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MAGNETIC DIE HOLDER

Ralph A. Pannier, McCandless Township, Allegheny County, Pa., assignor to The Pannier Corporation, Pittsburgh, Pa., a corporation of Pennsylvania
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This invention relates generally to die holders and more particularly to magnetic die holders for receiving and self-aligning flexible snap-on dies.

In printing whether the die holder is a flat plate or an annular wheel it is desirable to have a flexible die that is readily applied and removed from the die holder. Different mechanical structures have been employed from time to time to make the flexible die readily attachable and detachable to the die holder and each improvement which saves time in applying and removing the flexible die members to the die holder materially reduces the cost of printing with such die holders. Frequently it is desirable to change the snap-on dies after one or a very few number of printings.

The principal object of this invention is the provision of a die holder made of magnetic metal for the purpose of providing a magnetic field for receiving and aligning a flexible magnetic die thereon. This magnetic die holder thus provides a very strong magnetic field that will attract the flexible die and grip it tightly to the holder and also accurately align the same on the holder. Whether the die is flat or cylindrical in the form of a wheel it is constructed in the same manner to produce the same result. Thus for the purpose of this invention a rotary die holder is shown and described.

Another object of this invention is the provision of an improved flexible die member made of magnetizable material that enables it to be readily applied and removed from the magnetic die holder.

Another object is the provision of a die holder having two hubs of nonmagnetizable material with inwardly facing annular seats to receive the ends of two cylindrical collars of magnetizable material. Spaced seats on opposite sides of a spacer of nonmagnetic material to receive the other ends of the cylindrical collars to provide a cylindrical die supporting surface. A series of permanent magnets having their north poles seated on one magnetizable collar and their south poles seated on the other magnetizable collar. These magnets should be of the high retentivity type and may be straight bar magnets or horseshoe magnets. They create an intense field that will attract and draw a flexible, magnetizable strap thereto, centering the strap between the magnetizable collars. The die carrying strap is preferably as wide as the spacer which automatically centers the die between the two collars when released within the proximity of these collars.

Another object is the provision of a die holder having an axial series of magnetic attracting and clamping means assembled in a single roll for holding and supporting a series of printing dies.

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

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

FIG. 1 is a view partly in section, partly in elevation of a rotary magnetic die holder.

FIG. 2 is a sectional view of a flexible, magnetizable die.

Referring to the drawings the magnetic die holder 1 is preferably made for one or more die strips such as indicated at 2 in FIG. 2 wherein the characters of the

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die 2 are preferably rubber or a similar material as indicated at 3 vulcanized or otherwise secured to the spring steel strip 4 which may be ten-thousandths of an inch thick of magnetizable material and sufficiently wide to carry the characters of the die members 3. As shown in the drawings, the spring steel strip 4 is approximately three-eighths of an inch wide, whereas the rubber die 3 might be somewhat narrower. The spring steel 4 which functions as a base and is of magnetizable material being light such as ten-thousandths of an inch thick. The total thickness of the steel and the die is approximately ninety-thousandths of an inch thick or, let us say, substantially one tenth of an inch. Thus the die members are quite light and very flexible and may be sufficiently long to pass around the complete circumference of the magnetic die member 1.

As shown in FIG. 1 the die member is constructed of a pair of magnetizable cylindrical rings 5 and 6. These rings are spaced from each other by the annular aluminum spacing ring 7 and the distance between the adjacent edges of the magnetizable cylinders 5 and 6 is three-eighths of an inch or the same as that of the width of the spring steel 4 of the die to be employed with this particular magnetic die holder. The ring 7 is notched as indicated at 8 to receive and properly align the adjacent edges of the cylinders 5 and 6.

Aluminum end plates 9 and 10 are likewise provided with the shoulders 11 and 12 to receive the outer ends of the cylindrical magnetizable members 5 and 6. Each of the end plates 9 and 10 have a central opening 13 or bore 13 which is made sufficiently large to receive the shaft such as indicated at 14.

Each of the cylindrical drums 5 and 6 of magnetizable material are provided with a series of radial openings 15 and 16 through which extends the north and south poles 17 and 18 of the series of U-shaped magnets 20 that are disposed around the inner perimetral surface of the drums 5 and 6.

The magnets are preferably made of material that has a very high retentivity such as is known on the open market as an "Alnico" magnet. Since the portion of these magnets projects through the magnetizable cylindrical drums 5 and 6 and the balance of the face is fitted closely therethrough as indicated at 21, the ring 5 becomes the north ring and the ring 6 becomes the south ring of a very strong and powerful magnet. The holes 15 and 16 are spaced around the perimeter of the cylindrical magnetizable members 5 and 6 a sufficient distance to permit the magnets to be properly assembled with all their north poles on one side.

A sleeve 22 is mounted between the end plates 9 and 10 for the purpose of holding the wedges 23 between adjacent horseshoe magnets. Thus the wedges 23 and the sleeve 22 maintain proper alignment of the assembly. However, their magnetism is sufficiently strong to maintain each of the magnets in position.

If desired the spring steel 4 of the die member may be provided with a very thin coat of rubber or synthetic elastomer to keep the steel surface clean. However, this is not necessary.

When the die member such as indicated at 2 is brought reasonably close to the annular drum of the die holder and is released, the die will fly through the air and slap itself all the way around the magnetic drum and properly align itself regardless of whether it was held in initial close alignment or not. As the spring steel base 4 of the die is substantially the same width as the central strip or spacer 22, and is of a length equal to a substantial lineal distance of the magnetic gap the die becomes accurately aligned around the perimetral surface of the die holder and need never be corrected or shifted manually. Thus it is only necessary to release the die within

the magnetic proximity of the magnetizable die holder and the mere release of the flexible die will cause the latter to embrace itself in proper position around the die holder with accurate alignment.

To remove the die a sharp screw driver or other similar mechanism made of nonmagnetic material may be forced under the end of the flexible die permitting it to be peeled from the surface of the magnetic die holder and another flexible die member applied thereto.

A die holder of this character permits the removal and reapplication of different dies with a rapidity heretofore unknown in the die changing art.

Although the present structure depicts a roll having only a single marker it is obvious that the same may be duplicated so as to provide a series of magnetic hold-downs adjacent to each other on the same roll. In such a structure the adjacent magnetic mechanism may be entirely independent and strictly a duplication of that shown in the drawings or one might reverse the magnets in alternate groups so as to employ opposite polarity and provide only one magnetizable member between each separator 20. In any event, the structure is substantially that as shown.

I claim:

1. A magnetically held die having a frame supporting at least a pair of parallel magnetized metal members separated by a spacer of nonmagnetic material and presenting a smooth continuous die surface, characterized by a printing die having printing characters thereon and having at least one magnetizable strip means of light flexible material for each pair of magnetized metal members substantially equal in width to said nonmagnetizable spacer and of a length equal to a substantial lineal distance of said nonmagnetizable spacer to hold the die in alignment and held solely by the magnetism in said members.

2. The magnetically held die of claim 1, characterized in that said strip means is flexible spring steel.

3. The magnetically held die of claim 2, characterized in that said strip means is covered with an elastomer coating.

4. The magnetically held die of claim 1, characterized in that said strip means is covered with an elastomer coating.

5. A magnetically held die having a rotary frame supporting at least a pair of annular parallel magnetized metal members separated by an annular spacer of nonmagnetic material and presenting a smooth continuous cylindrical die surface, characterized by a printing die having printing characters thereon and having at least one magnetizable strip means of light flexible material for each pair of magnetized metal members equal in width to the distance between the annular adjacent edges of said annular parallel magnetizable metal members and of a length equal to a substantial lineal distance of said nonmagnetizable spacer and held solely by the magnetism in said members.

6. The magnetically held die of claim 5, characterized in that said strip means is flexible spring steel.

7. The magnetically held die of claim 5, characterized in that said strip means is a portion of a flexible base covered with an elastomer coating and said characters are mounted on said elastomer coating.

8. A magnetically supported printing die comprising a flexible body of nonmagnetic material carrying printing characters, at least one light flexible magnetizable strip means carried by said body, said magnetizable strip means having a width substantially equal to the magnetic gap and of a length equal to a substantial lineal distance of the magnetic gap on which the die is to be used.

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