Jan. 24, 1961 H. N. BLISS 2,969,175

COUNTER WHEEL

Filed June 27, 1957

FIG. 1

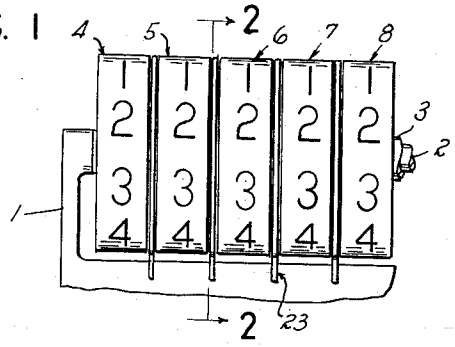


FIG. 2

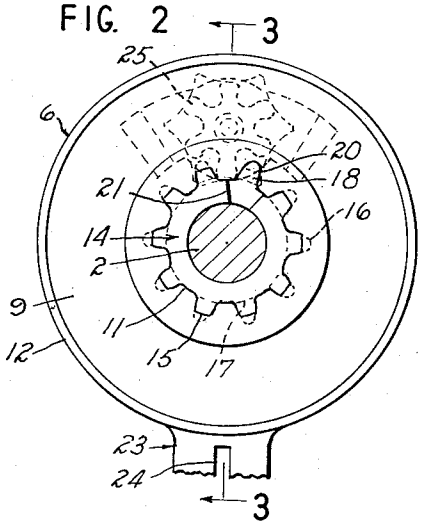


FIG. 3

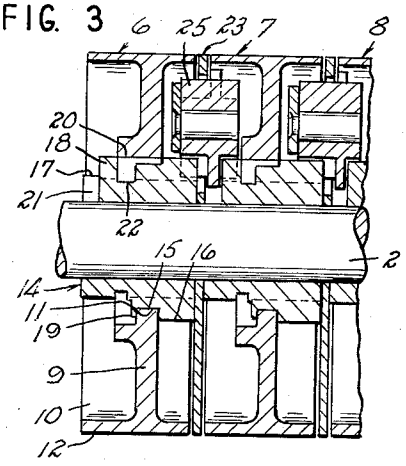


FIG. 4

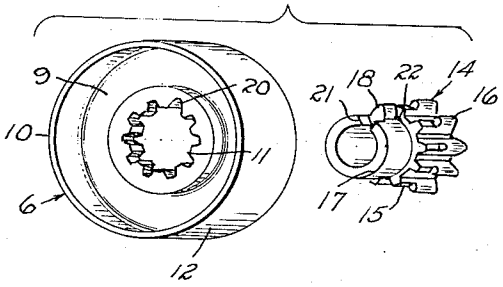
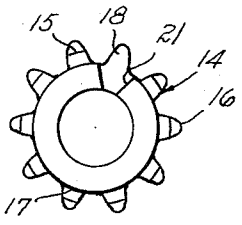


FIG. 5



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2,969,175

COUNTER WHEEL

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3 Claims. (Cl. 235—1)

This invention relates to a number wheel for counters of the internal transfer type, and more particularly to a novel construction of the hub and transfer gearing for such a number wheel.

A primary object of this invention is to provide a new and novel hub and transfer gearing for a number wheel of the type generally employed in counters.

Another object of this invention is to provide such a new structure for number wheels which reduces the inertia of the wheel so as to render the counter more susceptible to high speed operation. Included in this object is the provision of a structure which permits a selective use of materials compatible with strength and light weight.

A further object of this invention is to provide a hub and gearing arrangement for number wheels which readily absorbs the shock loading of adjacent different order wheels commonly encountered during transfer in high speed counter operation.

A still further object of this invention is to provide a new and improved hub for a number wheel which is economical to manufacture and quickly and easily assembled, particularly inasmuch as the number of parts is greatly reduced, and which is readily manufactured from readily available materials.

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.

The invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a fragmentary front view of a counter containing number wheels constructed in accordance with this invention;

Fig. 2 is an enlarged sectional view taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view taken substantially along line 3—3 of Fig. 2;

Fig. 4 is an exploded perspective view of the number wheel of the present invention; and

Fig. 5 is an end view of the hub and gearing structure of Fig. 4.

Referring now to the drawing, there is shown in Fig. 1 a counter of the type with which number wheels constructed in accordance with the invention are associated. The counter includes a frame 1 on which is suitably journaled a shaft 2.

Rotatably mounted on the shaft 2 are a plurality of such number wheels 4—8 of successively higher order. In the operation of the counter of Fig. 1, it will be understood that a number wheel of lower order which in the embodiment illustrated may be wheel 8 is turned by any suitable means such as the sleeve or counter shaft 3 in accordance with the count to be registered. Upon each revolution of a wheel of lower order, the next adjacent higher order wheel has to be advanced one unit or count

to advance the count in the usual manner. The operation of the counter of Fig. 1 is similar to that described in Patent No. 2,628,779 dated February 17, 1953, and issued to Harvey N. Bliss and assigned to assignee of the present application. Each of the number wheels is similar in construction and number wheel 6 only will be described in detail.

Referring now to Figs. 3, 4, number wheel 6 is provided with a number drum 10 having a supporting web 9 which contains a splined central bore 11. The drum 10 is provided with a peripheral flange 12 on the outer surface of which are inscribed consecutive numbers of any desired range, those numbers in the specific embodiment shown running from 0–9. Since the drum 10 has no other function except that of an indicator, it may be made of any desired light weight material such as aluminum.

In accordance with the invention, the only other element of the wheel is a unitary hub and gear assembly 14 which consists of a central splined hub section 15 on which the drum 10 is mounted, a driven gear section 16, a locking ring 17 and a one-tooth driving gear 18, all formed as an integral one-piece structure. In the preferred embodiment, the hub and gear assembly is fabricated from a single piece of hardened steel pinion stock which is readily available commercially and consists of extruded lengths of steel having peripheral teeth formed thereon.

When making the hub and gear assembly 14 from pinion stock, the original teeth are retained on the hub adjacent one end without modification as shown in Fig. 4 to provide the driven gear 16. The splined hub section 15 is provided by shaving or otherwise removing the tips of the teeth in the area next adjacent the gear 16. The splined hub section 15 is dimensioned to be received within the splined central bore 11 of the drum 10. In order to fixedly mount the number drum 10 on the hub 14 with the splines in engagement, the hub may be staked over the drum 10 as shown at 19 in Fig. 3. A clearance space or groove 22 is formed in the hub 14 to facilitate the staking operation.

Adjacent the splined hub section 15, all of the teeth are removed with the exception of a driving gear 18 which in the specific embodiment shown comprises a single tooth. It can be seen that the height of this tooth 18 would normally prevent insertion of the hub 14 into the bore 11 so one of the spline recesses on the bore 11 has been suitably enlarged as shown at 20 so as to permit the insertion of the hub in a keyed relationship with the drum 10. This has an advantage in that the location of the enlarged recess 20 is selected so that during assembly the numbers on the flange 12 are properly positioned relative to the hub position. The end of the hub opposite from the driven gear 16 has all the teeth removed as shown to form the locking ring 17. A portion of the wall of the locking ring is removed to form a radial slot or transfer unlocking notch 21 located adjacent the one-tooth driving gear 18.

When the wheels are assembled in a counter, a partition plate 23 is positioned between the wheels of lower and higher order and are fixed against rotation by engagement of slotted portion 24 with the frame 1. Each plate 23 carries a mutilated transfer pinion 25 which cooperates with the locking ring 17 and driving gear 18 of the wheel of lower order and the driven gear 16 of the wheel of high order in the manner described in the Bliss Patent No. 2,628,779 previously referred to.

Among the advantages of the structure of the present invention is that the driving and driven gears are integrally joined and may be made of hardened steel stock so that there is provided great strength to absorb the impact shock which takes place during a transfer operation as

the driving gear engages the transfer pinion. As a result of the present invention it is possible to increase the number of wheels or the speed of operation or both without destruction of the wheel due to torsional shock occurring between the driven and driving gears. Also included in this advantage is the fact that the hub and gear assembly is of small diameter and requires only a light weight drum to complete the wheel so that inertia is reduced to a minimum which further reduces the shock impact of a transfer operation at high speeds.

The reduction in parts so that only two elements are required to form a wheel is an advantage both in fabricating and assembling the wheel and the use of standard pinion stock provides a readily available source of material as well as facilitating the fabrication of the unitary hub and gear assembly.

The specific embodiment of the invention described may be subject to variation by one skilled in the art without departing from the scope of the invention and all such variations and modifications are intended to be included within the invention.

I claim:

1. A number wheel comprising a drum having a central splined aperture and a single unitary hub and gear assembly comprising a piece of gear stock having one end forming the driven gear of the wheel, an intermediate portion of reduced tooth length seated in the splined aperture of the drum and at its other end having all but a small segment of the gear removed to form a locking ring and a driving gear segment of greater tooth length than the intermediate portion, said drum having a portion of the splined aperture enlarged to permit axial passage of the driving gear segment therethrough during assembly of the drum on the hub.

2. A number wheel comprising a drum having a radial wall formed with a central splined aperture, and a single unitary hub and gear assembly comprising a piece of pinion stock having one end forming the driven gear of the wheel, an intermediate hub portion of reduced tooth length seated in the splined aperture of the drum, and at its other end having a mutilated portion forming a cylindrical locking ring and a driving gear segment of greater tooth length than the intermediate hub portion, said drum having a portion of the splined aperture enlarged to permit axial passage of the driving gear segment therethrough during assembly of the drum on the hub.

3. A number wheel comprising a single unitary hub and gear assembly comprising a piece of pinion stock having one end forming the driven gear of the wheel, an intermediate hub portion of reduced tooth length, and at its other end having all but a portion of one tooth removed to form a locking ring and driving gear segment, and a drum having a radial wall provided with a central splined aperture dimensioned to seat on and interlock with said hub portion, one of the splines of said aperture being deeper than the others to pass over the tooth of the driving gear segment during assembly at a selected rotated position of the drum relative to the hub.

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