

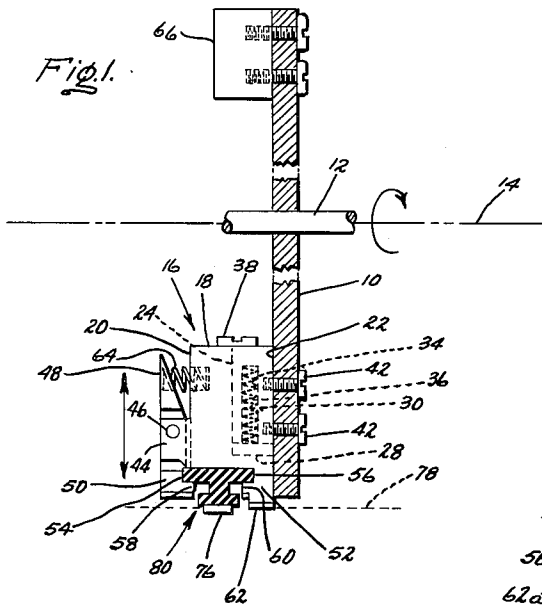
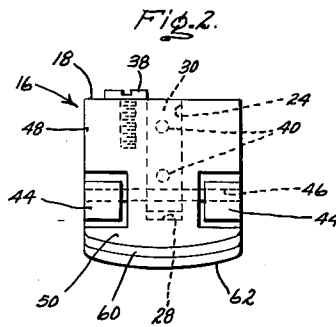
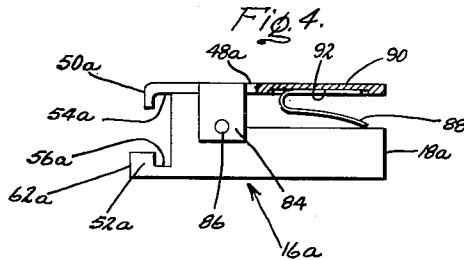
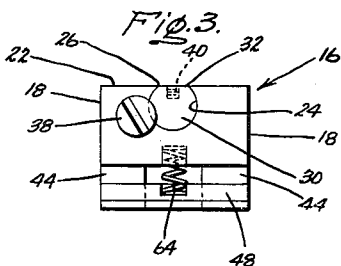
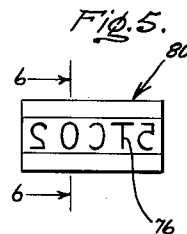
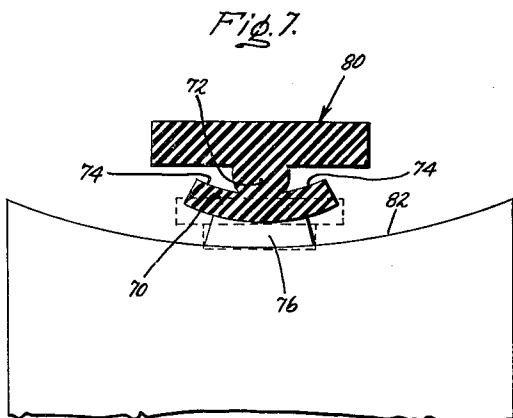
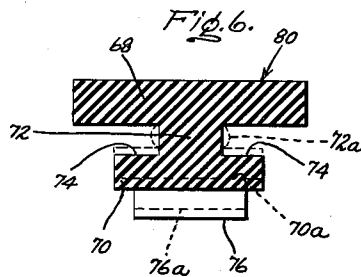
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2,987,995

PRINTING DEVICE

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2,987,995

PRINTING DEVICE

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8 Claims. (Cl. 101—376)

The present invention relates to a printing device, and more particularly to a device for utilizing type made of rubber for printing indicia and the like on flat, irregular or curved surfaces.

Commodities such as beverages, lotions, creams, pastes and the like are conventionally packaged in metal, plastic and cardboard containers. Since, normally, these commodities are produced and packaged in mass production quantities over an extended period of time, it is desirable to know, at some later date, certain information regarding a particular commodity, such as the date and place of manufacture, the composition thereof, and the like. Through the use of a printed code, which changes with variations in this information, a set of figures, letters and/or symbols having a particular meaning may be imprinted on the package, the printing being performed as a step in the manufacturing operation.

Some commodities are packaged under gas pressure in metal cans, these cans varying in shape, size and surface configuration, a typical such container being of cylindrical shape but having a concave bottom. Since the bottom normally is not used for advertising purposes, the coded information may be printed thereon. However, because of the irregular shape of the bottom, the printing of coded information thereon at a high rate of speed which will not slow down the overall manufacturing processes becomes difficult, since it has been the experience in the past that the code cannot be printed in repeating operations with consistent legibility.

It is therefore an object of this invention to provide a printing device which may be used for clearly and legibly printing words, symbols, indicia and the like on surfaces which may be flat, irregular or curved.

It is another object of this invention to provide a printing device capable of clearly and legibly printing information on flat, irregular or curved surfaces at a relatively high rate of speed.

It is still another object of this invention to provide a printing device capable of using rubber type in such a manner that the type will not distort or crush to produce smearing and illegibility when the printing is performed on either flat, irregular or curved surfaces.

Other objects will become apparent as the description proceeds.

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side elevation of one embodiment of this invention, a portion of the embodiment being sectioned for clarity;

FIG. 2 is a front view of the type holder;

FIG. 3 is an end view thereof;

FIG. 4 is a side elevation of a second embodiment of the type holder;

FIG. 5 is a front view of a segment of rubber type;

FIG. 6 is a sectional view thereof illustrating by phantom lines typical deflection thereof; and

FIG. 7 is a similar cross-sectional view illustrating the distortion of the type when printing is performed on a curved surface.

Referring to the drawings, and more particularly to

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FIGS. 1, 2 and 3, a rigid, metallic disc 10 is mounted for rotation on a shaft 12 about its axis 14. Secured to one side of the disc 10 adjacent to its perimeter is a type holder indicated generally by the reference numeral 16, this holder being shown in different views in FIGS. 1, 2 and 3. The holder comprises a substantially rectangular metallic block or body 18 having opposite sides 20 and 22 which preferably are flat and parallel. Adjacent to the side 22 and in the block 18 is a part-cylindrical bore 24 having an axis parallel to the side 22 and which opens through this side to provide an elongated opening 26. This bore 24 is closed at its end 28 but opens through the end 18 of the body.

The bore 24 slidably receives for reciprocation a plunger 30 of part-cylindrical shape, the plunger having an axially extending flat side 32 which lies in the plane of the side 22 of the body.

The plunger 30 is provided with a re-entrant passage 34 which receives a helical compression spring 36 bearing at one end against the end of the passage and at the opposite end against the end surface 28 of the bore 24. By means of this spring 36, the plunger 30 is yieldably urged upwardly as viewed in FIG. 1 in a direction out of bore 24.

In order to rotate the plunger 30 in the bore 24, a screw 38 is threaded into the body 18 through the end as shown in such position that the head of the screw overlies the exposed end of the plunger 30.

Two threaded openings 40 in the plunger 30 axially spaced apart along a radius of disc 10 as shown receive companion screws 42 which pass through the disc 10 for securing the flat side 32 of the plunger against the disc. By this means, the entire holder 16 is mounted on the disc 10, the holder 16 being capable of limited movement on the plunger 30 along a radius of the disc 10 by reason of the plunger 30 being shorter than the bore 24 as shown.

Projecting from the left-hand side 20 (FIG. 1) of the body 18 are two spaced apart lugs 44, these lugs receiving a pivot pin 46 on which is pivotally mounted a lever 48. As viewed in FIG. 1, the lower ends of both the body 18 and lever 48 are provided with jaw portions 50 and 52, respectively, these jaw portions being provided, respectively, with substantially identical, juxtaposed arcuate recesses or grooves 54 and 56. The two jaws are thereby provided with inwardly projecting portions 58 and 60, respectively, which, for reasons which will become apparent from the following, are spaced apart a predetermined distance.

As is shown more clearly in FIGS. 1 and 2, the jaw 52 is longer than the jaw 50, the distal end 62 of the jaw 52 being terminated in an arcuately shaped gauging surface or limit gauge having a curvature, in the illustrated embodiment, about the same center as the perimeter of the disc 10. Also as viewed in FIG. 1, this gauging surface or limit gauge 62 projects slightly beyond the perimeter of the disc 10 for a purpose which will become apparent from the following.

A helical compression spring 64 (FIG. 1) is interposed between the upper end of the lever 48 and the body member 18, this spring 64 urging the two jaws 50 and 52 together about the pivot pin 46.

The weight of the type holder 16 on the disc 10 preferably is counterbalanced by means of a suitable weight 66 secured to the disc.

The type holder 16 of FIG. 1 is illustrated as having clamped in position a molded segment 80 of rubber type as illustrated in detail in FIGS. 5, 6 and 7. This type in cross-section (FIG. 6) is substantially H-shaped, the base leg 68 being longer than the other leg 70. The cross bar 72 between the two legs 68 and 70 has a length corresponding substantially to the width dimensions of the two legs 68 and 70, respectively, thereby

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providing two grooves 74 having a purpose which will become apparent from the following description. The type characters 76 are formed on the outer surface of the shorter leg 70 and preferably are molded integrally with the type body composed as aforescribed of the two legs 68 and 70 and the cross bar 72.

This segment 80 of type is curved longitudinally, the center of curvature preferably being the axis 14 of the disc 10 when the segment is clamped in the holder 16. With reference to the disc 10, the two arcuate recesses 54 and 56 of the two jaws 50 and 52, respectively, also have centers of curvature about the axis 14.

As viewed in FIG. 1, the type segment is clamped in position in the type holder 16 by positioning the longer leg 68 in the jaw recesses 54 and 56 as shown, these recesses conforming in size, shape and dimension to grip snugly the opposite ends of the leg 68 as viewed in FIG. 6.

It should be noted in particular that the opposite ends of the shorter leg 70 as viewed in FIG. 6 are spaced inwardly from the portions 58 and 60 of the two jaws 50 and 52, respectively, and further that the type characters 76 project slightly beyond the gauging surface 62 on the jaw 52 as graphically illustrated by the straight dashed line 78 in FIG. 1.

The type segment 80 is removed from and inserted into the holder 16 by merely opening and closing the jaws 50 and 52. The spring 64 normally clamps and retains the jaw 50 onto the base leg 68 of the type segment, forcing the opposite side of the segment into the jaw 52.

Before explaining the operation of the type holder 16 in performing a printing job, the unique functioning of the type segment 80 will first be explained. Two different functions are illustrated, respectively, in FIGS. 6 and 7, FIG. 6 illustrating type deformation for printing on a flat surface and FIG. 7 illustrating the distortion for printing on a curved surface. With reference to FIG. 6, the dashed lines indicate the deformation of the type segment 80 when the same is impressed on a flat surface, the reference numerals with the suffix "a" indicating the outlines, respectively, of the various segment portions bearing the same numerals. As can now be understood, the grooves 74 in the segment permit the shorter leg 70 to compress but yet exert enough resilient force to produce a legible imprint. By reason of this deformation, the center leg 72 obviously compresses to the shape indicated by the reference numeral 72a.

In FIG. 7 is illustrated typical deformation of the segment parts when printing is performed on a concave surface 82. Here again, the groove 74 serves as a resilient cushion accommodating resilient flexure of the ends of the leg 70, thereby permitting the type face 76 to conform in shape to that of the surface 82. The cross bar 72 also distends slightly under compression, thereby contributing to the reaction necessary to engage firmly the type 76 with the surface 82.

The shape of the segment leg 70, the presence of the groove 74, and the size and shape of the cross bar 72 all contribute conjointly to the legible imprinting on an irregular surface as well as a flat or curved surface. The type segment is capable of deforming in incremental portions or lengths thereof in such a manner that the type face 76 will always be forced and firmly engaged with the surface being printed. Thus, the type face 76 is capable of deformation to follow the contour of an irregular surface for producing a legible imprint thereon. This, of course, is quite important in the case of printing on metal containers and the like having ribs, embossments and the like, since it permits indicia to be imprinted legibly thereon.

Referring now to FIG. 1, the reason for providing a clearance between the opposite ends of the shorter type leg 70 and the jaw surfaces 58 and 60, respectively, should now be obvious, this clearance permitting unin-

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hibited flexure of the type face and body to conform to the irregularities of any surface on which printing is being performed. Thus, it is important that the jaws 50 and 52 of the type holder 16 be properly designed to permit this flexure.

Typical operation of the embodiment of the invention as illustrated in FIG. 1 will now be explained. For convenience, let it be assumed that a multiplicity of inverted metallic containers, with bottoms up, are being transported seriatim along a given path by means of a suitable conveyor belt and that printing operation must be performed on each of the bottoms as they pass the printing station. This is accomplished by positioning the shaft 12 a predetermined distance above the container bottoms such that the type holder 16 will be in registry with the bottoms. The gauging surface 62 of the type holder 16, when the disc 10 is properly positioned, is set to just touch the bottoms, in which event the type face 76 will be gauged to engage firmly the bottoms for imprinting thereon. Because of the presence of this gauging surface 62, it will now be obvious that the type face 76 cannot be compressed beyond a limited amount, thereby preventing the printing from smearing and becoming illegible.

It has been found that the containers will vary in length by as much as one-sixteenth ($\frac{1}{16}$) of an inch, but this variation is accommodated by the plunger 30 mounting of the type holder 16 on the disc 10 such that if a container taller than a previous container passes beneath the printer 16 as it revolves with the disc 10, the entire type holder 16 will move upwardly on the plunger 30 by reason of the engagement of the gauging surface 62 with the container bottom. This taller container, as it is moving, thereby receives a legible imprint the same as the preceding shorter one. Thus, it will become apparent that regardless of the variations in size of the container, the invention is capable of producing a legible print thereon.

By forming the jaw 50 shorter than the jaw 52, the type face 76 may be inked for each revolution of the disc 10 without the ink being spread on either the gauging surface 62 or the end of the jaw 50. Thus, the ink is limited to the type face 76, thereby preventing any smudges of ink on the product being imprinted.

A different embodiment of the type holder 16 is illustrated in FIG. 4 as indicated by the reference numeral 16a. Parts of this holder 16a which conform to those of the type holder 16 are given the same reference numerals with the suffix "a" added. The principal difference between these two embodiments resides in the fact that the lever 48a is a sheet metal stamping which is pivotally mounted on the sides of the block 18a by means of two spaced apart laterally extending ears 84 through which a pivot pin 86 passes. This pivot pin 86 also passes through the body 18a.

A flat, U-shaped spring 88 is interposed between the handle end 90 of the lever 48a and the body 18a, this spring 88 being retained in a rectangular recess 92 in the underside of the handle 90 as shown. The jaw 50a is formed by merely bending the end of the lever 48 over, as shown, thereby providing the arcuate recess 54a the same as the recess 54 in FIG. 1.

A segment of type as illustrated in FIG. 5 is inserted in the holder 16a by spreading the jaws 50a and 52a, the depression of the handle portion 90 toward the body 18a serving to spread the jaws apart. Once the type segment has been inserted into the jaw recesses 54a and 56a, the handle portion is released, whereupon the jaws are forced toward each other by the preformed spring 88. Thus holder 16a may be mounted on the disc 10 the same as the holder 16.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention.

What is claimed is:

1. A printing device comprising a disc rotatable about its axis, a holder mechanism mounted on said disc for rotation therewith; said mechanism comprising a body having opposite ends and sides, respectively, said body having a part-cylindrical elongated bore which extends from one end toward the other and terminates just short of said other end, said bore opening through said one end and being closed at the opposite end, said bore extending parallel to one of said sides and opening through said one side, the width of said side opening being smaller than the diameter of said bore, a part-cylindrical mounting member slidably received by said bore, the cylindrical portion of the mounting member conforming in size and shape to the cylindrical portion of said bore, said mounting member having a flat side exposed through said side opening which lies in the plane of said one side, said mounting member being shorter than said bore, a compression spring interposed between the closed end of said bore and said mounting member for yieldably urging said mounting member toward the open end of said bore, an abutment on said body engaging the end on said mounting member for preventing the latter from being dislodged from said bore, the flat side of said mounting member engaging a side of said disc and being secured thereto by at least one screw in a position in which the axis of said bore is parallel with a radius of said disc, said body thereby having limited movement radially of said disc, two lugs projecting laterally outwardly from the other body side, said lugs being spaced apart in a direction transverse to the length dimension of said bore, a lever disposed between said lugs and pivotally connected thereto by a pin extending in said transverse direction, two jaws on said other body end and one end of said lever respectively, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate recess spaced rearwardly from the end thereof, the recesses in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having an arcuately shaped gauging perimeter on the end, said gauging perimeter normally extending beyond the circumference of said disc, a spring interposed between said lever and said body for yieldably urging said jaws toward each other, a segment of rubber type clamped in said jaws, said type in cross-section being of H-shape with one leg being longer than the other, the longer leg fitting snugly between the recesses in said two jaws, the cross-bar of said H-shape extending outwardly from said jaws and having clearance with the remaining portions of said jaws, the shorter leg having a dimension shorter than the space between the closest portions of said jaws, and type characters on said shorter leg which project a predetermined distance beyond said gauging perimeter, the thickness of said shorter leg being substantially equal to the spacing between legs thereby permitting said type to distort to print on an irregular surface.

2. A printing device comprising a disc rotatable about its axis, a holder mechanism mounted on said disc for rotation therewith; said mechanism comprising a body having opposite ends and sides, respectively, said body having a part-cylindrical elongated bore which extends from one end toward the other and terminates just short of said other end, said bore opening through said one end and being closed at the opposite end, said bore extending parallel to one of said sides and opening through said one side, the width of said side opening being smaller than the diameter of said bore, a part cylindrical mounting member slidably received by said bore, the cylindrical portion of the mounting member conforming in size and shape to the cylindrical portion of said bore, said mounting member having a flat side exposed through said side opening which lies in the plane of said one side, said mounting member being shorter than said bore, a compression spring interposed between the closed end of said

bore and said mounting member for yieldably urging said mounting member toward the open end of said bore, an abutment on said body engaging the end on said mounting member for preventing the latter from being dislodged from said bore, the flat side of said mounting member engaging a side of said disc and being secured thereto by at least one screw in a position in which the axis of said bore is parallel with a radius of said disc, said body thereby having limited movement radially of said disc, two lugs projecting laterally outwardly from the other body side, said lugs being spaced apart in a direction transverse to the length dimension of said bore, a lever disposed between said lugs and pivotally connected thereto by a pin extending in said transverse direction, two jaws on said other body end and one end of said lever respectively, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate recess spaced rearwardly from the end thereof, the recesses in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having an arcuately shaped gauging perimeter on the end, said gauging perimeter normally extending beyond the circumference of said disc, a spring interposed between said lever and said body for yieldably urging said jaws toward each other.

3. A printing device comprising a disc rotatable about its axis, a holder mechanism mounted on said disc for rotation therewith; said mechanism comprising a body having opposite ends and sides, respectively, said body having a part-cylindrical elongated bore which extends from one end toward the other and terminates just short of said other end, said one end facing radially inwardly toward the axis of said disc, said bore opening through said one end and being closed at the opposite end, said bore extending parallel to one of said sides and opening through said one side, the width of said side opening being smaller than the diameter of said bore, a part-cylindrical mounting member slidably received by said bore, the cylindrical portion of the mounting member conforming in size and shape to the cylindrical portion of said bore, said mounting member having a flat side exposed through said side opening which lies in the plane of said one side, said mounting member being shorter than said bore, a compression spring interposed between the closed end of said bore and said mounting member for yieldably urging said mounting member toward the open end of said bore, an abutment on said body engaging the end on said mounting member for preventing the latter from being dislodged from said bore, the flat side of said mounting member engaging a side of said disc and being secured thereto by at least one screw in a position in which the axis of said bore is parallel with a radius of said disc, said body thereby having limited movement radially of said disc, a first jaw on said other end of said body, a second jaw pivotally mounted on said body for movement toward and away from said first jaw, said first jaw having a gauging perimeter on the outer end portion thereof which extends beyond the end portion of said second jaw, said jaws having means for clamping a segment of rubber type therebetween.

4. A printing device comprising a disc rotatable about its axis, a holder mechanism mounted on said disc for rotation therewith; said mechanism comprising a body having opposite ends and sides, respectively, two lugs projecting laterally outwardly from a body side, said lugs being spaced apart, a lever disposed between said lugs and pivotally connected thereto by a pin, two jaws on two adjacent ends of said body and lever, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate groove spaced rearwardly from the end thereof, the grooves in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having an

arcuately shaped gauging perimeter on the end, said gauging perimeter normally extending beyond the circumference of said disc, a spring interposed between said lever and said body for yieldably urging said jaws toward each other, a segment of rubber type clamped in said jaws, said type in cross-section being of H-shape with one leg being longer than the other, the longer leg fitting snugly between the grooves in said two jaws, the cross-bar of said H-shape extending outwardly from said jaws and having clearance with the remaining portions of said jaws, the shorter leg having a dimension shorter than the space between the closest portions of said jaws, and type characters on said shorter leg which project a predetermined distance beyond said gauging perimeter, the thickness of said shorter leg being substantially equal to the spacing between legs thereby permitting said type to distort to print on an irregular surface.

5. A printing device comprising a disc rotatable about its axis, a holder mechanism mounted on said disc for rotation therewith; said mechanism comprising a body having opposite ends and sides, respectively, two lugs projecting laterally outwardly from a body side, said lugs being spaced apart, a lever disposed between said lugs and pivotally connected thereto by a pin, two jaws on two adjacent ends of said body and lever, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate recess spaced rearwardly from the end thereof, the recesses in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having an arcuately shaped gauging perimeter on the end, said gauging perimeter normally extending beyond the circumference of said disc, means interposed between said lever and said body for yieldably urging said jaws toward each other.

6. A printing device comprising a body having opposite ends and sides, respectively, said body having a part-cylindrical elongated bore which extends from one end toward the other and terminates just short of said other end, said bore opening through said one end and being closed at the opposite end, said bore extending parallel to one of said sides and opening through said one side, the width of said side opening being smaller than the diameter of said bore, a part-cylindrical mounting member slidably received by said bore, the cylindrical portion of the mounting member conforming in size and shape to the cylindrical portion of said bore, said mounting member having a flat side exposed through said side opening which lies in the plane of said one side, said mounting member being shorter than said bore, a compression spring interposed between the closed end of said bore and said mounting member for yieldably urging said mounting member toward the open end of said bore, an abutment on said body engaging an end on said mounting member for preventing the latter from being dislodged from said bore, two lugs projecting laterally outwardly from the other body side, said lugs being spaced apart in a direction transverse to the length dimension of said bore, a lever disposed between said lugs and pivotally connected thereto by a pin extending in said transverse direction, two jaws on said other body end and one end of said lever respectively, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate groove spaced rearwardly from the end thereof, the grooves in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having

an arcuately shaped gauging perimeter on the end, a spring interposed between said lever and said body for yieldably urging said jaws toward each other, a segment of rubber type clamped in said jaws, said type in cross-section being of H-shape with one leg being longer than the other, the longer leg fitting snugly between the grooves in said two jaws, the cross bar of said H-shape extending outwardly from said jaws and having clearance with the remaining portions of said jaws, the shorter leg having a dimension shorter than the space between the closest portions of said jaws, and type characters on said shorter leg which project a predetermined distance beyond said gauging perimeter, the thickness of said shorter leg being substantially equal to the spacing between legs thereby permitting said type to distort to print on an irregular surface.

7. A printing device comprising a body having opposite ends and sides, respectively, said body having a part-cylindrical elongated bore which extends from one end toward the other and terminates just short of said other end, said bore opening through said one end and being closed at the opposite end, said bore extending parallel to one of said sides and opening through said one side, the width of said side opening being smaller than the diameter of said bore, a part-cylindrical mounting member slidably received by said bore, the cylindrical portion of the mounting member conforming in size and shape to the cylindrical portion of said bore, said mounting member having a flat side exposed through said side opening which lies in the plane of said one side, said mounting member being shorter than said bore, a compression spring interposed between the closed end of said bore and said mounting member for yieldably urging said mounting member toward the open end of said bore, an abutment on said body engaging an end on said mounting member for preventing the latter from being dislodged from said bore, two lugs projecting laterally outwardly from the other body side, said lugs being spaced apart in a direction transverse to the length dimension of said bore, a lever disposed between said lugs and pivotally connected thereto by a pin extending in said transverse direction, two jaws on said other body end and one end of said lever respectively, said jaws being juxtaposed, each jaw having in the inner portion thereof an arcuate groove spaced rearwardly from the end thereof, the grooves in the two jaws being juxtaposed, the outermost ends of said two jaws being spaced apart and having portions extending toward each other, the jaw on said body being longer than the other jaw and having an arcuately shaped gauging perimeter on the end.

8. A printing device comprising a support, a body having opposite end portions, said body being mounted on said support for limited rectilinear movement endwise between two extreme positions, means yieldably urging said body toward one of said extreme positions, a pair of spaced apart jaws on one end portion of said body, each said jaw having an elongated recess therein extending transversely of the direction of limited body movement, the recesses in said jaws being juxtaposed and a portion of at least one jaw extending beyond the respective recess to provide a limit gauge, the recess of said one jaw thereby being positioned between said body and said limit gauge.

References Cited in the file of this patent

UNITED STATES PATENTS

1,769,583	Lamb et al. _____	July 1, 1930
2,147,480	Beckert _____	Feb. 14, 1939
2,475,524	Scott et al. _____	July 5, 1949