Aug. 22, 1967 N. F. HAWTHORNE 3,336,866

INK ROLLER

Filed May 14, 1965

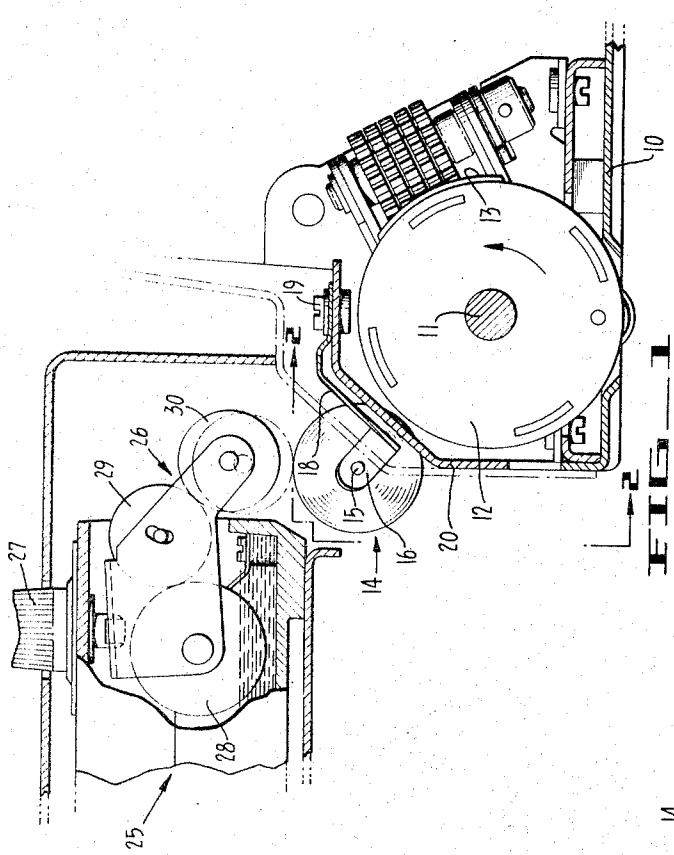


FIG. 1

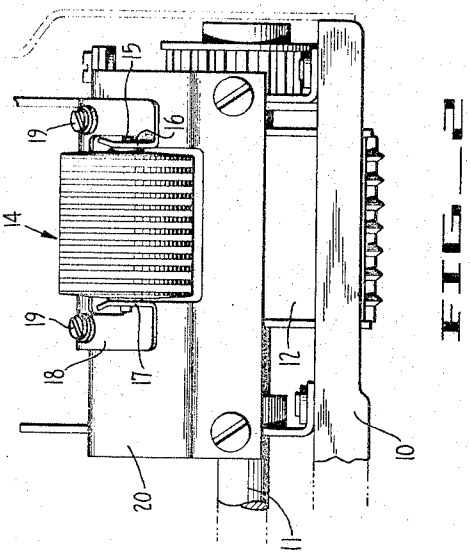


FIG. 2

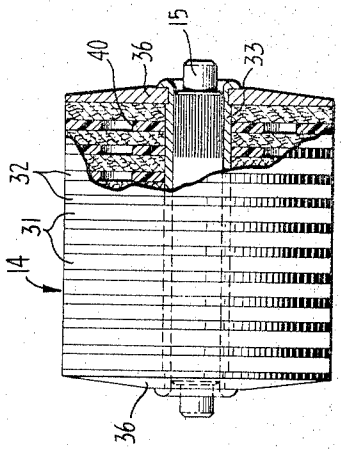


FIG. 3

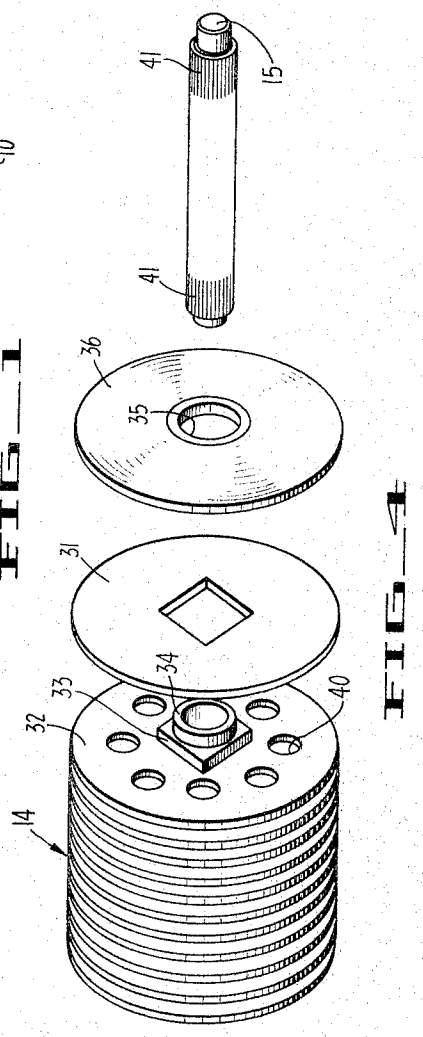


FIG. 4

United States Patent Office 3,336,866 Patented Aug. 22, 1967

3,336,866

INK ROLLER

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Filed May 14, 1965, Ser. No. 455,766
2 Claims. (Cl. 101—348)

ABSTRACT OF THE DISCLOSURE

In rotary printing machines, the inking of the type die plate is effected by the rolling contact of the die plate with an inking roller. Such inking rollers are of various types. This invention relates particularly to a laminated roller, the laminate structure of the roller comprising a series of absorbent disks such as felt alternately arranged on a square shaft with a series of resilient plastic disks. All of the disks (felt and plastic) are of equal diameter and normally are not in contact with the print drum. However, during rotation of the print drum and as the type die plate thereon moves into rolling contact with the inking roller, the plastic disks sustain the impact of the raised type characters or other indicia on the plate, thus reducing the wear of the felt disks. At this same time, the type characters cause a slight deformation of the contact areal portion of the resilient plastic disks which is sufficient to compress the adjacent felt disks causing ink to flow to the surface in that immediate area, supplementing the capillary action. As the contact area changes with the rotation of the roller, the previously deformed area portion of the resilient disks returns to its normal condition and the surplus ink is withdrawn into the felt in that area. Also, in the areas where ink has been removed by the type characters and indicium, a normal return of ink to these areas is effected by capillary action.

This invention relates to an inking device, and more particularly to an ink roller for transferring ink onto a rotary marking element.

There are basically two types of ink rollers, one of which is a cylinder or drum having an inking surface of porous rubber or absorbent material, such as felt, receiving ink from a series of rollers which serve to convey the ink from a reservoir to the ink surface. In the use of this type of ink roller, the surface must be cleaned repeatedly to maintain the surface in a porous or resilient condition, as it tends to become hardened and compacted with use.

The other type of ink roller is the fountain ink roller formed by a cylinder providing an internal reservoir for the ink, the cylinder having a covering of porous material, or a series of axially arranged rings of an absorbent material, such as felt. As in the first mentioned type of ink roller, the porous material becomes clogged and immediately hardens and in those rollers formed of a series of rings of absorbent material, the inking surface will not remain dimensionally stable, but will rather tend to assume an out-of-round, or noncircular, cross-section, when moistened. At the same time, the felt tends to become compacted after repeated contact with the rotary print member, making it necessary to continually adjust the ink roller relative to the print member to maintain sufficient contact therebetween.

It is, therefore, an object of the present invention to provide an ink roller which will retain dimensional stability.

Another object of the invention is to provide an inking roller which is resistant to wear under all operating conditions.

Other objects and advantages will be apparent from the following description of a preferred embodiment as illustrated in the accompanying drawings in which:

FIG. 1 is a fragmentary sectional elevational view of a printing device showing the rotary print drum, inking roller and ink supply mechanism;

FIG. 2 is an elevational view of the inking roller and print drum, the view being taken on the planes indicated by lines 2—2 in FIG. 1;

FIG. 3 is a view of the inking roller with a portion thereof broken away to show the internal construction; and

FIG. 4 is an isometric projection of the inking roller showing the partial assembly of the parts.

The invention is shown as being embodied in a printing device of the type shown and described in the patent of Ingemar H. Lundquist, No. 3,107,854, issued Oct. 22, 1963. The device embodying the invention comprises, generally, the base plate **10** which supports the frame structure within which the shaft **11** carrying the rotary print drum **12** is suitably journalled. Upon each cyclic rotation of the print drum **12**, the type die plate **13**, secured thereon, makes a rolling contact with an ink roller **14** carried on a shaft **15** suitably journalled at its respective ends in spaced parallel upstanding ears **16** and **17** (FIGS. 1 and 2) of bracket **18**, adjustably mounted by means of similar screws **19** on the auxiliary frame member **20**. The auxiliary frame member **20** is secured on base plate **10**, and the adjustment of bracket **18** on the member **20** is such that the ink roller **14** may be moved toward and away from print drum **12** as required.

The ink fountain **25** is suitably supported within the framework of the machine, as disclosed in the aforementioned patent, No. 3,107,854, and ink is supplied from the fountain to ink roller **14** by selective adjustment of the ink supply roller carriage **26** upwardly and downwardly, in a well-known manner, upon manipulation of knob **27**. Ink is supplied from the fountain to the roller **14** by means of ink supply roller **28**, intermediate roller **29** and supply roller **30**, the latter roller being rocked downwardly and upwardly into and out of engagement, respectively, with roller **14**. It will be noted that normally and for a greater part of the operating cycle, the print drum **12** is not in rolling contact with the inking roller **14** as seen in FIG. 1.

The ink roller **14** is formed of each of two elements, the assembly of which is such that the inking surface is more wear resistant and a more dimensionally stable roller diameter is maintained for longer roller life. For this purpose, a series of disks **31** and disks **32** are axially alternately arranged on a square sleeve **33** (FIGS. 3 and 4). Each of the respective end portions of the square sleeve **33** is turned to provide similar hubs **34**, the diameter of which is slightly less than the bore **35** of each of similar metal disks **36**. Also, the length of each of the hubs **34** is sufficiently greater than the thickest center portion of the disks **36**, so that upon placement of the respective disks **36** on hub **34**, the end of the hubs may be peened, or otherwise formed, to secure the metal disks in position on sleeve **33**.

The shaft **15**, which serves to support the ink roller **14** for rotation in bracket **18**, is of a diameter sufficiently less than the inside diameter of the bore of sleeve **33** to effect a press fit of the shaft within the bore of the sleeve. Each end portion of the shaft **15** is knurled, as at **41**, in order to secure the roller **14** on shaft **15** upon insertion of the shaft within the bore of the sleeve **33**.

Each of the disks **31** are formed of felt or other absorbent material and have a thickness of approximately 1/16". Each of two of the felt disks **31** is positioned on square sleeve **33** adjacent the inner surface of respective metal disks **36**. Intermediate these felt disks **31**, and alternately

arranged on the square sleeve **33**, are the disks **32**. Each of the disks **32**, equal in diameter to the felt disks **31**, is of an acrylic treated Dacron and has a thickness of approximately 1/32", and each is provided with a series of equiangularly spaced openings **40** on a common radius. These perforations **40**, which are preferably 1/8" in diameter and eight in number, become effective to determine a degree of resiliency in the otherwise rigid disks **32**, i.e., the larger the perforations and/or the greater the number, the more resilient the disks become.

In placing the disks **31** and **32** on the square shaft **33**, the Dacron disks **31** are contiguous with the adjacent felt disks **32**, but without compression of the felt disks. Thus, in operation and upon the initial contact of the type die plate **13** with the ink roller **14**, the impact is borne by the Dacron disks **32**. As the raised type characters and other configurations on the indicia plate **13** engage the thin resilient disks **32**, the chordal portion of each disk **32** is formed over slightly, altering the rotational plane of the disks in the area along the line of rolling contact of the die plate and inking roller. Such deformation of the disks **32** serves to slightly compress felt disks **31**, thereby causing the ink to flow to the peripheral surface thereof and, by capillary action, form a film of ink across the peripheral surface of the Dacron disks, thereby providing a continuous film of ink on the inking surface of the roller. Immediately following the rolling contact of the type die plate **13** with the ink roller **14**, the Dacron disks return to their original form and normal rotational plane as do the felt disks. By virtue of the resiliency of the Dacron disks, the ink roller **14** does not become out-of-round or elliptical in cross-section and the extent of wear of the felt disks **31** is determined by the degree of wear of the Dacron disks **32**. Also, the sponge-like action of the felt disks **31**, by the compression and release of the disks between adjacent Dacron disks during each operation, prevents the accumulation of ink on the surface of the roller, thereby greatly reducing the hardening of the felt, thus prolonging the life of the roller **14**.

What is claimed is:

1. An ink roller for a rotary printing device comprising a shaft, a pair of rigid circular plates, one secured on each end of said shaft, and a series of disks of equal diameter axially and nonrotatably arranged in contiguity on said shaft between said plates, certain of said disks being of an ink absorbent material and the other of said disks being resilient and impermeable to ink, the peripheral edges of said disks defining an inking surface, said other of said disks being arranged on said shaft in alternate relationship with said certain of said disks whereby a rolling pressure applied to the peripheral edges of said other of said series of disks resiliently deforms said other disks to compress said certain of said disks to cause ink to flow radially outwardly tending to form a film of ink on the inking surface along the line of rolling contact.

2. An ink roller for a rotary printing device comprising a square shaft, a pair of rigid circular plates, one secured on each end of said shaft, and a series of disks of equal diameter axially arranged on said shaft intermediate said plates, certain of said disks being ink absorbent and having a thickness of the order of about 1/16" and the other of said disks being impermeable to ink and positioned along said shaft between and contiguous with each of adjacent pairs of said certain of said disks, each of said other of said disks being of a thickness of the order of about 1/32" and having a series of equiangularly spaced perforations therein lending resiliency to said other of said disks whereby a rolling pressure applied to the peripheral edges of said other of said disks causes an areal deformation of said other disks compressing said certain of said disks to cause a flow of ink therefrom forming a continuous film of ink on the inking surface.

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