

July 5, 1960

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2,943,567

FLEXIBLE SNAP-ON ELASTOMER DIE

Filed Aug. 5, 1957

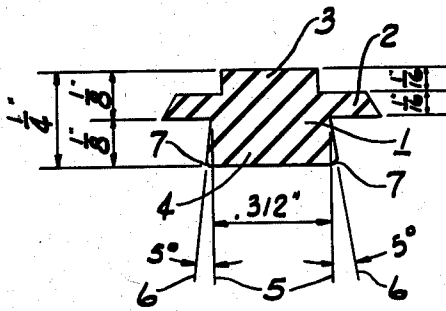


Fig. 1

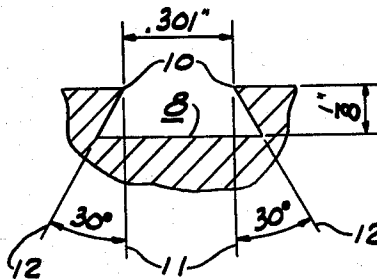


Fig. 2

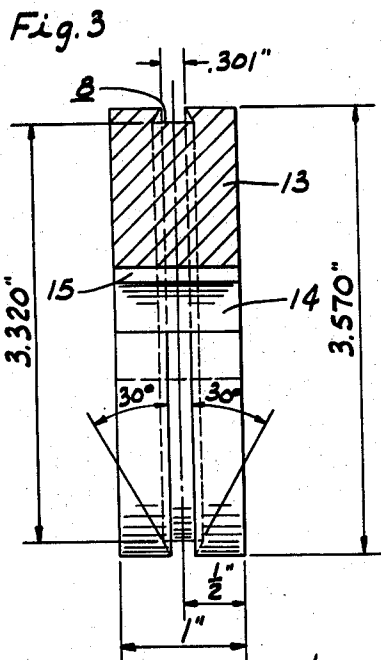


Fig. 3

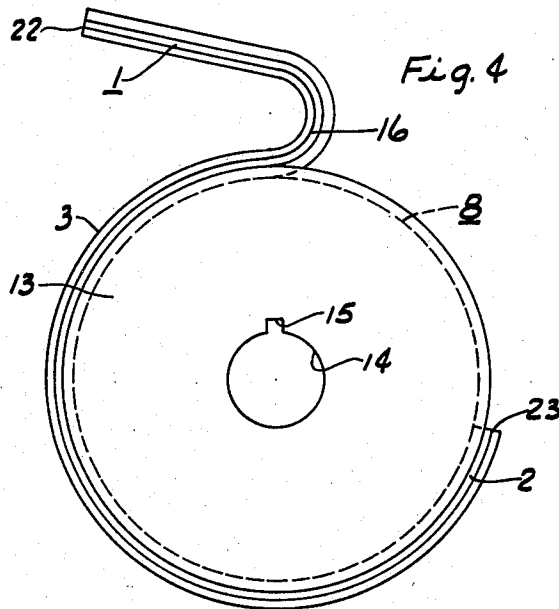


Fig. 4

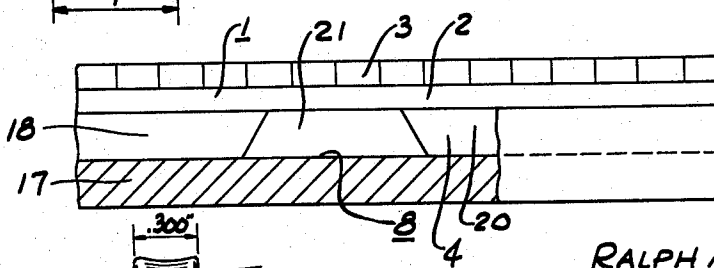


Fig. 5



Fig. 6

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FLEXIBLE SNAP-ON ELASTOMER DIE

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Filed Aug. 5, 1957, Ser. No. 676,291

14 Claims. (Cl. 101—377)

This invention relates generally to printing dies and more particularly to the application of fast snap-on dies to die holders for either direct or offset printing.

The present practice requires snap-on dies to have attaching means on the end thereof to hold them fast to the die holder whether it be round or flat. This form requires proper sized holders and the attaching devices must be properly adjusted to fit the die to the holder.

Dovetailed grooves have been employed in die holders for carrying leaded dies or other dies having a complementary dovetail that substantially fits the dovetail groove in the holder or at least will slide longitudinally in place from the end or from a break in the die holder. Owing to the fact that there is a substantial fit between the dovetail on the die and the dovetail groove in the holder in which the die fits by sliding longitudinally therein, it is impossible to remove the dovetail other than longitudinally of the slot.

The principal object of this invention is the provision of a quick snap-on flexible die that employs a dovetail type mounting body that engages into a dovetail groove but is inserted by rolling the mounting body into the groove. This is accomplished by first having a die made of flexible material. The die has a mounting body on the bottom of its background and printing characters on the top. The mounting body should be somewhat greater in its smallest cross-sectional dimension than that of the complementary dimension of the dovetail slot but the head of the mounting body should be such that when the die is flexed back over the printing characters the mounting body becomes arcuate in cross-sectional shape which makes the body narrower than the mouth and smallest dimension of the slot. Thus by putting a reverse curve in the flexible rubber die it may be rolled into the dovetailed groove whether this groove is in a flat or wave shaped member or whether the groove encircles a wheel or cylindrical drum as a continuous or a spiral groove. The flexible die will easily and quickly roll into the groove and may be rolled out the same way without the aid of tools. This cuts down the time for a quick change of dies when only one machine or even hand rolling tool or die holding platen is available.

The circular dovetailed slot in a printing wheel presents the most difficult form of dovetailed slot as it changes constantly as it encircles the perimeter of the wheel but this type of groove actually tightens the die in place preventing its shifting or otherwise moving when subjected to high peripheral speeds. It actually affords the fastest type change available. It may be used on many different diameters of wheels or rollers ranging as low as four inches.

These dies can be forced into the grooves by merely rolling the wheels over the dies but it may be easily placed

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in if it is given a reverse curve by folding it over the printing to reduce the cross dimension of the mounting body permitting it to slip into the narrower slot or groove.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawings show for the purpose of exemplification without limiting the invention or claims thereto certain practical embodiments illustrating the principles of this invention wherein:

Fig. 1 is an enlarged cross section of the flexible die comprising this invention.

Fig. 2 is an enlarged cross section of the dove-tailed groove for the die shown in Fig. 1.

Fig. 3 is a view partly in section and partly in elevation showing a wheel for receiving the flexible die.

Fig. 4 is a side elevation of the wheel shown in Fig. 3 with the flexible die partly applied to the die wheel.

Fig. 5 shows a reduction of the dimensions of the flexible die when turned back on itself.

Fig. 6 is a view partly in section partly in elevation of a flat mounting member containing a snap-on die.

Referring to Fig. 1 the die member 1 is of the snap-on type and is preferably made of a flexible elastomer such as rubber. This die member has a flat background section 2 which is usually wider than the rest of the die and the top face of this flexible background is provided with the characters 3 to be printed. These characters may vary in length or depth. However, they ordinarily represent a series of separated characters rather than a continuous longitudinal section which is characteristic of the background section 2.

The underface or bottom of the background section 2 is provided with the mounting body 4, the cross section of which is determined by the size and character of the groove in which it is to fit. As shown in Fig. 1 the mounting body 4 extends one-eighth of an inch from the bottom or underside of the background 2 which is itself one-sixteenth of an inch thick and the characters indicated at 3 are one-sixteenth of an inch high. The mounting body 4 is shown to be one-eighth of an inch in depth from the underface of the background section 2 thereby making the depth of the whole of the snap-on die approximately one-fourth of an inch. This snap-on die may be made of any material such as rubber, plastic or other elastomer material that permits a length of the die section to be flexed readily and turned back on itself until the characters are in substantial engagement with each other.

The mounting body 4 is shown to be at its narrowest cross-sectional dimension to be .312 inch and its sides are tapered to produce a dovetail, the taper forming the dovetail being substantially 5° from the line 5 normal to the underface of the background 2. The sides of the dovetail cross section follow the line 6 which as previously stated are 5° from the line 5 and the lines 5 and 6 intersect at the underface of the background 2.

The corners of the mounting body are rounded as indicated at 7 with a one-thirty-second inch radius.

The dovetailed groove 8 as indicated in Fig. 2 in which the snap-on rubber die 1 of Fig. 1 is to be inserted may be in a flat plane or in the annular perimetral surface of a wheel or drum. The dovetailed groove 8 is likewise one-eighth of an inch in depth and the points 10 defining the edge or mouth of the groove are spaced .301 inch apart which is substantially .011 smaller than the smallest cross-sectional dimension of the mounting body 4. Lines normal to the surface of the mounting mem-

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ber are indicated at 11 and these form an arc equal to 30° with the lines 12 that represent the sides of the dovetailed groove 8. These angles may vary from 9° to 40° with the same structure as that illustrated in regard to the mounting body of Fig. 1 and the 5° angle representing the taper on one side of the mounting body as shown in Fig. 1 may vary from 4° to 6°. These tolerances are found to work; however other measurements of tolerance may also be found to properly perform the function of this invention.

As shown in Figs. 3 and 4 the die mounting member is in the form of the wheel 13 having a central opening 14 provided with the keyway 15. The dovetailed groove 8 as shown in Fig. 2 is illustrated in this wheel which is illustrated as being one inch wide and the dovetailed groove 8 is mounted in the center thereof.

In Fig. 4 the flexible die 1 is shown partially mounted in the wheel 13. When this snap-on die 1 is completely inserted in the groove 8 of the wheel 13, the end 22 of the snap-on die will be in engagement with the mounted end 23. When it is desired to remove the snap-on die the background is lifted and the die is given a twist to produce a reverse curve such as illustrated at 16 in Fig. 4 thereby causing the mounting body 4 and the background 2 to become dished as illustrated in Fig. 5 to reduce the greatest dimension of the cross section of the mounting body to less than that of the fixed dimension of the opening in the slot to permit the latter to be rolled into place. As shown in Fig. 6 the die mounting member 17 is flat and has a longitudinal dovetailed groove 8 cut therein. The snap-on die member 1 is provided with a background 2 and the characters indicated at 3. However the mounting body generally indicated at 4 has been broken up into two sections as shown at 18 and 20 forming a gap 21 therebetween. Thus the mounting body need not be continuous and yet it will still function in the manner previously described.

With this simplified construction a die may very readily and quickly be inserted and removed from a dovetailed groove regardless of whether this groove is in an annular surface or in a flat surface as disclosed. The mere flexing of the die in the reverse direction with the characters overlying themselves causes the cross section of the die to become arcuate or dished thereby reducing its dimension to enable it to be readily inserted or removed in the dovetailed groove which is produced in a rigid member such as metal.

I claim:

1. An integral manual snap-on flexible elastomer die made of incompressible material and having a flat background section with raised characters along its top face and a longitudinal mounting body section along its bottom face for insertion into a dovetailed groove in a rigid die holder, said groove having opposed acutely shaped marginal edges, characterized in that said longitudinal mounting body section is incompressible and dovetailed but smaller in cross section than said groove and has a selected wider dimension than the gap between said opposed acutely shaped marginal edges, said selected wider dimension permitting the longitudinal mounting body section to dish and freely enter between the edges defining said groove when the elastomer is flexed and folded back over its top face and rolled forward directly into place in the groove.

2. The snap-on flexible elastomer die of claim 1 characterized in that said selected wider dimension of said dovetail cross section of said mounting body section at its smallest cross dimension is from .009 to .011 of an inch wider than the dimension between the edges defining said dovetailed groove.

3. The snap-on flexible elastomer die of claim 2 characterized in that the sides of the dovetailed cross section of said mounting body section taper outwardly from 4° to 6° from an intersecting longitudinal plane normal to said background section and the sides of the dovetailed

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groove form an angle more than twice as great as that of the taper of said mounting body section.

4. The snap-on flexible elastomer die of claim 1 characterized in that said selected wider dimension of said dovetail cross section of said mounting body section at its smallest cross dimension is from .009 to .011 of an inch wider than the dimension between the edges defining said dovetailed groove and the sides of the dovetailed cross section of said mounting body section taper outwardly from 4° to 6° from an intersecting longitudinal plane normal to said background section.

5. The snap-on flexible elastomer die of claim 1 characterized in that said mounting body section is continuous along said background section.

6. The snap-on flexible elastomer die of claim 1 characterized in that said mounting body section is interrupted along said background section.

7. The snap-on flexible elastomer die of claim 1 characterized in that the sides of said dovetailed groove in said die holder may be from 9° to 40° from a normal plane longitudinally of the groove.

8. The snap-on flexible elastomer die of claim 2 characterized in that said selected wider dimension of said dovetailed cross section of said mounting body section at its smallest cross dimension is .312 inch and the dimension between the edges defining the dovetailed groove is .301 inch.

9. The snap-on flexible elastomer die of claim 8 characterized in that the sides of said mounting body section taper outwardly 5° from a line normal to said background and the sides of said dovetailed groove taper 30° from a line normal to face of said rigid die holder.

10. The snap-on flexible elastomer die of claim 1 characterized in that said selected wider dimension of said dovetailed cross section of said mounting body section at its smallest cross dimension is .312 inch and the dimension between the edges defining the dovetailed groove is .301 inch, and the sides of said mounting body section taper outwardly 5° from a line normal to said background and the sides of said dovetailed groove taper 30° from a line normal to face of said rigid die holder.

11. An integral manual snap-on flexible elastomer die made of incompressible material and having raised characters along its top face and a longitudinal mounting body section along its bottom face for insertion into a dovetailed groove in a rigid die holder, said groove having opposed acutely shaped marginal edges, characterized in that said longitudinal mounting body section is incompressible and dovetailed but smaller in cross section than said groove and has a selected wider dimension than the gap between said opposed acutely shaped marginal edges, said selected wider dimension permitting the longitudinal mounting body section to dish and freely enter between the edges defining said groove when the elastomer is flexed and folded back over its top face and rolled forward directly into place in the groove and to lock the die in place.

12. A manual snap-on die comprising a rigid die holder having a dovetailed groove with sides sloping toward each other and defining the mouth of the groove, an incompressible flexible elastomer die having characters along its top face and on its bottom face a dovetailed mounting wider than the mouth of but smaller in cross section than said dovetailed groove and having inwardly sloping sides, the angle between the sloping sides of said dovetailed groove being greater than the angle between the sloping sides of said dovetailed mounting, the angle between the sloping sides of said dovetailed mounting being selected to distort said dovetailed mounting when the characters are folded back on themselves to freely and progressively admit the fold of the incompressible dovetailed mounting directly into place in the mouth of said dovetailed groove and as the fold is progressed along the mouth of the dovetailed groove and to lock the die in place.

13. The structure of claim 12 characterized in that said die holder is flat.
14. The structure of claim 12 characterized in that said die holder is circular.

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