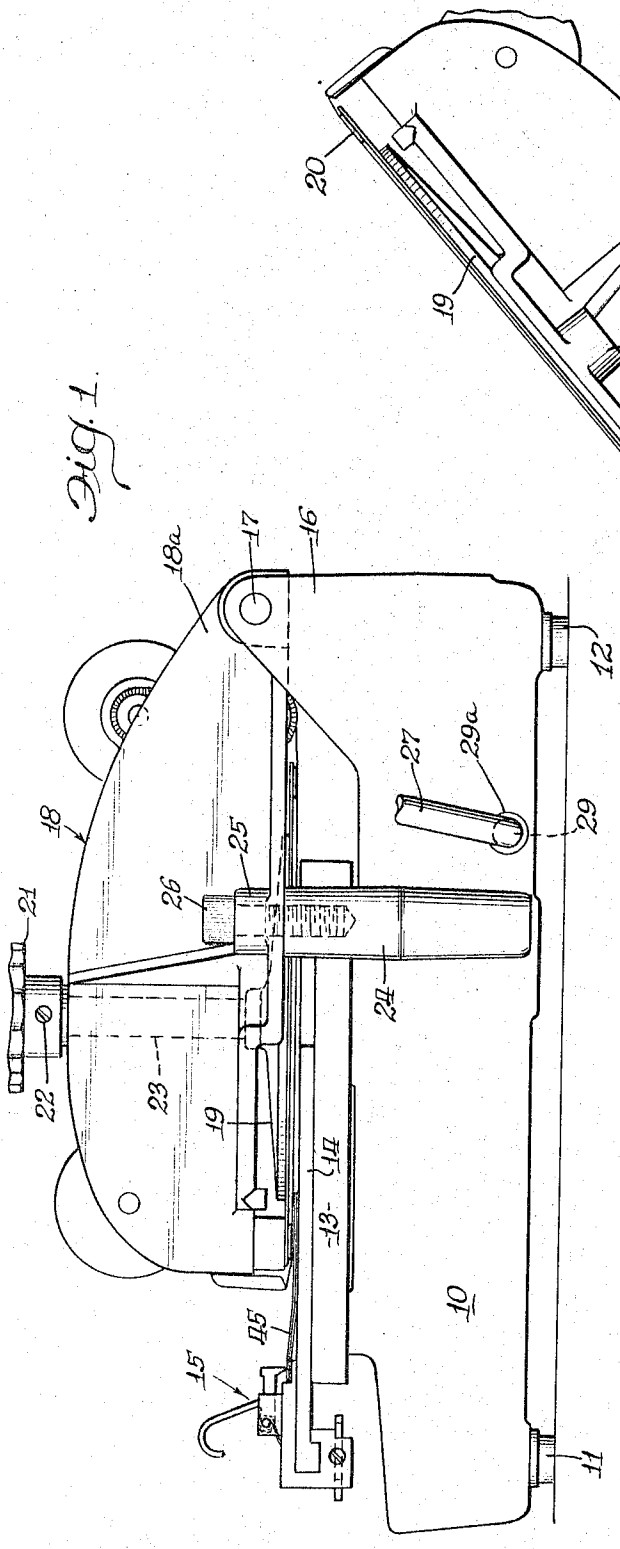
March 7, 1967 R. W. JACKSON 3,307,673

ROLLING CONTACT THROUGH STATIONARY MEMBER TO PROVIDE PRESSURE FOR CUTTING STENCIL

Original Filed Sept. 29, 1964 4 Sheets-Sheet 1



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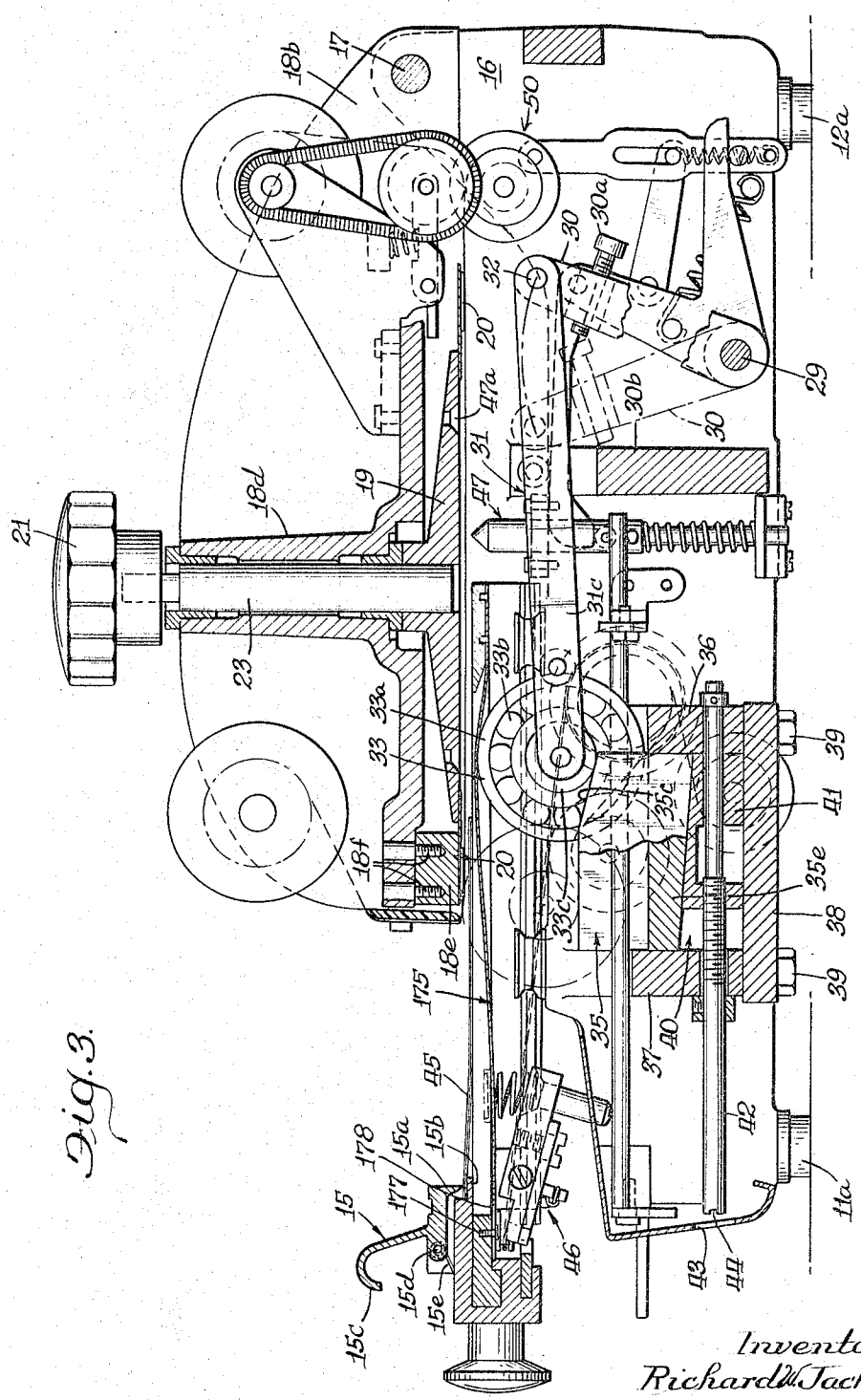


Fig. 3.

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Original Filed Sept. 29, 1964 4 Sheets-Sheet 3

Fig. 4.

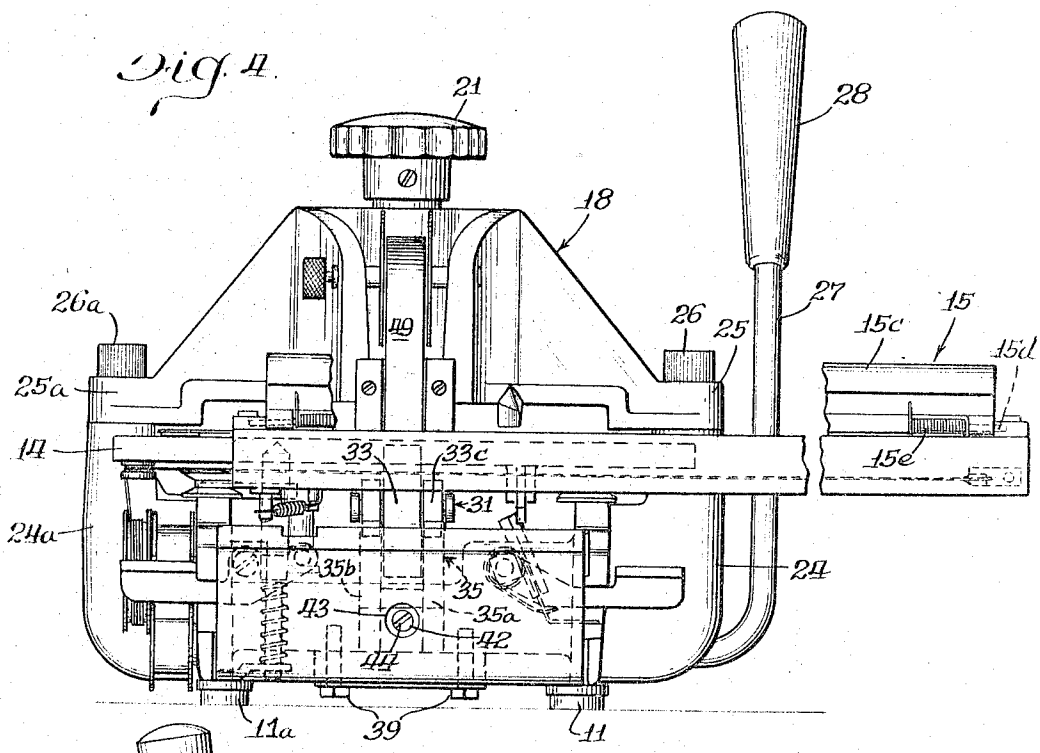
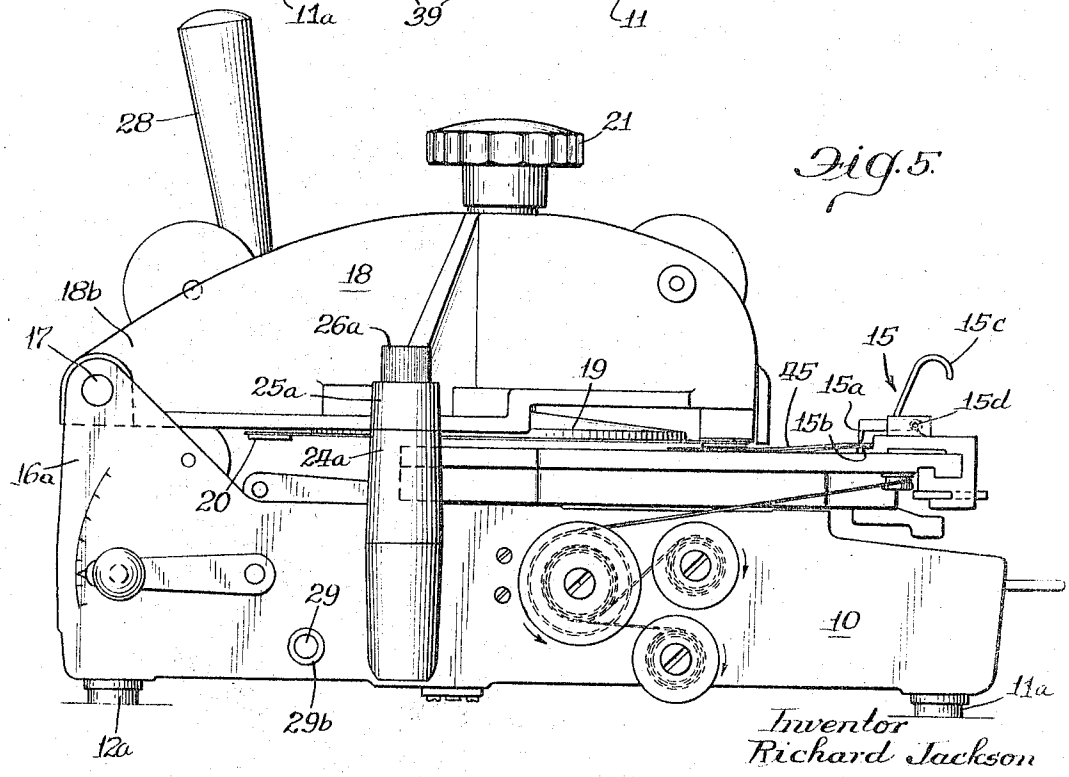


Fig. 5.



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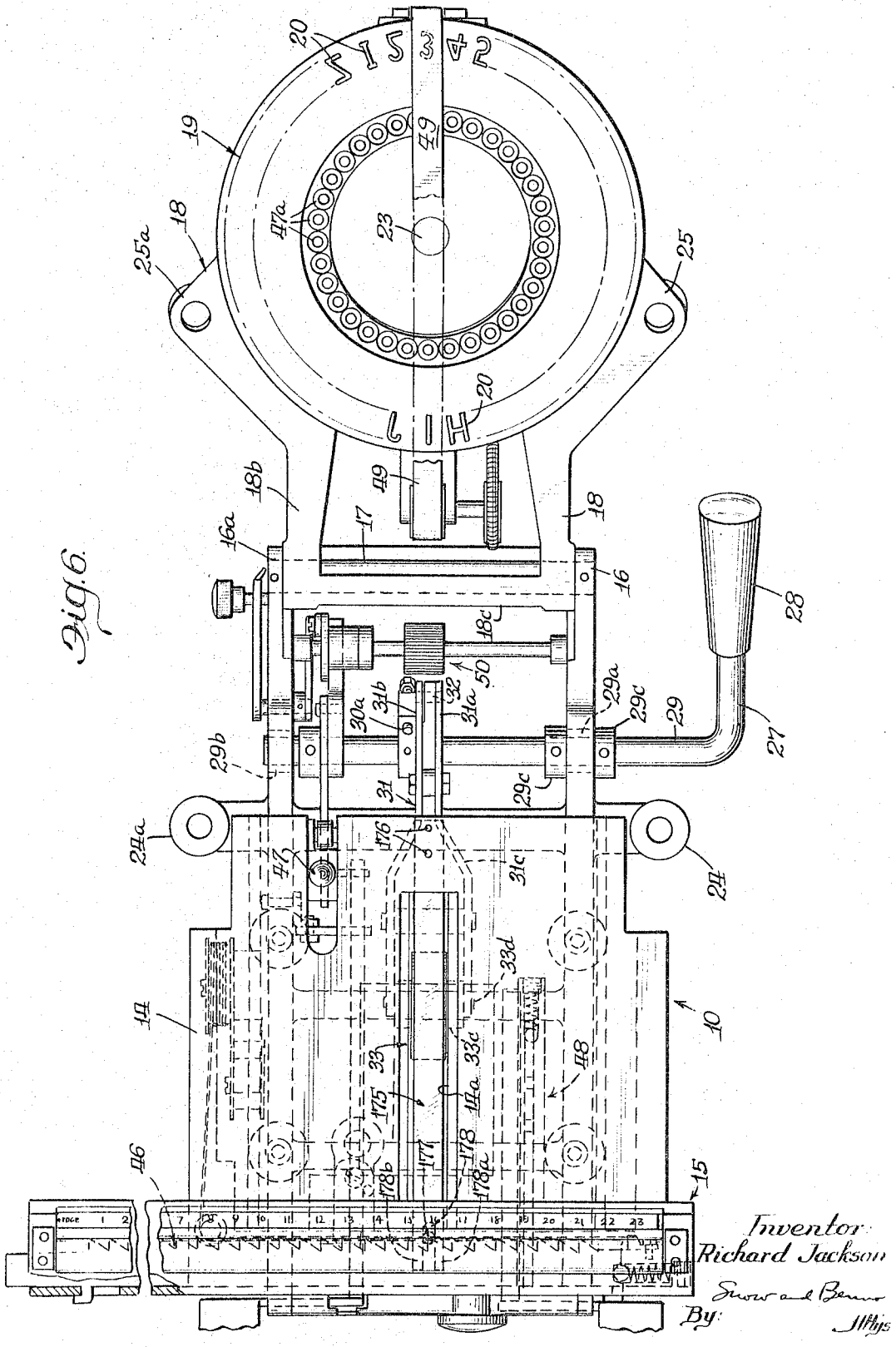
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Original Filed Sept. 29, 1964 4 Sheets-Sheet 4

Fig. 6.



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ROLLING CONTACT THROUGH STATIONARY MEMBER TO PROVIDE PRESSURE FOR CUTTING STENCIL

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Continuation of application Ser. No. 400,258, Sept. 29, 1964. This application Apr. 8, 1966, Ser. No. 541,393

2 Claims. (Cl. 197—6.4)

This invention relates to a new and improved rolling contact through a stationary member to provide pressure for cutting stencils. This application is a continuation of Serial No. 400,258, filed September 29, 1964, and now abandoned.

The present invention is concerned with the cutting of stencils and by this we mean the removal of stencil coatings from stencils which have an emulsion or wax-like coating over a porous tissue base. In order to cause letters or characters of any broad surface to be cut into a stencil it is necessary to exert tremendous pressures in a novel manner. This removal of the emulsion coating by pressures must be done without damaging the porous tissue base which must be left unimpaired to uniformly expel ink therethrough in the subsequent reproduction of the cut stencil indicia. Attention is directed to the copending application of the assignee of record in this application wherein the application of James R. Thomas, Serial No. 274,570 discloses the utilization of high pressures by a roller mechanism in which succeeding line contacts are made with the stencil against a broad surfaced letter so that the cutting of the letter occurs by these successive line contacts. The present invention is concerned with a novel improvement over that earlier mechanism. Because of the fragile character of stencils it has been found desirable to shield the stencil from a direct rolling pressure contact.

A principal object of the present invention is to provide a novel shielding means for the rolling pressure contact used in a stencil cutting machine.

An important object of this invention is the provision of a spring steel strip disposed above a pressure roller so that longitudinal rolling movement of the roller will still exert successive line contacts on a stencil against a character to be cut therein without having direct relative rolling movement between the stencil and the pressure roller.

Another important object of this invention is to provide a novel interposed shielding strip for the pressure applying roller of a stencil cutting machine in which the shielding strip is fixedly anchored to the machine at one end at a position near one endwise movement of the pressure roller and loosely guided against lateral shifting thereof at its other end adjacent the other end-wise movement of the pressure roller.

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 particularly 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 previously 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 FIGURE 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 surfaces 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 thin spring metal strip **175** is attached by screws or the like **176** to the underside of the stencil carrying table **14** at substantially the center of the rear edge. The strip **175** is disposed longitudinally from front to back of the machine. The lateral disposition of the strip is determined by the positioning of the table opening **14***a*. The strip extends from its attachment in the rear at **176**, forwardly and centrally of the opening **14***a*, and thence to a vertically disposed guide pin in the form of a screw **177**. The screw **177** is threadedly engaged to the underside of the table **14** at its forward edge. A forwardly opening elongated notch **178** is provided in the forward end of the strip **175**. The notch **178** defines spaced apart arms **178***a* and **178***b* which are adapted to flank the sides of the guide pin **177**. It should be understood the width of the notch **178** is slightly greater than the diameter of the guide pin **177** to permit free sliding of the flanking arms **178***a* and **178***b* therepast.

The width of the strip **175** is substantially identical to the width of the outer race **33***a* of the roller **33**. The strip thus acts as a shield or insulator of the roller **33** in its application of pressure against the stencil to be cut. The particular mounting of the strip permits it to move upwardly and downwardly following the travel of the roller **33** along its cam track **35** both longitudinally of the table opening **14***a* and vertically through the opening to engage a stencil to be cut. The shielding strip permits the continued cutting of letters by a series of successive line contacts without the direct contact of the rolling pressure with the stencil. Stencils are generally fragile and the use of the shielding strip prevents crimping or tearing such as might occur on direct rolling pressure contact.

It should be understood the strip **175** may be made of any suitable material or arranged in the machine in any manner as long as it is disposed intermediate the roller **33** and the stencil **45** to be cut. In effect the strip **175** acts as a relatively stationary member between the stencil to be cut and the application of rolling pressure therebeneath.

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

What is claimed is:

1. In a stencil cutting machine comprising, a generally horizontally disposed stencil receiving table, said table having an aperture, means positioning selected type letters above said table over said aperture, a roller, means moving and guiding said roller upwardly and longitudinally of said aperture to cause the roller to exert substantial pressures upwardly through said aperture, a stencil carried on said table over said aperture, a relatively stationary shield disposed intermediate said roller and said stencil, and said roller and said relatively stationary shield positioned to exert successive line contacts upwardly and through said aperture and on said stencil against selected type letters to be cut in said stencil, whereby the roller provides the pressure for cutting the stencil against the selected type and the relatively stationary shield shields the roller from direct relative rolling movement against the stencil thereby preventing the stencil from being crimped or torn by the roller, said relatively stationary shield comprising an elongated spring metal strip member, said elongated spring metal strip member attached to the underside of the generally horizontally disposed stencil receiving table at substantially the rear edge thereof and disposed longitudinally from its attachment to the table forwardly and centrally of the table aperture thereof, said elongated spring metal strip member having a forwardly opening elongated notch in the forward end thereof defining spaced-apart arms, and a vertically disposed guide pin engaging the underside of the generally horizontally disposed table at the forward edge thereof, and said spaced-apart arms flanking the sides of the vertically disposed guide pin for free sliding movement of the flanking arms past the guide pin.

2. In a stencil cutting machine comprising, a generally horizontally disposed stencil receiving table, said table having an aperture, means positioning selected type letters above said table over said aperture, a roller, means moving and guiding said roller upwardly and longitudinally of said aperture to cause the roller to exert substantial pressures upwardly through said aperture, a stencil carried on said table over said aperture, a relatively stationary shield disposed intermediate said roller and said stencil, and said roller and said relatively stationary shield positioned to exert successive line contacts upwardly and through said aperture and on said stencil against selected type letters to be cut in said stencil, whereby the roller provides the pressure for cutting the stencil against the selected type and the relatively stationary shield shields the roller from direct relative rolling movement against the stencil thereby preventing the stencil from being crimped or torn by the roller, said relatively stationary shield comprising an elongated spirng metal strip member, said elongated spring metal strip member attached to the underside of the generally horizontally disposed stencil receiving table at substantially the rear edge thereof and disposed longitudinally from its attachment to the table forwardly and centrally of the table aperture thereof, said elongated spring metal strip member and the underside of the generally horizontally disposed table having cooperative means adjacent the forward end thereof for loosely guiding said elongated spring metal strip member against lateral shifting thereof.

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