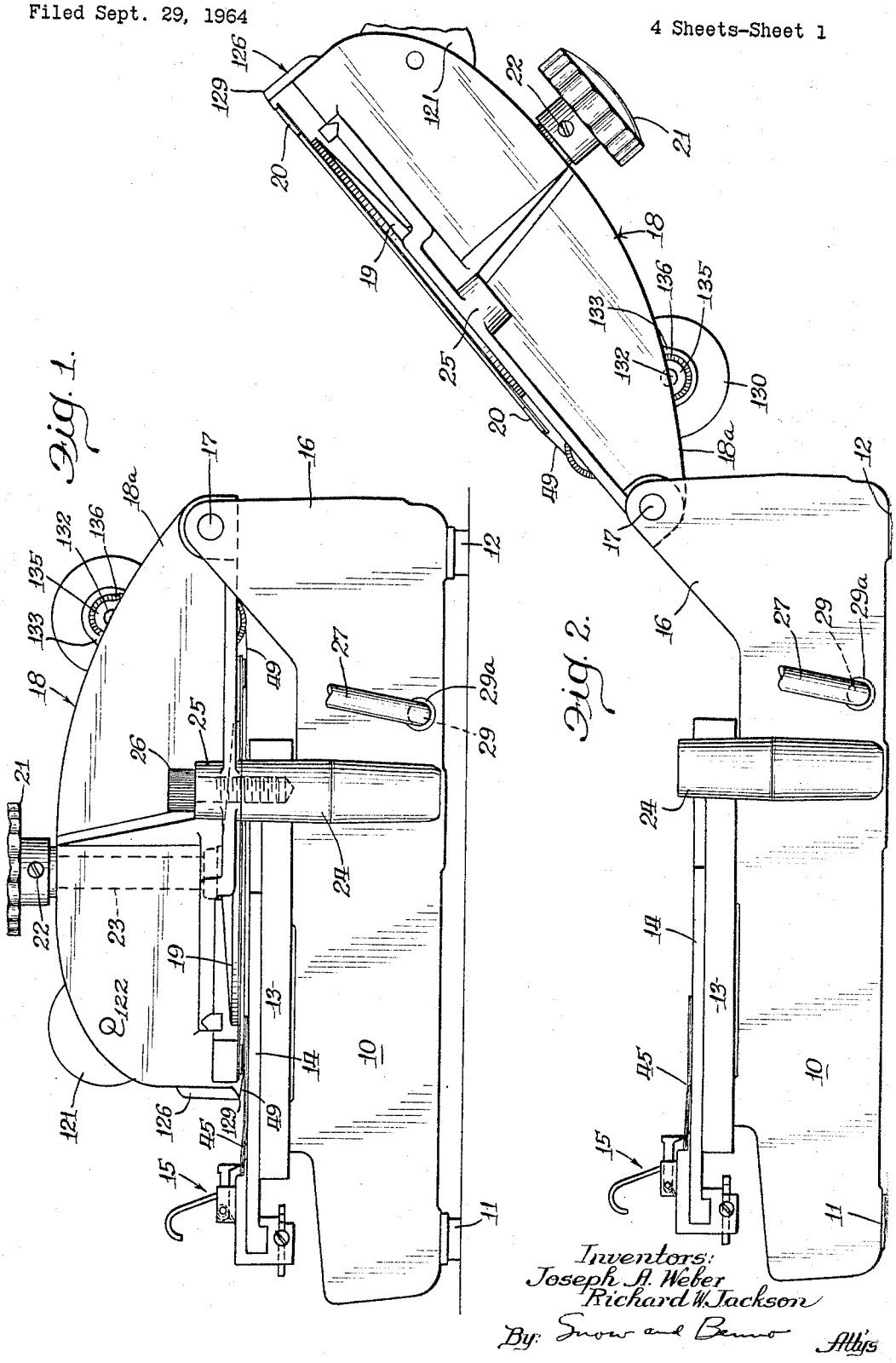
Oct. 11, 1966 J. A. WEBER ETAL 3,277,991

WAX ABSORBENT RIBBON FOR STENCIL CUTTING MACHINE

Filed Sept. 29, 1964 4 Sheets-Sheet 1



Inventors:
Joseph A. Weber
Richard W. Jackson
By: Snow and Bemo Attys

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4 Sheets-Sheet 2

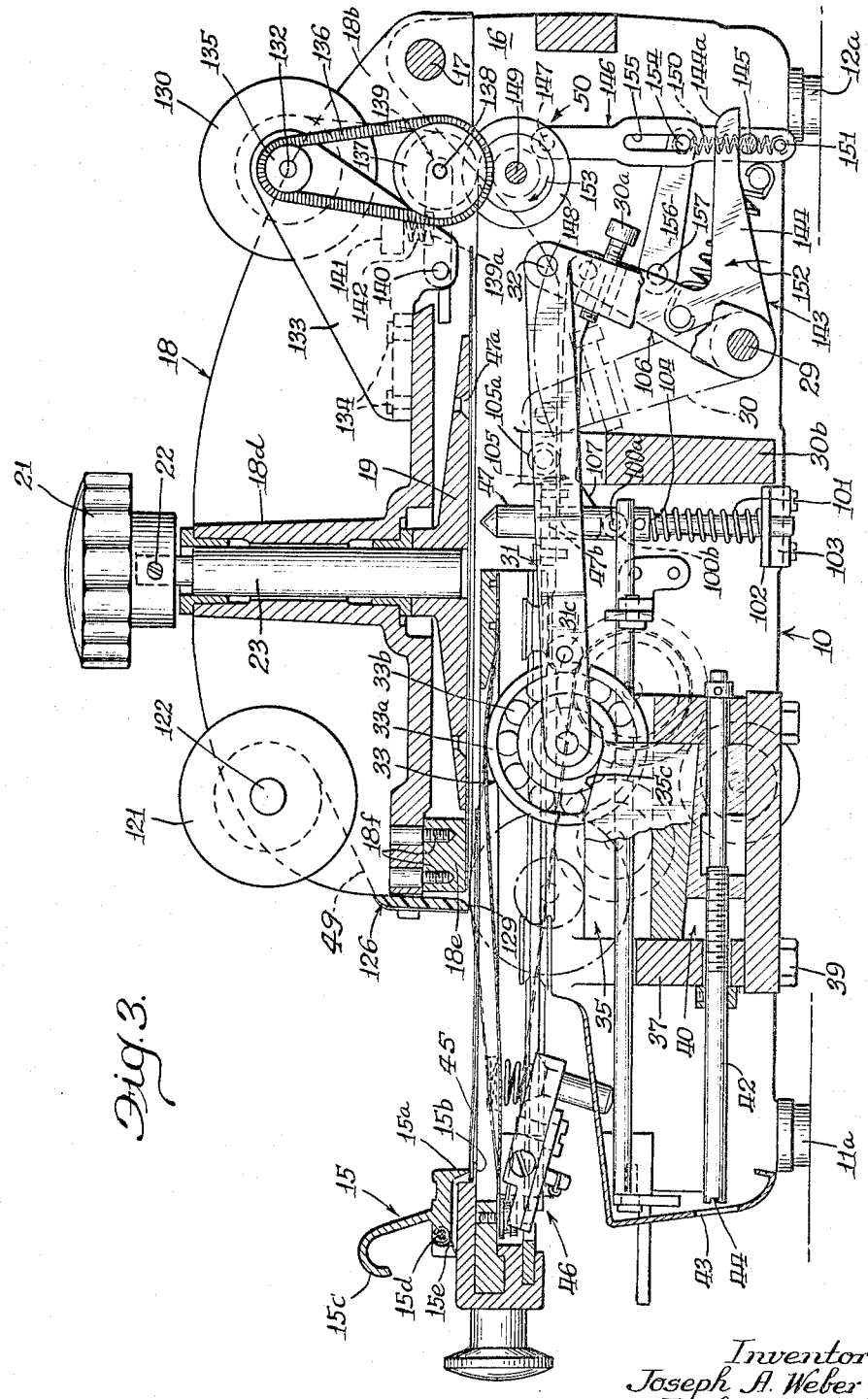


Fig. 3.

Inventors:
Joseph A. Weber
Richard M. Jackson
By: Snow and Bemis
Attys

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Fig. 4.

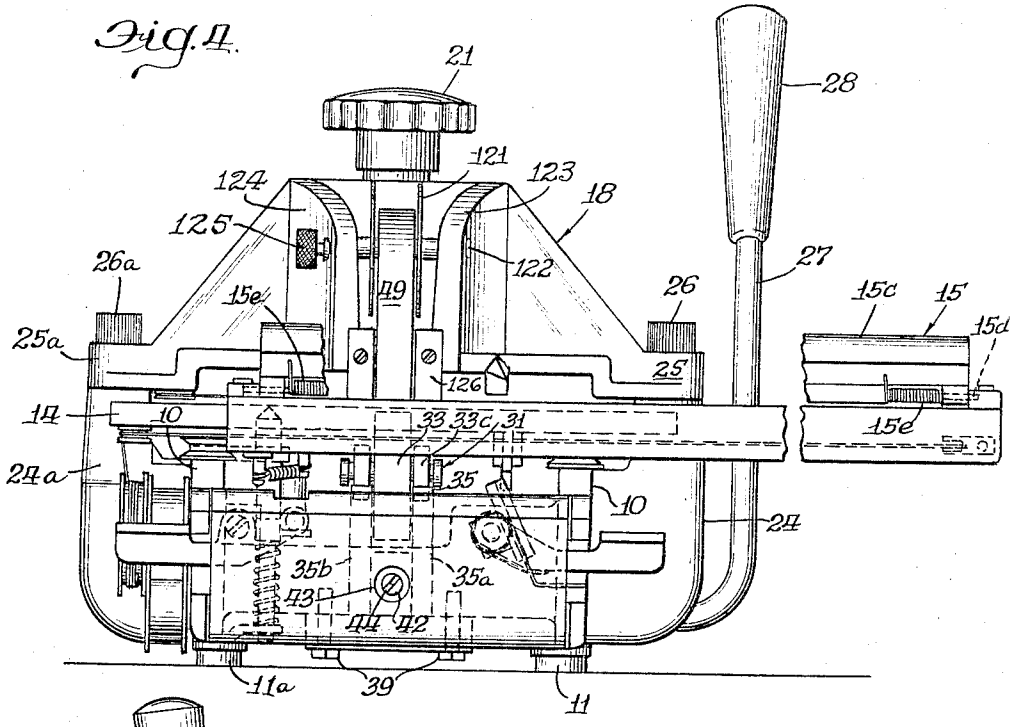
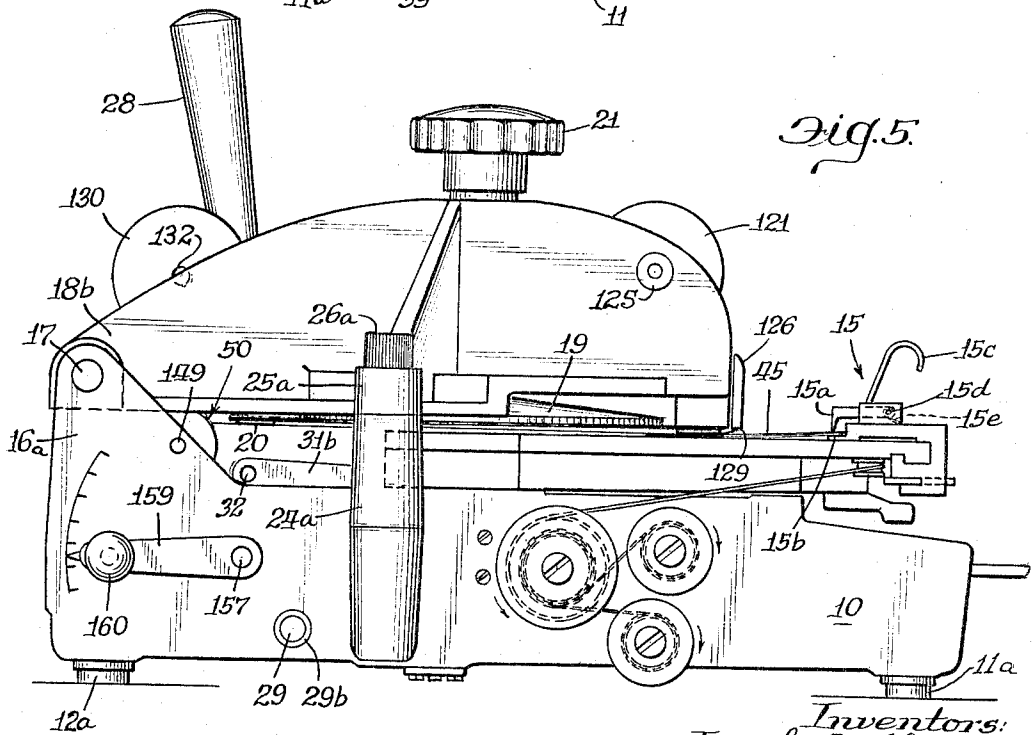


Fig. 5.



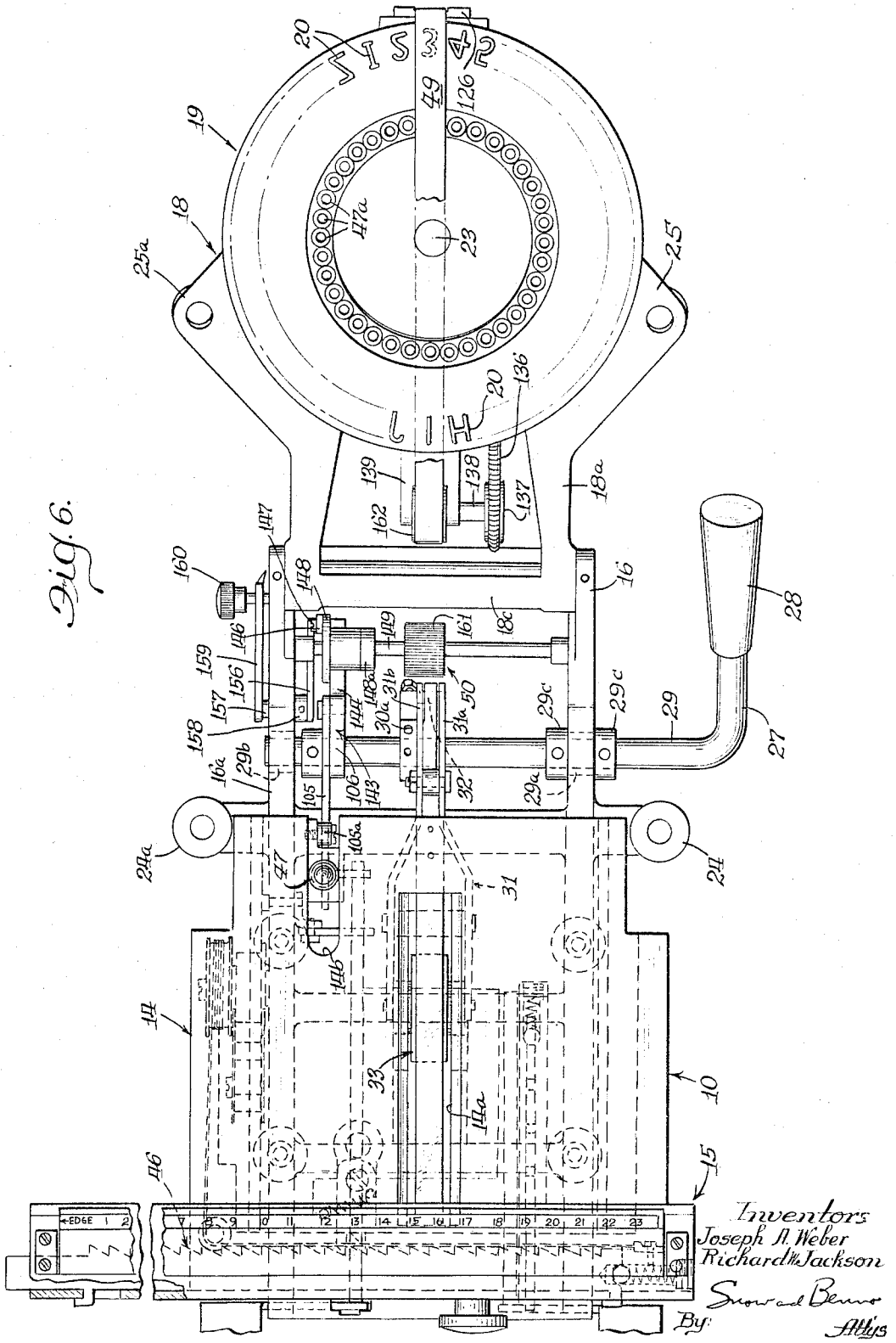
Inventors:
Joseph A. Weber,
Richard W. Jackson
By: Snow and Benno Attys.

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Fig. 6.



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WAX ABSORBENT RIBBON FOR STENCIL CUTTING MACHINE

Joseph A. Weber, Prospect Heights, and Richard W. Jackson, Arlington Heights, Ill.; said Jackson assignor to Weber Marking Systems, Inc., a corporation of Illinois

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1 Claim. (Cl. 197—6.4)

This invention relates to a new and improved wax absorbent ribbon for stencil cutting machines.

The cutting of stencils in modern office procedures has been limited to typewriters and to hand operated tools such as a stylus. In both instances the removal of the stencil coating which constitutes the "cutting" of the stencil has merely been with lined letters or characters. In no instance has there been any large areas of the stencil coating removed in the formation of letters or characters to be subsequently imprinted by expelling ink through the coating removed portions of the stencil. The coating of a modern stencil is an emulsion which is placed over a porous tissue base. This emulsion which is permitted to solidify after application to the porous tissue base prevents ink from passing through the stencil material. Therefore, the removal of portions of this emulsion permits ink to pass through the porous tissue base in a uniform manner to cause an imprinting of those portions of the stencil which have had the coating removed. For purposes of convenience herein the emulsion coating although not strictly a wax will be hereafter termed a wax coating and it should be understood that this application is concerned with such a wax coating removal.

A principal object of the present invention is to provide a novel machine for cutting stencils with broad surfaced characters and employing means for removing the wax-like stencil coating so that there will be no impairment of the cutting mechanisms in the machine in the cutting of succeeding characters in a stencil.

An important object of this invention is the provision of novel ribbon means for absorbing the stencil coating during the cutting of indicia in a stencil. The terms "absorbing" or "absorbent" used herein are intended to include any material which will cause the stencil wax-like coating to be adhered thereto whether on or within the material.

Another important object of this invention is to equip a stencil cutting machine with a novel wax absorbent ribbon movable in increments longitudinally of the machine in response to actuation of the machine in the cutting of individual characters in a stencil to be cut.

Another and still further important object of this invention is to provide a novel stencil cutting machine with means for holding a stencil to be cut, means for adjustably positioning type characters in a pre-selected relationship with the stencil to be cut and a wax absorbent ribbon arranged to lie longitudinally of the characters or letters to be cut and thereupon incrementally driving the ribbon in the same longitudinal direction to present a succeeding area of ribbon to absorb the wax from the cutting of the next character in the stencil.

A still further important object of this invention is the provision of means to adjustably control the degree of incremental movement of a stencil coating absorbing ribbon so that the incremental movement may be adjusted to conform to the size of type used in the cutting of the stencil.

Other and further important objects and advantages will be apparent from the disclosures in the following specification and accompanying drawings.

In the drawings:

FIGURE 1 is a side elevational view of the stencil cutting machine of this invention.

FIGURE 2 is a side elevational view of the stencil cutting machine of FIGURE 1 with the auxiliary frame swung away from its superposed position over the main frame as shown in FIGURE 1.

FIGURE 3 is a longitudinal front to back sectional view taken through the stencil cutting machine of FIGURE 1.

FIGURE 4 is a front elevational view of the device as shown in FIGURE 1.

FIGURE 5 is a side elevational view of the stencil cutting machine of this invention opposite to that shown in FIGURE 1.

FIGURE 6 is a top plan view of the stencil cutting machine as shown in FIGURE 2 with the auxiliary frame in an outwardly swung position.

As shown in the drawings:

The reference numeral **10** indicates generally a main frame or supporting structure which is preferably made as a metal casting. The frame **10** is substantially hollow in order to minimize the weight of the machine and to provide for a housing for the operating parts of the stencil cutting machine. The main frame **10** is provided with spaced apart front feet or table engaging pads **11** and **11***a*. Similarly the supporting structure **10** is provided with spaced apart rear feet or table engaging pads **12** and **12***a* so that the main frame is supported in a stable manner to permit the cutting of stencils thereon. The main frame **10** is provided with upper side edges **13** which act to receive a generally flat horizontally disposed stencil receiving table **14**. It is on this table that the stencil to be cut is placed.

The table **14** is arranged and constructed to be incrementally adjusted longitudinally relative to the top **13** of the supporting structure **10**. An aperture **14***a* is provided in a generally central portion of the table **14** for the purpose of permitting the application of substantial pressures upwardly through the table to engage the stencil and thereupon effect a cutting thereof by reason of the stencil engaging type characters. The type characters will subsequently be described and shown to be arranged and positioned above the table aperture. The longitudinal incremental movement of the table **14** thus provides for the line spacing of the stencil as it is being cut with various indicia.

A stencil clamping means **15** is mounted on the forward edge of the table **14** and is arranged and constructed to have transverse sliding movement therealong. The stencil clamping elements are shown at **15***a* and **15***b*. An edge of a stencil to be cut is placed between the gripping members **15***a* and **15***b* while the body portion of the stencil is adapted to extend rearwardly over the table **14**. The clamping member **15** is arranged to be incrementally moved along the forward edge of the table **14** to thereupon obtain proper letter spacing for the stencil indicia.

The main frame or supporting structure **10** is provided with spaced apart hinge ears **16** and **16***a* which project generally upwardly at the rear thereof. A hinge pin **17** is disposed generally transversely of the main frame **10** and passes through aligned apertures in the spaced apart hinge ears **16** and **16***a*. An auxiliary frame or supporting structure **18** is arranged and constructed to be hingedly mounted relative to the main frame **10** in such a manner that the auxiliary frame may be positioned in a superposed position over the main frame as shown in FIGURES 1, 3, 4 and 5 or in an outwardly swung position such as shown in FIGURES 2 and 6. The auxiliary frame is provided with spaced apart rearwardly projecting ears **18***a* and **18***b* which are joined by a cross member **18***c* at their outer ends. The spaced apart ears **18***a* and **18***b* are provided with aligned apertures to permit the passage therethrough of the hinge pin **17** such as partic-

ularly shown in FIGURE 6. The ears 18*a* and 18*b* are adapted to lie between and in generally closely abutting relationship to the inner edges of the spaced apart ears 16 and 16*a* respectively which form a part of the base main frame 10. Thus the auxiliary frame 18 is hingedly mounted relative to the main frame 10 about the hinge pin 17 so that as preivously stated the auxiliary frame may be disposed in either a position where it is in close superposition relative to the main frame or outwardly swung away from its position over the stencil receiving table on the main frame.

The auxiliary frame is adapted to carry a disc 19 on its underside. The outer periphery of the disc has embossed type characters 20 thereon such as shown in FIGURES 3 and 6. A hand engaging knob 21 is provided at the top of the auxiliary frame 18 and by means of a set screw or pin 22 is adapted to be affixed to a generally vertically disposed spindle 23 on which the disc 19 is mounted for concurrent rotation. The spindle 23 is journally supported within a generally vertically disposed and elongated bushing 18*d* of the auxiliary frame 18. Thus the type carrying disc 19 may be manually rotated by an engagement of the hand knob 21 to thereupon place any one of the type characters 20 in proper position to act as the means for cutting or removing the stencil coating in this machine. A generally centrally disposed block 18*e* is bolted to the auxiliary frame 18 as shown at 18*f* at the front center position of the auxiliary frame. It is beneath this block 18*e* that the selected type character 20 on the disc 19 must be placed in order to effect a stencil cutting in this machine.

The main frame 10 is provided with generally cylindrically shaped bosses 24 and 24*a* formed on both sides thereof as shown in FIGURE 6. These sleeve-like bosses are internally threaded. The auxiliary frame 18 is provided with similarly transversely spaced apart bosses 25 and 25*a* which are each provided with apertures arranged and constructed to lie in axial alignment with the internally threaded holes in the sleeves 24 and 24*a* on the main frame when the auxiliary frame is in superposed position over the stencil receiving table 14 of the main frame. Cap screws 26 and 26*a* are employed to pass through the apertures in the wing-like bosses 25 and 25*a* of the auxiliary frame 18 for threaded engagement with the internal threads in the sleeve-like bosses 24 and 24*a* of the main frame to thereupon rigidly hold the auxiliary frame in fixed position relative to the main frame as it is shown in FIGURES 1, 3 4 and 5 of the drawings. When it is desired to gain access to the type carrying disc 19 for replacement or servicing or to gain more ready access to the operating mechanisms of the device to be subsequently described, the cap screws 26 and 26*a* are removed and the auxiliary frame 18 swung upwardly and rearwardly such as shown in FIGURES 2 and 6. In this open position it is obvious that the movable type carrying mechanism may be entirely removed and replaced with different sizes or styles of type or may be merely cleaned or serviced as necessary. When the machine is again to be used in its stencil cutting function the auxiliary frame is swung downwardly about its hinge 17 and the cap screws 26 and 26*a* replaced. In this closed position the stencil may be cut. The cutting operation utilizes a back-up block or plate 18*e* to contain the pressure which is utilized to impress the stencil against the particular type character 20 to be cut in the stencil.

The device of this invention is operated by a lever 27 having a hand engaging knob or handle 28 such as shown in FIGURES 4 and 6. The lever 27 is bent at right angles as shown in FIGURE 6 so that its right angle extension indicated by the numeral 29 constitutes a shaft which is journally supported in bushings 29*a* and 29*b* mounted respectively in the spaced apart ears 16 and 16*a* of the main frame at a position spaced forwardly of the hinge pin 17 and generally near the bottom of the main frame. Adjustable collars 29*c* are arranged on the shaft 29 to flank both sides of the wall member 16 whereby the shaft may be accurately adjusted within the frame.

As best shown in FIGURES 3 and 6 the shaft 29 has mounted thereon a lever 30 which in a non-actuating position is as shown in full lines in FIGURE 3. When the hand lever 27–28 is pulled forwardly toward the stencil receiving table 14 the lever arm 30 is rocked to a position as shown in dashed lines in FIG. 3 by reason of rotation of the shaft 29. An adjustable screw 30*a* is threadedly carried by the crank 30 and is adapted to limit the throw of the hand lever 27–28. The screw 30*a* is arranged to engage a lug 30*b* formed integrally with the frame structure 10. Greater or lesser arcuate movement may be accomplished by greater or lesser extensions of the end of the threaded set screw 30*a*. A link means 31 comprises spaced apart arm members 31*a* and 31*b* which are fastened by means of a cross pin 32 to the upper end of the lever arm 30. This link means 31 extends forwardly within the base housing 10 for ultimate connection to a pressure urging roller mechanism 33. The roller mechanism 33 includes an outer race member 33*a*, a plurality of anti-friction ball members 33*b* and an inner race or hub 33*c* as best shown in FIGURE 6. The hub 33*c* is substantially wider than the outer race 33*a* and the extensions formed on both sides of the centrally located roller are utilized to cooperate with a cammed surface to cause a raising of the roller mechanism 33 for the purpose of applying pressures through the aperture 14*a* in the stencil receiving table 14 to cause stencil cutting in a manner to be subsequently described. The link members 31*a* and 31*b* are bent or flared outwardly intermediate their ends as shown at 31*c* and their forward ends 31*d* flank the outer sides of the hub 33*c*. A rivet or pin means 34 fastens the link arms 31*a* and 31*b* to the hub 33*c*. A rocking movement of the lever arm 30 from its full line position to the dashed line position as shown in FIGURE 3 will cause the roller mechanism 33 to move forwardly in the device of this invention.

The cam mechanism constitutes a generally U-shaped block member 35 with spaced apart track or rail members 35*a* and 35*b*. The rearward ends of the rails 35*a* and 35*b* have their top surfaces 35*c* inclined upwardly and forwardly whereupon the top surfaces are generally horizontally disposed as shown at 35*d* at their outer forward ends. It is upon these track-like surfaces 35*a* and 35*b* that the laterally extending hub portions 33*c* of the roller means 33 ride to cause the roller means through its outer race 33*a* to exert substantial pressures upwardly through the aperture 14*a* in the stencil holding table 14. The generally U-shaped block 35 with a base 35*e* is confined by longitudinally spaced apart bosses 36 and 37 which form a part of the base housing 10. A bottom plate 38 is fastened to the longitudinally spaced boss members 36 and 37 by cap screws 39 and define a space 40 within which is carried a mechanism to cause accurate vertical adjustment of the block member 35 so that various thicknesses of stencil sheets may be accommodated and so that only the stencil coating is removed in the stencil cutting process without causing damage to the porous base tissue sheet of the stencil.

The chamber 40 includes a longitudinally adjustable wedge block 41 the inclined top surface of which lies against the similarly inclined lower surface of the bottom 35*e* of the generally U-shaped block 35. These mating inclined surfaces provide the wedge adjusting means for the micrometer-like vertical positioning of the block 35. An elongated screw member 42 is threadedly engaged to and within the wedge block 41. As shown in FIGURE 3 the block 41 abuts the end boss 36 and thus has raised the block 35 its maximum distance. The block 35 may be lowered by rotating the screw 42 and causing the wedge block 41 to move forwardly in the chamber 40 to thus permit the block 35 to drop. The adjustment is preferably made by manually inserting a screw driver through an aperture 43 in the front skirt of the housing 10 and

into a screw slot **44** in the forward end of the elongated screw **42**.

In the operation of the device of this invention a stencil **45** to be cut is placed on the table **14**. The clamp elements **15***a* and **15***b* are separated by depressing a handle **15***c* of the member **15***a* about a hinge **15***d*. A spring **15***e* is arranged about the hinge **15***d* in a manner to cause the jaws **15***a* and **15***b* to be urged together. An incrementally releasable ratchet mechanism **46** is disposed intermediate the table **14** and the clamping member **15** such that the clamping member may be adjustably moved transversely of the table **14**. The stencil **45** extends beneath the block **18***e* of the auxiliary frame **18** and has individual type characters **20** cut therein at that position. The desired letter is selected and then manually positioned beneath the block **18***e* by rotation of the hand knob **21**. Now the hand lever **27–28** is swung forwardly causing the pressure roller to be cammed upwardly and thence longitudinally of the opening **14***a*. The roller causes the stencil sheet to be rolled against a selected letter on the disc **19** with the block **18***e* as the reactance member. In order that the selected letter **20** be centered in the stencil cutting location the disc **19** is locked in position by a locking pin **47** moving into engagement in socket apertures **47***a* in the disc **19** thereupon prohibiting rotation of the disc **19**. The device is arranged to automatically lock during application of the stencil cutting pressures by the roller means **33**. A second ratchet means **48** is mounted longitudinally of the base **10** beneath the table **14** so that upon completion of one line of stencil cutting indicia the entire table **14** may be longitudinally adjusted so that a uniformly spaced succeeding line may be cut.

A ribbon **49** may be utilized to absorb the emulsion coating of the stencil during its removal from a particular letter outline. The ribbon **49** may be incrementally advanced by means **50** in response to operation of the stencil cutting. Obviously with the hinged auxiliary frame of this construction the user may readily replace the type carrying disc **19** by opening the auxiliary frame about its hinge **17** after first removing the cap screws **26**.

A coil spring **101** surrounds the rod **47** and is disposed between a flange **102** on a lower supporting bracket **103** and a shoulder **104** on the rod **47** spaced upwardly therefrom. The spring thus normally urges the rod **47** upwardly. A cam-like detent **105** passes through a cross notch or opening **47***a* in the indexing rod **47** and normally engages the top side of a roller **100***b* journalled on the pin **100***a* within the rod **47** and in one position thereof holds the indexing rod or pin **47** down and free from engagement with the type carrying wheel or disc **1**. A crank **106** is mounted on the shaft **29** and carries the cam-detent **105**. When the hand lever **27–28** is swung forwardly, the cam-detent **105** is moved forwardly through the center of the rod **47**. As shown in FIGURE 3 the underside of the cam-detent **105** has a quickly receding surface **107** which permits the indexing rod **47** to move upwardly. A guide roller **105***a* is mounted on the supporting structure **10** and acts to guide the cam-detent **105** through the indexing rod **47**. As may be seen in FIGURE 6 the table **14** is provided with a rearwardly opening elongated notch **14***b* to permit the longitudinal indexing thereof without interference with the indexing pin **47**.

The present invention is concerned with the ribbon **49** which will absorb or hold in some manner wax-like stencil coating materials when large surfaced letter characters are cut in stencils by the cutter described above. The ribbon may be a fabric ribbon or it might be a plastic or other composition which will serve to remove the wax-like stencil coating at the time of stencil cutting so that the type or other character embossments **20** on the disc **19** will not become clogged with wax buildup and ultimately impair the stencil cutting operation. It has and shall be stated that the ribbon is wax absorbent. This is intended to mean that the ribbon will hold the wax-like coating either on its surface or in its interior. The ribbon **49** must further not be such as to prevent the type on the disc **19** from being clearly and accurately reproduced in the stencil during the cutting thereof.

A supply of ribbon **49** is mounted on a spool **121** which in turn is carried on a shaft **122** on the top front of the machine. The shaft **122** is journally mounted in a transverse position in spaced supporting members **123** and **124**. As shown in FIGURE 4 a knurled knob **125** is provided on an outer extension of the shaft **122** and provides for the manual rotation of the ribbon carrying spool **121**. From the spool **121** the ribbon progresses downwardly through a vertically disposed guide member **126**. The guide member is provided with spaced side members **127** and **128** which define a centrally disposed vertical passageway just slightly wider than the width of the ribbon **49**. The ribbon **129** then passes beneath the lower edge **129** of the guide member **126** and thence longitudinally rearwardly beneath the block member **18***e* and across the type carrying disc **19** and out the rear thereof for winding on a take-up spool **130**. The guide member **126** is fastened by means of screws **131** to the auxiliary frame structure **18**.

The take-up spool **130** at the rear of the auxiliary frame **18** is mounted on a shaft **132** which is journally suported on a bracket member **133** which in turn is attached to the auxiliary supporting structure **18**. The bracket member **133** is fastened by means of screws **134** or the like to the frame support **18** as shown in FIGURE 3.

A small grooved pulley **135** is mounted on the shaft **132** at a position on the other side of the supporting bracket **130**. An endless spring type belt **136** is carried in the groove of the pulley **135** and projects downwardly for engagement with a somewhat larger diameter grooved pulley **137** mounted on a shaft **138**. The shaft **138** is carried on an arm **139** which is hingedly mounted at **140** on the supporting structure **18**. A block **141** is welded or otherwise formed on one side of the bracket **133** in generally planar alignment with the pulley carrying arm **139**. A coil spring **142** is disposed between the block **141** and the hinged arm **139** and is adapted to exert a downward force on the arm **139** to thus maintain the belt **136** sufficiently taut to impart rotational drive from the pulley **137** to the pulley **135**. This causes the take-up spool **130** to be rotatably driven. A socket **139***a* is provided in the top of the arm **139** to receive and guide the lower end of the coiled extension spring **142**.

The crank **106** is part of a bell crank lever **143** which is rockable about the shaft **29**. The crank **106** forms one part of the bell crank **143**. A rearwardly extending crank **144** forms an angularly disposed portion of the bell crank **143** and at its rearward end **144***a* is adapted to ride on a pin **145** which is carried in a generally vertically disposed link arm **146**. The link arm **146** is pivotally attached at **147** to a disc-like member **148** mounted on a shaft **149**. A spring **150** is fastened to a pin **151** at the lower end of the connecting link **146** and at its upper end is fastened to the end of a link arm to be subsequently described whereby the connecting link **146** is constantly urged in an upward direction. When the stencil cutting machine of this invention is operated to cut a stencil by reason of the forward pulling of the hand lever **27–28** to thereupon rock the shaft **29** the bell crank **143** is simultaneously rocked and moved in a counterclockwise direction as viewed in FIGURE 3 as indicated by the arrow **152**. This then causes the outer end **144***a* of the bell crank arm **144** to be raised from the pin **145** thus permitting the spring **150** to pull the link **146** upwardly. The disc **148** is part of a conventional one-way clutch **148***a* shown in the form of a drum mounted over the saft **149** and closely adjacent to the disc **148**. The one-way clutch is arranged whereby upward movement of the link **146** does not cause rotational drive to be imparted to the shaft **149**. However, when the cutting operation for a particular letter is completed the operating lever **27–28** is swung rearwardly causing the end **144***a* of the bell crank arm **144** to be moved downwardly thus striking the pin **145** and

moving the link **146** downwardly to its position as shown in FIGURE 3. The clutch **148***a* is so arranged that downward movement of the link **146** imparts incremental rotation of the shaft **149** in the direction of the arrow **153**.

The "throw" of the connecting link **146** may be changed by the employment of an adjustably positionable pin **154** within an elongated slot **155** in a central portion of the connecting link **146**. In the position of the device as shown in FIGURE 3 the connecting link **146** is barred from any upward movement even after the bell crank arm **144** is raised because of the bottom end of the slot **155** is in direct contact with the pin **154**. The higher the pin **154** is positioned in the elongated slot **155** the greater is the "throw" or travel of the connecting link **146** and thus also the greater the arcuate rotation of the shaft **149**. The pin **154** is mounted on the outer end of a crank arm **156** which also carries the upper end of the spring **150**. The other end of the crank arm **156** is hinged on a transversely disposed shaft **157** which is journally supported in the side frame member **16***a* of the main frame **10** as shown in FIGURE 6. A collar **158** is mounted on the shaft **157** and acts to maintain the crank **156** spaced from the side wall of the frame **10**. The shaft **157** projects outwardly of the wall member **16***a* and has a crank arm **159** mounted thereon in a position to preferably correspond in angular position to that of the crank arm **156**. A thumb-type set screw **160** threadedly engages the outer end of the crank arm **159** and provides the means for locking the crank arm **159** in any desired arcuate position by screwing the thumb screw inwardly to abut the side frame **16***a*. Thus, the positioning of the "throw" limit pin **154** is adjusted by a loosening of the thumb screw and a swinging of the arm **159** thereof which simultaneously causes a shifting of the arm **156** which in turn carries the limit pin **154**.

The shaft **149** is carried transversely in the machine between and in the frame ears **16** and **16***a*. The shaft **149** lies parallel to and spaced above and rearwardly of the shaft **29**. As previously stated the shaft **149** carries the one-way clutch **148–148***a*. A milled roller **161** is mounted on and driven by the shaft **149** in a generally central position. In closed operating position of the machine the milled roller **161** is in abutting relationship with the ribbon **49** and as the roller is incrementally driven it imparts movement to the ribbon **49**. A roller **162** is mounted on the spring biased shaft **138** and acts as a guide for the ribbon **49** as it leaves the underside of the disc **19** and runs up to the take-up spool **130**. The roller **162** is urged into engagement with the milled roller **161** by action of the same spring **142** which causes a tautness of the drive belt **136**. As the ribbon **49** and roller **162** are driven so also is the grooved pulley **137**. This in turn drives the take-up pulley and thus insures movement of the wax absorbent ribbon through the machine from supply spool to take-up spool.

We are aware that numerous details of construction may be varied throughout a wide range without departing from the principles disclosed herein and we therefore do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claim.

What is claimed is:

In a stencil cutting machine comprising a supporting structure, a generally horizontally disposed stencil receiving table carried on said supporting structure, said table having a stencil cutting area with an aperture therein, movable type means disposed above said table for presenting any desired type to said area with the aperture therein, said movable type means including a disc with embossed type characters thereon, a spindle journally supported in said supporting structure in a generally vertically disposed position, means for rotating said disc to thereupon place any one of the embossed type characters in position over said aperture, means exerting pressure upwardly through the table aperture, a spool carried on a transversely disposed shaft at the top front of the stencil cutting machine, a supply of stencil coating absorbent ribbon mounted on said spool, said ribbon progressing vertically downwardly from the spool and thence longitudinally rearwardly across said disc and out the rear thereof, a take-up spool at the rear of the stencil cutting machine mounted on a shaft which is journally supported for rotation, said ribbon extending out the rear of the disc and then to said take-up spool, the portion of said ribbon extending across the disc interposed between a stencil to be cut and the movable type means, means indexing a stencil across said table area with the aperture therein, and means incrementally advancing said ribbon responsive to the operation of the means indexing the stencil, and said means to incrementally advance said ribbon member comprising a one-way clutch and a milled drive roller adapted to incrementally drive said take-up spool.

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ROBERT E. PULFREY, *Primary Examiner.*

DAVID KLEIN, *Examiner.*

EDGAR S. BURR, *Assistant Examiner.*