Aug. 30, 1966 B. S. SMILGYS 3,269,306

INDICIA WHEEL ASSEMBLY

Filed Feb. 18, 1964

FIG. 1

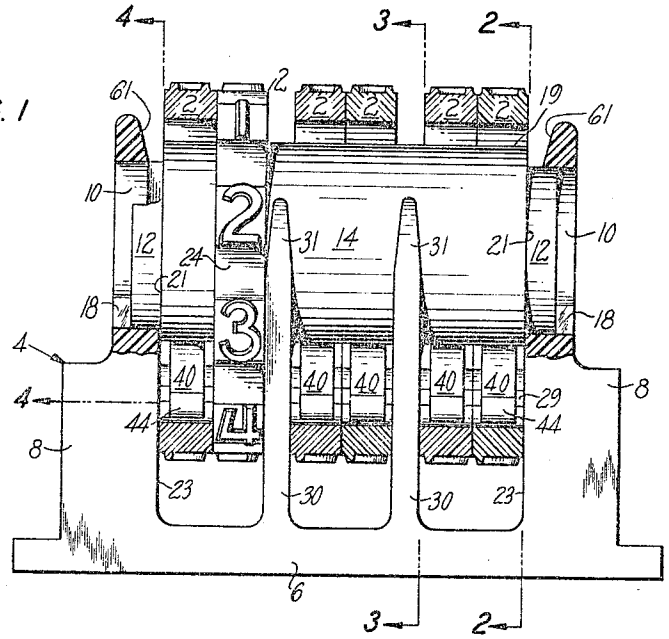


FIG. 2

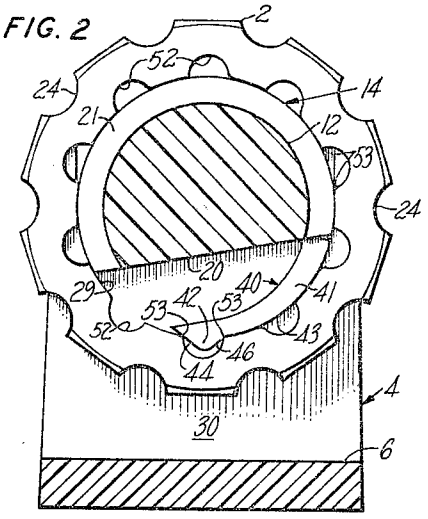


FIG. 3

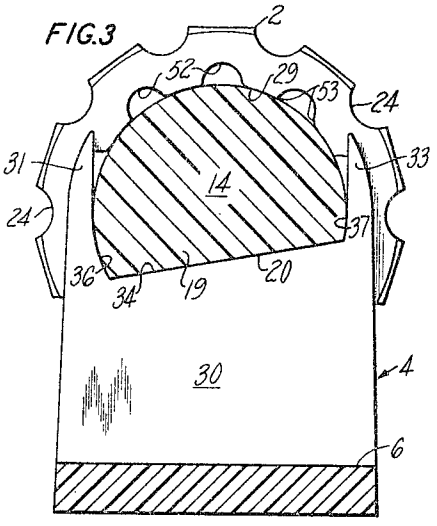
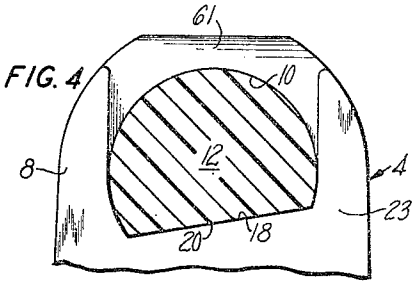


FIG. 4



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INDICIA WHEEL ASSEMBLY

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The present invention generally relates to registering devices of the type having a plurality of coaxial indicia bearing wheels mounted for individual rotation, as by selective manual manipulation, and more particularly to a novel and improved indicia wheel assembly having notable utility as a printer with the wheels embossed to provide peripheral printing characters.

One of the objects of the present invention is to provide an indicia wheel assembly of the type described having a novel and improved construction with a minimum number of parts that may be economically manufactured and quickly and easily assembled into a highly compact and useful device.

Another object of the present invention is to provide an improved printing wheel assembly providing rigid wheel support and accurate positioning of the printing characters for precise printing results.

A further object of the present invention is to provide an indicia wheel assembly of the type described having a new and improved detent mechanism for retaining the indicia bearing wheels in selected angular positions and which allows for manually repositioning or indexing the wheels.

A still further object of the present invention is to provide an improved printing wheel assembly constructed of plastic.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the drawing:

FIG. 1 is a longitudinal side view, partly broken away and partly in section, of an indicia wheel assembly embodying the present invention;

FIG. 2 is a transverse section view taken along line 2—2 of FIG. 1;

FIG. 3 is a transverse section view taken along line 3—3 of FIG. 1; and

FIG. 4 is a fragmentary transverse section view taken along line 4—4 of FIG. 1.

Referring to the drawing in detail, the illustrated indicia wheel assembly embodying the present invention provides a printer with six printing wheels 2 each embossed with characters providing a sequence of numeral indicia of 0 through 9, inclusive, and thereby adapted for printing the calendar date, i.e., with pairs of wheels providing the numerical month, the day, and the last two digits of the year.

The assembly includes a frame 4, preferably molded of a suitable plastic, having a base 6 and a pair of integrally formed spaced shaft supports 8 upstanding from adjacent the ends of the base. The outer portions of the shaft supports 8 are provided with aligned openings 10 which snugly receive the conforming reduced end portions 12 of a shaft 14, also preferably molded of a suitable plastic.

Referring to FIG. 4, the shaft-receiving openings 10 are of generally cylindrical shape excepting for being defined in part by coplanar flat shaft supporting surfaces 18. The reduced end portions of the shaft 14 and an intermediate enlarged shaft portion 19 are of generally

cylindrical shape excepting for a flat axial surface 20 extending the full length of the shaft and engaging the coplanar supporting surfaces 18. Radial shoulders 21 formed at the ends of the intermediate shaft portion 19 adjacent the reduced end portions 12 abut the opposed parallel planar surfaces 23 of the upright shaft supports 8. In this manner the shaft is fixed on the frame against rotative and axial movement and with the flat shaft surface 20 facing generally toward the base and extending laterally of the shaft axis at an angle oblique to the plane of the base and thereby assist in precluding inadvertent reverse assembly of the shaft on the frame.

The printing wheels 2 are rotatably mounted on the intermediate portion 19 of the stationary shaft 14 for which purpose they are provided with internal generally cylindrical surfaces 29 for receiving the shaft. In the preferred manner, the wheels are angularly positioned with the selected characters for printing in axial alignment at a station removed from the base 6 and adjacent the cylindrical part of the shaft opposite the flat axial surface 20.

In the shown embodiment the printing characters are arranged on the wheels so that the next higher numeral character in the sequence may be moved to the printing station by indexing the wheel in the clockwise direction, as seen in FIG. 2, for which purpose peripheral radial grooves 24 may be provided between adjacent numerical characters for manual indexing of the wheels.

The printing wheels 2 are arranged in three spaced pairs with the pairs of wheels being separated by combination spacer and supporting ribs 30 integrally formed with the base intermediate the shaft supports 8. The ribs 30 are generally U-shaped with outwardly extending fingers 31, 33 on opposite sides of the shaft and with intermediate laterally extending flat supporting surfaces 34 coplanar with the flat surfaces 18 of the supports 8. The fingers 31, 33 are formed with inner concave edge portions 36, 37, respectively, adjacent to their juncture with the surfaces 34 and which conform to the contour of the shaft 14 and thereby provide additional lateral support for the shaft. The intermediate support of the shaft 14 is provided by the flat surfaces 34 and by the concave edge portions 36, 37 thus ensures that the shaft and therefore the number wheels will not yield under the force of printing, with the wheels thereby being maintained in axial alignment for precise printing results. The ribs 30 together with the parallel opposed faces 23 of the supports 8 further serve to prevent axial movement of the printing wheels 2, with the axial distances between the ribs 30 and between the upright supports 8 and the ribs being substantially equal and sufficient to accommodate individual rotation of the wheels.

In order to maintain the embossed characters of the wheels 2 appropriately aligned at their printing station a plurality of axially aligned radially resilient pawls 40 are formed integrally with the shaft 14. As shown in FIG. 2, the pawls 40 include supporting arms 41 extending circumferentially from adjacent the flat axial surface 20 and in overlying relationship therewith whereby the pawls 40 may be deflected radially inwardly toward the shaft.

The internal generally cylindrical surface 29 of each wheel 2 is provided with generally semicircular radial grooves 52 radially aligned with the printing characters. The free ends of the pawls 40 are formed with radial protrusions or detents 42 projecting outwardly from the partially cylindrical outer surfaces 43 of the supporting arms 41 so as to be receivable in the wheel grooves and thereby restrain the wheels against rotation. As shown in FIG. 2, the detents 42 are located diametrically opposite the printing stations to ensure maximum effectiveness of the pawls when the printing wheels are under printing

pressure; and the flat shaft surface **20** extends laterally of the shaft axis at an angle oblique to the radial of the detents to provide a maximum shaft bearing surface for the printing wheels. The detents **42** are formed with generally V-shaped outer surfaces providing inclined cam surface portions **44**, **46** engageable by the opposed edges **53** of the wheel grooves **52** to deflect the detents inwardly out of restraining influence upon rotation of the wheels in either angular direction. Because of the supporting arm mounting of the detents, however, the pawls are more readily displaced out of the grooves **52** by indexing the wheel in the clockwise direction, as seen in FIG. 2, such being the direction for displacing the next higher numeral character on the wheels to the printing station.

Assembly of the printer may be rapidly and easily effected by first mounting the printing wheels **2** on the shaft **14** in the illustrated paired arrangement with the detents preferably received in the wheel grooves **52**. The shaft supports **8**, which are made outwardly resilient, are then displaced outwardly, and the shaft **14** with the wheels assembled thereon is inserted between the shaft supports **8** and onto the supporting ribs **30**, whereupon the shaft supports **8** are returned to their normal upright positions with the reduced end portions of the shaft received and thereby locked in the aligned openings **10** of the supports. In the illustrated embodiment this assembly of the shaft **14** is facilitated by a pair of opposed nonparallel surfaces **61** formed on the opposed faces of the supports **8** and inclined away from each other outwardly of the openings **10**. As a result the ends of the shaft **14** may be simultaneously pressed against the inclined faces **61** to deflect the supports **8** outwardly and to thereby facilitate the insertion of the ends of the shaft into the openings **10**. Such outward flexing of the supports **8** may be readily controlled by appropriately dimensioning the length of the shaft **14**, as for example in the shown embodiment the shaft is dimensioned so that its reduced end portions **12** extend approximately half way through the openings **10** (FIG. 1).

Thus it will be seen from the foregoing that the indicia wheel assembly of the present invention is compact and lightweight and is readily susceptible to economical methods of production and assembly. Additionally, as a printing device with the wheels provided with suitable peripheral printing characters, accurate alignment of the printing characters under pressure is ensured with complete and precise printing results.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. In a registering device, a frame having a pair of spaced shaft supports, a shaft mounted on said shaft supports having a flat axial surface, said shaft having a plurality of axially spaced integrally formed pawls with radially resilient arms extending circumferentially from adjacent said flat axial surface and detents at free ends thereof, and a plurality of number wheels rotatably mounted on the shaft and about the pawls, said number wheels having inner generally cylindrical surfaces engaging the shaft formed with a plurality of angularly spaced radial grooves adapted for selectively receiving the detents and thereby restrain the wheels against rotation, and said frame having a rib extending between a pair of wheels with a flat supporting surface in engagement with the flat axial surface of the shaft.

2. A printer comprising, a frame having a base and a pair of spaced shaft supports upstanding from the base, said shaft supports having aligned shaft mounting openings defined in part by flat coplanar surfaces facing generally away from the base, a shaft having reduced end portions closely received in said aligned openings with a flat axial surface in engagement with said coplanar surfaces, said shaft supports being flexible outwardly from each other to permit insertion of the shaft between the shaft supports and of the shaft end portions into said openings, said shaft having a plurality of axially spaced integral pawls intermediate the shaft supports with radially resilient arms extending circumferentially from adjacent the flat surface of the shaft and detents at free ends thereof, and a plurality of printing wheels with angularly spaced printing indicia on the periphery thereof rotatably mounted on the shaft about the pawls, said printing wheels having means for selectively receiving the detents for restraining the rotation of the wheels and for deflecting the detents inwardly upon rotation of the wheels, said frame further having a spacer rib upstanding from the base between two of the wheels with a flat surface in the plane of said coplanar surfaces and in engagement with the flat axial surface of the shaft.

3. A printer comprising a frame having a base and a pair of spaced shaft supports upstanding therefrom, said supports having aligned mounting openings defined in part by coplanar flat surfaces facing generally away from said base, a shaft having reduced end portions closely received in said aligned openings with flat axial surfaces in engagement with said coplanar surfaces, said supports being outwardly resilient to permit insertion of the shaft between the supports and of the shaft end portions into said aligned openings for assembly of the shaft on the supports, a plurality of printing wheels rotatably mounted on the shaft, and detent means for selectively restraining the printing wheels against rotation on the shaft.

4. The printer defined in claim **3** wherein the spaced shaft supports have opposed nonparallel surface portions inclined away from each other outwardly of the aligned openings, said nonparallel surfaces being engageable by the ends of the shaft for deflecting the end walls apart and thereby permit insertion of the end portions of the shaft into the aligned openings.

5. A registering device comprising a frame having a base and a pair of spaced shaft supports upstanding therefrom, said shaft supports having aligned openings defined in part by coplanar flat supporting surfaces facing generally away from the base, a shaft having reduced end portions closely received in said openings and a flat axial surface between the ends thereof engaging said coplanar surfaces, said shaft having radial shoulders adjacent its reduced end portions engageable with the shaft supports, said shaft supports being flexible away from each other to permit insertion of the shaft between the supports and of the shaft end portions into said openings, a plurality of radially resilient pawls axially spaced along the shaft having arms extending circumferentially from adjacent the flat axial surface of the shaft and detents at free ends thereof, and a plurality of printing wheels rotatably mounted on the shaft about the pawls, said printing wheels having generally cylindrical surfaces engaging the shaft formed with a plurality of angularly spaced radial grooves for selectively receiving the detents and thereby restrain the printing wheels against rotation on the shaft, said detents having oppositely facing cam surface portions engageable by the wheels for deflecting the detent pawls inwardly upon rotation of the wheels, and said frame having spacer ribs upstanding from the base between the wheels with flat surfaces extending in the plane of said coplanar surfaces and in engagement with the flat axial surface of the shaft.

6. A registering device comprising a plastic frame with a base portion and integrally formed upstanding spaced shaft supports with aligned shaft openings therein formed in part by flat coplanar surfaces facing generally away from the base, a plastic shaft having its end portions received in the aligned openings with a flat axial surface in engagement with said coplanar surfaces, a plurality of plastic number wheels rotatably mounted on the shaft between the shaft supports, the frame having an integrally

formed spacer rib upstanding between two of the wheels with a flat supporting surface in the plane of the coplanar surfaces and in engagement with the flat axial surface of the shaft, and pawl means integrally formed with the shaft adapted for cooperation with the wheels for restraining the wheels in selected angular positions against rotation.

7. In a registering device, a frame, a molded plastic shaft fixed in the frame having an elongated flat axial surface, said shaft having a plurality of axially aligned integrally molded pawls with radially resilient arms extending circumferentially from adjacent the flat axial surface of the shaft and detents at free ends thereof, and a plurality of number wheels rotatably mounted on the shaft and about the pawls respectively for receiving the pawls internally thereof, said number wheels having inner generally cylindrical surfaces engaging the shaft and formed with a plurality of angularly spaced radial grooves for selectively receiving the detents and thereby restrain the wheels against rotation, and said detents having camming edge portions engageable by the wheels for deflecting the detents inwardly toward the elongated flat axial surface upon rotation of the wheels.

8. In a registering device, a frame, a shaft fixed in the frame having a flat axial surface, said shaft having a plurality of axially aligned integral pawls with radially resilient arms extending circumferentially from adjacent the flat axial surface of the shaft and detents at free ends thereof, and a plurality of number wheels rotatably mounted on the shaft about the pawls, said number wheels having inner generally cylindrical surfaces engaging the shaft and formed with a plurality of angularly spaced radial grooves for selectively receiving the detents and thereby restrain the wheels against rotation, said detents having camming edge portions engageable by the wheels for deflecting the detents inwardly upon rotation of the wheels, and said flat axial surface of the shaft extending larterally of the shaft axis at an angle oblique to the radial of the detents.

9. A printer comprising a frame having a base and a pair of spaced shaft supports upstanding therefrom, said supports having aligned mounting openings defined in part by flat surfaces, a shaft having reduced end portions closely received in said aligned openings with flat axial surfaces in engagement with said flat surfaces of the spaced shaft supports, said supports being outwardly resilient to permit insertion of the shaft between the supports and of the shaft end portions into said aligned openings for assembly of the shaft on the supports, a plurality of printing wheels rotatably mounted on the shaft, and detent means for selectively restraining the printing wheels against rotation of the shaft.

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