a fixed axis, manually actuated means to shift the axis of said upper cylinder in parallelism toward and away from the axis of said lower cylinder to a plurality of selected positions, and means to set said upper axis in a plurality of predetermined shifted positions for duplicate printing on varying thickness of stock.

7. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder having a diameter equal to that of said upper cylinder for pressing said sheets against said master leaf intergeared with said upper cylinder, means to positively drive each of said cylinders at same peripheral speed, said lower cylinder carrying mechanism for gripping the leading end of said directed sheet to its periphery and to release said gripping, and means actuating said mechanism to cause it to grip the sheet to the lower cylinder and carry it through the bight of both cylinders and to release the sheet upon its emergence from said bight to permit advancement of the sheet by the peripheries of both cylinders.

8. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf being intergeared with said upper cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, and said lower cylinder carrying a member for abutting the leading edges of said directed sheets thereagainst upon said arrest of the lower cylinder.

9. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf being intergeared with said upper cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, and said lower cylinder carrying a member within it for abutting the leading edges of said directed sheets thereagainst upon said arrest of the lower cylinder.

10. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder and being intergeared with said cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member for abutting the leading edges of said directed sheets thereagainst upon said arrest of the lower cylinder, said lower cylinder carrying a device for gripping the leading ends of said sheets to its periphery when their edges are in abutment with said member, mechanism to actuate said device to perform said gripping, means to actuate said mechanism to release said gripping when the leading ends of said sheets have passed out from between said cylinders, and said mechanism and actuating means being operated by said driving means.

11. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder and being intergeared with said cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member within it for abutting the leading edges of said directed sheets thereagainst upon said arrest of the lower cylinder, said lower cylinder carrying within it a rock shaft, said shaft carrying a blade adapted to grip the leading ends of said sheets to the periphery of said lower cylinder when their said edges are in abutment with said member, said lower cylinder carrying mechanism for rocking said shaft, means to actuate said mechanism to rock said shaft to cause said blade to perform said grip, means to actuate said mechanism to rock said shaft to cause said blade to release said grip when the leading ends of said sheets have passed out from between said cylinders, and said actuating means being operated by said driving means.

12. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, a pad to contact the top surfaces of said sheets for applying solvent located above said directing means, a pivoted apron for backing the undersides of said sheets while contacted by said pad being located beyond the terminal of said means and between said pad and lower cylinder, and a spring normally maintaining said apron out of contact with said lower cylinder.

13. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, means to drive said cylinders, said lower cylinder carrying within it a device for gripping the leading ends of said sheets to its periphery, said device releasing its gripping when the leading ends of said sheets have passed out from between said cylinders, said device being disposed under the periphery of said lower cylinder during said gripping and over said periphery during said releasing, a pad to contact the top surfaces of said sheets for applying solvent located above said directing means, an apron for backing the undersides of said sheets while contacted by said pad being located beyond the terminal of said means and between said pad and lower cylinder, and said apron being pivotally mounted to permit said device to pass thereunder while it is in released state.

14. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member for abutting the leading edges of said sheets thereagainst upon said arrest, said lower cylinder carrying mechanism for gripping the leading ends of said sheets to its periphery after disposal of said member for said abutment, said mechanism releasing its gripping when the leading ends of said sheets have passed out from between said cylinders, said device being disposed under said periphery during said gripping and over said periphery during said releasing, a pad for contacting and applying solvent to said sheets located above said directing means, a casing for retaining said pad, an apron for backing the undersides of said sheets while contacted by said pad being located beyond the terminal of said directing means and between said pad and lower cylinder, said apron being pivoted to permit said device to pass thereunder while it is in released state, and mechanism to actuate said casing to contact said pad with said sheets after disposal of said member for said abutment and priorly to said gripping and to move said pad away upon said arrest.

15. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member for abutting the leading edges of said sheets thereagainst upon said arrest, said lower cylinder carrying mechanism for gripping the leading ends of said sheets to its periphery after disposal of said member for said abutment, said mechanism releasing its gripping upon emergence of the leading end of said sheet from the bight of said cylinders to permit advancement of the sheet by the cylinders, a pad for contacting and applying solvent to said sheets located above said directing means, a casing for retaining said pad, and mechanism to actuate said casing to contact said pad with said sheets after disposal of said member for said abutment and priorly to said gripping and to move said pad away upon said arrest.

16. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member for abutting the leading edges of said sheets thereagainst upon said arrest, said lower cylinder carrying mechanism for gripping the leading ends of said sheets to its periphery after

disposal of said member for said abutment, a pad for contacting and applying solvent to said sheets located above said directing means, a casing for retaining said pad, and mechanism to actuate said casing to contact said pad with said sheets after disposal of said member for abutment and to move said pad away priorly to said disposal.

17. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying a member for abutting the leading edges of said sheets thereagainst upon said arrest, a pad for contacting and applying solvent to said sheets located above said directing means, a casing for retaining said pad, and mechanism to actuate said casing to contact said pad with said sheets after disposal of said member for abutment and to move said pad away priorly to said disposal.

18. In a duplicating machine, the combination of a pad for applying solvent to sheets, a reservoir for supplying said solvent to said pad, means to feed the solvent from said reservoir to the rear of said pad at a plurality of places, said pad sloping downwardly from said rear to produce uniform distribution of said solvent along the front of said pad, and means to selectively cut off the flow of said solvent at one of said places.

19. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf, a pad for applying solvent to said sheets located above said directing means, a framing, a casing for retaining said pad being receivable into and removable from said framing, mechanism to actuate said framing to contact said pad with said sheets during rotation of said cylinders and to move said pad away for feeding said sheets, and means for locking said casing within said framing.

20. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder, said cylinders being intergeared, means to drive said cylinders, said lower cylinder carrying within it a rock shaft, said shaft carrying a plurality of blades adapted to grip the leading ends of said sheets to the periphery of said lower cylinder and to release said grip, mechanism for rocking said shaft, and said mechanism being actuated by said driving means.

21. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder, said cylinders being intergeared, said lower cylinder having a gap in its periphery, said lower cylinder having its periphery composed of a blanket of resilient material, and said lower cylinder having means within said gap to mount said blanket thereon and to demount it therefrom.

22. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder, said cylinders being intergeared, said lower cylinder having a gap in its periphery, said lower cylinder having its periphery composed of a blanket of resilient material, said lower cylinder having means within said gap to mount said blanket thereon and to demount it therefrom, and said lower cylinder having means to draw said blanket for stretching it taut and to restore said tautness.

23. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder, said cylinders being intergeared, said lower cylinder having a gap in its periphery, said lower cylinder having its periphery composed of a blanket of resilient material, said lower cylinder having means within said gap to mount said blanket thereon and to demount it therefrom, said lower cylinder having a rotatable bar for securing the terminal of said blanket thereto, and a pawl and rachet wherewith to set said bar for stretching said blanket taut and to restore said tautness.

24. A duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, a table in front of said cylinder for thereupon directing sheets under the cylinder, said table carrying means for guiding said sheets laterally a lower rotatable cylinder for pressing said sheets against said master leaf, said table being shiftable in a motion of translation relatively to said cylinders laterally, and means to indicate the degree of said lateral shifting.

25. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing a sheet under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheet against said master leaf intergeared with and having a diameter equal to that of said upper cylinder, means to drive said cylinders, said lower cylinder carrying within it a device for gripping the leading end of said sheet to its periphery and to release said gripping, and means operating said gripping device to conduct said end into the bight of said cylinders and to release it upon its emergence from said bight.

26. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing a sheet under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheet against said master leaf being intergeared with and having a diameter equal to that of said upper cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, said lower cylinder carrying within it a device for gripping the leading end of said sheet to its periphery and to release said gripping, said lower cylinder carrying an abutment for said end, said abutment being disposed to operative position upon said arrest of the cylinders, and means operating said gripping device to grip said end at location of said abutment and conduct it into the bight of said cylinders

and release it upon its emergence from said bight.

27. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing a sheet under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheet against said master leaf being intergeared with and having a diameter equal to that of said upper cylinder, means to drive said cylinders, means to arrest the rotation of said cylinders, and means carried by said lower cylinder operating said device to apply solvent to the sheet during rotation of said cylinders and to move said device away from said lower cylinder during said arrest of said cylinders.

28. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means in front of said cylinder for directing sheets under the cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder to prevent impairment of the flatness of said solvent treated sheets, and means to positively drive each of said cylinders at same speed to prevent relative slippage of their peripheries.

29. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder having a diameter equal to that of said upper cylinder for pressing said sheets against said master leaf to prevent impairment of the flatness of said solvent treated sheets, said lower cylinder having a gap therein and its periphery composed of a blanket of resilient material, said lower cylinder having means in said gap to mount said blanket thereon and to demount it therefrom, and means to positively drive each of said cylinders at same speed to prevent slippage of either of said cylinders relatively to the other.

30. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder to prevent impairment of the flatness of said solvent treated sheets, said lower cylinder having a gap therein and its periphery composed of a blanket of resilient material, said lower cylinder having means in said gap to mount said blanket thereon and to demount it therefrom, said lower cylinder having means in said gap to stretch said blanket while it is in mounted condition thereon, and means to positively drive each of said cylinders at same speed to prevent slippage of the periphery of either of said cylinders relatively to the other.

31. A solvent applying duplicating machine having the combination of an upper rotatable cylinder for carrying a master leaf, means for directing sheets under said cylinder, a device over said directing means for applying solvent upon said sheets, a lower rotatable cylinder for pressing said sheets against said master leaf having a diameter equal to that of said upper cylinder to prevent impairment of the flatness of said solvent treated sheets, said lower cylinder having a gap therein and its periphery composed of a blanket of resilient material, said lower cylinder having means in said gap to stretch said blanket while it is in mounted condition thereon, and means to positively drive each of said cylinders at same speed to prevent slippage of the periphery of either of said cylinders relatively to the other.

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