

[54] FLEXIBLE BIASED SELECTIVE WEB PRINTER	3,482,512	12/1969	Jung.....	101/110
	1,928,928	10/1933	Compton.....	101/110 X
	660,512	10/1900	Humphrey et al.....	101/110 X
[75] Inventors: Eugene W. Finke, Miamisburg; Paul H. Hamisch, Jr., Franklin, both of Ohio	940,186	11/1909	Otteson.....	101/111
	507,067	10/1893	Dodge.....	101/111 X
	1,067,448	7/1913	Standley.....	101/111 X
[73] Assignee: Monarch Marking Systems, Inc., Dayton, Ohio	1,131,959	3/1915	Robbins.....	101/110
	828,478	8/1906	Hodge.....	101/110 X
	449,831	4/1891	Smith.....	101/111
[22] Filed: June 4, 1973	447,912	3/1891	Shaw.....	101/111

FOREIGN PATENTS OR APPLICATIONS

111,596	12/1928	Austria.....	101/111
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[21] Appl. No.: 366,834

Related U.S. Application Data

[63] Continuation of Ser. No. 208,037, Dec. 8, 1971, abandoned.

[52] U.S. Cl. .... 101/111, 101/105

[51] Int. Cl. .... B41j 1/60

[58] Field of Search ..... 101/111, 110, 99, 95, 105, 101/106, 98, 89

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 Assistant Examiner—Eugene H. Eickholt  
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[57] ABSTRACT

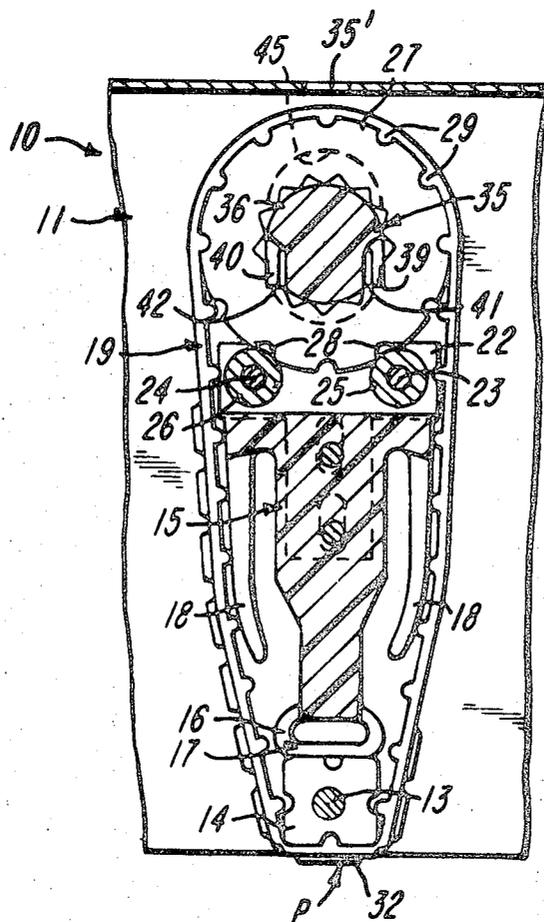
There is disclosed a print head with selectively settable printing bands, a selector for selectively driving any one of the printing bands, a wheel for supporting the printing band at the printing zone, brackets for adjusting the amount of tension in the bands, flexible resilient fingers for detenting the wheel, and flexible resilient fingers for diminishing increases in the tension in the bands during printing band selection.

3 Claims, 5 Drawing Figures

[56] References Cited

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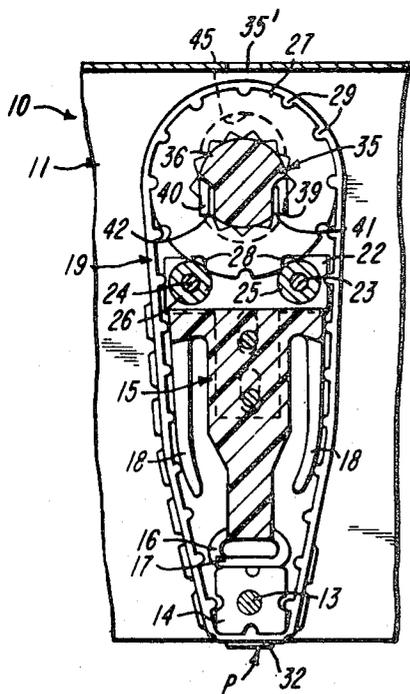
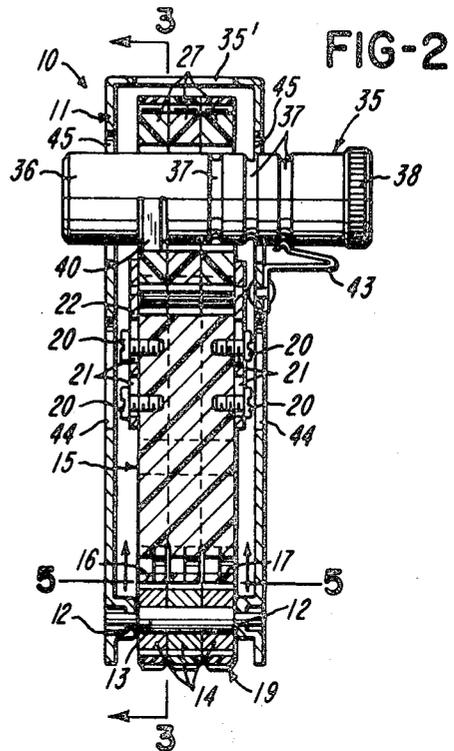
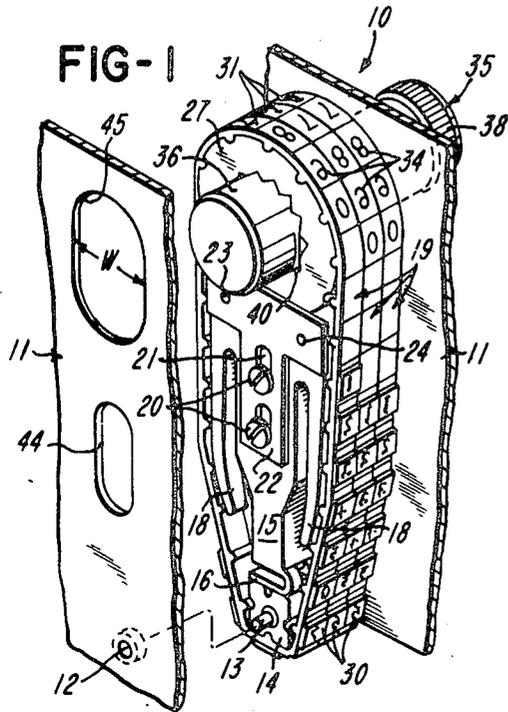


FIG-3

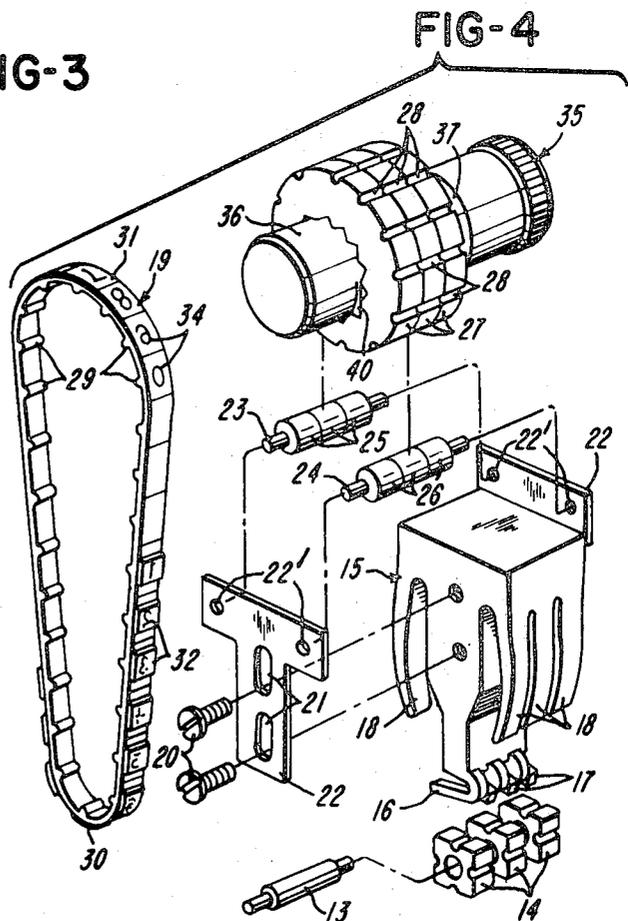


FIG-4

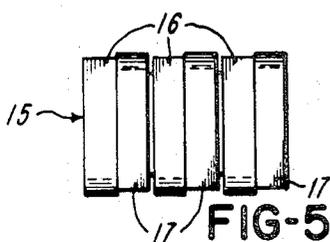


FIG-5

## FLEXIBLE BIASED SELECTIVE WEB PRINTER CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of application Ser. No. 208,037, filed Dec. 8, 1971, now abandoned owned by the assignee of the present application.

### FIELD OF THE INVENTION

This invention relates to the art of printing.

### SUMMARY OF THE INVENTION

The invention resides in a print head having improvements relating generally to printing band selection, adjustment of the tension in the printing bands, mounting and detenting of the printing bands, detenting of the wheels which support the printing bands at the printing zone, and diminishing increase in tension in the printing band as a driven wheel corresponding to the selected printing band is rotated. The printing bands have teeth formed on their undersides. Each printing band is trained about a driven wheel and a support. The supports are specifically shown to comprise individual multi-sided support wheels by which the printing bands are supported at the printing zone. The teeth on the printing bands engage notches in the driven wheels. The driven wheels are mounted and detented by rollers. The rollers are mounted by a pair of brackets adjustably secured to a mounting block. The mounting block has at least one and preferably two independent flexible resilient fingers which diminish the increase in tension in each printing band as the respective printing band is driven around the support. Due to manufacturing tolerances the molded lengths of the printing bands will differ slightly. The spring finger or fingers which engage the respective printing bands also serve to compensate for the tolerances in the lengths of the individual printing bands. The support wheels are detented by a respective pair of flexible resilient fingers which extend in opposite directions and which are shown to engage one side of the support wheel.

The selector comprises a one-piece molded plastic member having drive lugs for engaging any driven wheel. The drive lugs can engage in internal notches in the driven wheel and rotate the driven wheel when the selector is rotated. The driven wheel rotates through the same angle as the angle through which the selector rotates. The driven wheel rotates, and the respective printing band is advanced, in the direction in which the selector is rotated. Having referred to several salient features of the invention, reference is now made to the accompanying drawings and the following description.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the print head, showing part of the frame exploded away;

FIG. 2 is a sectional elevational view of the print head shown in FIG. 1;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is an exploded perspective view of a print head, but omitting the frame for the sake of clarity; and

FIG. 5 is a view taken generally along line 5—5 of FIG. 2.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is shown a print head generally indicated at 10. The print head can be used, for example, in a marking machine to print data on a ticket, tag or label, or to print directly on a product or on packaging therefor. The print head 10 includes a suitable frame 11 shown to have a generally U-shaped configuration. The frame 11 has a pair of aligned holes 12 for receiving the ends of a shaft 13. The shaft 13 mounts a plurality of supports which are illustrated as comprising multi-sided side-by-side wheels 14. The wheels 14 are independently rotatable about the shaft 13.

A molded plastic mounting block 15 is shown to have a plurality of pairs of integrally molded independent, flexible, resilient spring fingers 16 and 17. The fingers extend in opposite directions as best shown in FIG. 5. Each pair of spring fingers 16 and 17 is shown to provide a detent for a respective wheel 14. The mounting block 15 also has a plurality of pairs of independent, flexible, resilient spring fingers 18. Each pair of spring fingers 18 is in contact with the underside of a respective flexible endless printing band 19.

The mounting block 15 threadably receives screws 20. The screws 20 pass through elongated slots 21 in T-shaped brackets 22 and clamp the brackets 22 to the mounting block 15. Rods 23 and 24, mounted in holes 22' of the brackets 22, carry rollers or mounting members 25 and 26. The rollers 25 and 26 mount and detent respective driven members in the form of side-by-side drive wheels 27. Each wheel 27 has peripheral notches 28 engaged by teeth 29 formed on the underside of the respective printing band 19. Each printing band 19 is shown to be trained about respective wheels 14 and 27.

The printing band 19 has a printing section 30 and a human readable section 31. The printing section contains printing elements 32 for printing different data and the readable section 31 contains corresponding indicia 34 which are capable of being viewed through a window 35 in the frame 11. When a particular printed element 32 is at the printing position P, a corresponding human readable character or indicium is visible through the window 35'.

A selector generally indicated at 35 is shown to be of one-piece molded plastic construction. The selector 35 includes a circular cylindrical section 36 having axially spaced apart annular grooves 37. A knob 38 is formed integrally with one end of the section 36. A pair of lugs 39 and 40 are formed integrally with the section 36. The lugs 39 and 40 extend beyond the cylindrical surface of the section 36 and are engageable in recesses 41 and 42 in any one of the wheels 27. A detent 43 comprised of a single piece of flexible resilient material is secured to the frame 11 and is cooperable with any one of the grooves 37 to hold the selector 35 in any axial position in driving engagement with any one of the wheels 27.

The tension on the printing bands 19 can be adjusted by loosening the screws 20 as by using a screwdriver through access openings 44 in the frame. The frame 11 has a pair of aligned elongated slots 45. Each slot 45 has a width W equal to the diameter of the section 36, except for clearance, so that the position of the selector

35 can be adjusted toward or away from the shaft 13.

The tension on each printing band 19 sequentially increases and decreases each time the band 19 is advanced around the support wheel 14 to a newly selected position. The main purpose of the spring fingers 18 is to deflect and thus partially diminish the increase in tension on the printing band 19 which is being moved to the newly selected position. In the assembled condition as shown in FIGS. 1, 2 and 3, the fingers 18 (as well as fingers 16 and 17) are shown deflected slightly compared to FIG. 4 due to the forces exerted by the respective printing bands 19. Increased tension in the printing bands 19 will cause pairs of spring fingers 18 to deflect to a greater extent.

Other embodiments and modifications of the invention will suggest themselves to those skilled in the art, and all such of these as come within the spirit of this invention are included within its scope as best defined by the appended claims.

We claim:

1. Printing apparatus, comprising: a plurality of flexible endless printing bands, each printing band having printing elements on its outer side and teeth formed on its underside; means for mounting the printing bands including a plurality of side-by-side multi-sided wheels for supporting the respective printing elements of each printing band at a printing zone and a plurality of side-by-side driven wheels, each driven wheel having a plurality of spaced apart notches engaged by the teeth of a respective printing band, a mounting block having at least one independent spring finger in resilient engagement with each printing band to diminish the increase in tension in the printing band as the driven wheel and the multi-sided wheel rotate, and rollers mounted by the mounting block for supporting the driven wheels and cooperable with the notches in the driven wheels for detenting the printing bands; flexible resilient means molded integrally with the mounting block for independently detenting each multi-sided wheel, means

for adjusting the tension on the printing bands, and a selector having an integrally molded drive lug drivingly cooperable with any one of the driven wheels to effect selective setting of any one of the printing bands.

2. Printing apparatus, comprising: a plurality of flexible printing bands each having a plurality of printing elements, spaced-apart teeth formed on the underside of each printing band, means for mounting each printing band under tension including a molded plastic block in contact with the printing bands and drive wheels for advancing the respective printing bands, and a plurality of pairs of opposed, independent, flexible, resilient spring fingers molded integrally with the plastic block, each pair of spring fingers acting in opposite directions on the respective printing band by resilient contact with the underside of the printing band at opposed locations to compensate for manufacturing tolerances in the respective printing band and to diminish the increase in tension as the respective drive wheel is rotated to bring another of the printing elements to the printing zone, the oppositely acting spring fingers exerting opposite forces on the printing band.

3. Printing apparatus, comprising: a flexible printing band having a plurality of printing elements, spaced-apart teeth formed on the underside of the printing band, means for mounting the printing band under tension including a molded plastic block in contact with the printing band and a drive wheel for advancing the printing band, and a pair of opposed, independent, flexible, resilient spring fingers molded integrally with the plastic block, the pair of spring fingers acting in opposite directions on the printing band by resilient contact with the underside of the printing band at opposed locations to compensate for manufacturing tolerances in the printing band and to diminish the increase in tension as the drive wheel is rotated to bring another of the printing elements to the printing zone, the oppositely acting spring fingers exerting opposite forces on the printing band.

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