June 17, 1930. B. S. WATLING 1,763,841

DISPLAY APPARATUS

Filed Dec. 21, 1928

Fig. 1

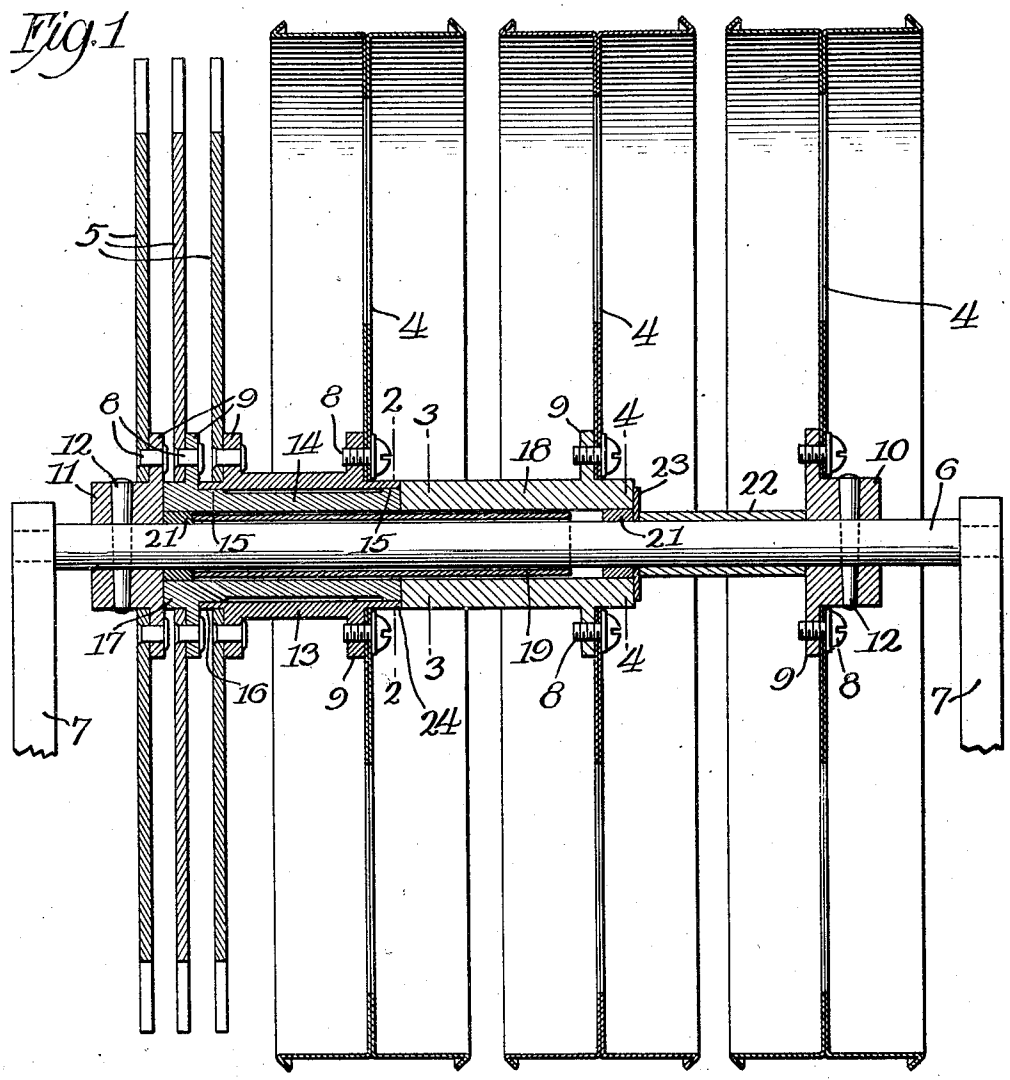


Fig. 2

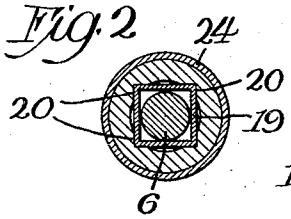


Fig. 3

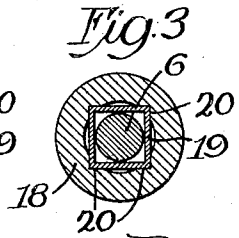
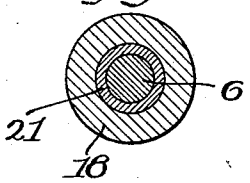


Fig. 4



Inventor:
Burns S. Watling
By Fisher, Clapp, Sears & Pond, Attys

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UNITED STATES PATENT OFFICE

BURNS S. WATLING, OF CHICAGO, ILLINOIS

DISPLAY APPARATUS

Application filed December 21, 1928. Serial No. 327,563.

The invention relates to display apparatus such as is now in use in coin-controlled amusement, fortune-telling and vending machines. In such apparatus three or more wheels provided with circular rims for displaying legends or insignia, are arranged side by side to rotate independently on a common axis, and a corresponding series of control, toothed or perforated disks are disposed at one side of the wheels and are connected, one to each wheel. Coin-controlled mechanism is employed for spinning the wheels and disks and for variably arresting the same. In this construction, the outer, inner and intermediate wheels of the series are connected to the outer, inner and intermediate disks respectively, so that telescoping connections between the wheels and disks are required, and it has been found difficult to so construct these connections that they will be durable and maintain each wheel and its corresponding disk against relative angular displacement.

The present invention seeks to provide improved, durable means for connecting the wheels and disks, which will prevent angular displacement between any one of the wheels and the disk connected thereto, and the invention consists in the features of improvement hereinafter set forth, illustrated in the preferred form in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a view in longitudinal section of the wheels and disks and the improved means for mounting and connecting the same.

Figs. 2, 3 and 4 are sections on the lines 2—2, 3—3 and 4—4 respectively of Fig. 1.

The wheels 4 and the disks 5 are mounted upon a common supporting shaft 6 having reduced end portions journaled in brackets 7. The central portions of the wheels and disks are fastened by riveted screws 8 to flanges 9 that are formed upon a number of hubs or sleeves mounted on the shaft 6.

The hubs or sleeves 10 and 11 of the outermost wheel and the outermost disk are provided with bores fitting the shaft 6 and are fixed thereto by taper pins 12 extending transversely through the hubs and shaft. The flanges which support the innermost wheel and the adjacent disk are, in the preferred form shown, formed integral with the hub or sleeve 13 and this hub or sleeve is rotatably mounted upon the hub or sleeve 14 of the intermediate disk. Preferably, as shown, the latter is provided adjacent its ends with bearing portions 15 which fit the bore of the sleeve 13. The hub 13 is provided with an extension 16 as shown, engaging the flange on the hub 14 and the latter is provided with a similar extension 17 engaging the inner face of the hub 11, so that the disks are held in proper spaced relation.

The intermediate wheel is fixed to a hub or sleeve 18, and the latter and the hub 14 are held against relative angular movement by a longitudinally extending key member. The latter is preferably in the form of a tube 19 of angular cross section, this tube being square in the form shown. The bores of the sleeves 14 and 18 are preferably first formed of circular outline and are then provided with a series of longitudinally extending grooves 20 which receive the corners of the angular tube or key member and so securely hold the sleeves 14 and 18 against relative rotation. Preferably the tube is soldered or otherwise fixed to one of the sleeves or hubs and telescopes within the bore of the other.

The bores of the sleeves or hubs 14 and 18 and of the tube 19 are larger than the shaft 6 which extends therethrough, but the opposite outer end portions of the sleeves or hubs are provided with bearing portions engaging the shaft. These bearing portions are preferably formed of collars 21 which have a snug, driving fit within the bores of the sleeves, and which are preferably provided with knurled edges to secure them in position. If necessary, solder may be used to secure the collars 21 in position and fasten the tube 19 to one of the hubs or sleeves connected thereby.

Another spacing sleeve 22 and a washer 23 are interposed between the adjacent ends

of the hubs 10 and 11. Obviously, the parts may be inexpensively manufactured and readily and quickly assembled on the shaft 6. The construction is strong and durable and securely maintains each wheel and its corresponding disk against relative angular displacement. To reduce friction and wear, the sleeves or hubs 14 and 18 and the bearing collars 21 therein are preferably formed of brass and the other parts of steel. Lubriction is readily provided for by placing grease within the bores of the hubs 13, 14 and 18.

The adjacent ends of the hubs 14 and 18 are in engagement and hub 18, which is slightly larger than hub 14, is engaged by an extension 24 of the hub 13, so that the latter, while free to rotate independently, is held against end play between the end of hub 18 and the flange on hub 14. Hubs 14 and 18 and the parts carried thereby, while free to rotate independently of the shaft 6, are held against end play thereon by the collars 10 and 11 and the spacing sleeve 22. It is particularly noted that the wheels and disks are properly connected and are held in proper spaced relation without the use of clamps or other fastening devices other than the pins 12 which fasten the hubs 10 and 11 to the shaft 6. It is also noted that the tubular key member 19 not only holds the hubs 14 and 18 against relative angular displacement, but also maintains them in proper axial alignment.

Changes may be made in the details set forth without departure from the scope of the appended claims.

I claim as my invention:

1. In combination, a supporting shaft, a series of independently rotatable display wheels disposed side by side on said shaft, a corresponding series of disks on said shaft at one side of the wheels, the outermost wheel and disk being fixed to said shaft, separate sleeves to which an intermediate wheel and its corresponding disk are connected respectively, said sleeves being journaled on said shaft, a key member for connecting said sleeves and telescopically engaging at least one of the sleeves, and a sleeve journaled on one of said first mentioned sleeves to which the adjacent wheel and disk are fixed, substantially as described.

2. In combination, a series of display wheels arranged side by side and independently rotatable about a common axis, a corresponding series of disks at one side of said wheels, connections between the outermost wheel and disk and between the adjacent wheel and disk, and connections between an intermediate wheel and disk comprising separate sleeves and a key member of non-circular section extending from one of the sleeves and telescoped within the correspondingly shaped bore of the other sleeve, substantially as described.

3. In combination, a series of at least three display wheels arranged side by side, a corresponding series of disks at one side of said wheels, connections between the outermost wheel and disk, between the adjacent wheel and disk and between the intermediate wheel and disk, said connections being telescoped one within the other and relatively rotatable and the connection between the intermediate wheel and disk comprising separate sleeves the bores of which are provided with bearing portions and longitudinally extending grooves and a tube of angular cross section engaging said grooves, substantially as described.

4. In combination, a series of at least three display wheels arranged side by side and independently rotatable about a common axis, a corresponding series of control disks at one side of said wheels, a common supporting shaft, sleeves or hubs on said shaft for supporting and spacing said wheels and disks and serving to connect the outer, inner and intermediate wheels to the outer, inner and intermediate disks respectively, the intermediate wheel and disk having separate hubs, the bores of which are provided with bearing portions and longitudinally extending grooves, and a key member engaging said grooves and holding said separate hubs against relative rotation, substantially as described.

5. In combination, a series of at least three display wheels arranged side by side and independently rotatable about a common axis, a corresponding series of control disks at one side of said wheels, a common supporting shaft, sleeves or hubs on said shaft for supporting and spacing said wheels and disks and serving to connect the outer, inner and intermediate wheels to the outer, inner and intermediate disks respectively, the hubs of the outer wheel and disk being pinned to said shaft, the inner wheel and disk having a common hub journaled on the hub of the intermediate disk, and the hubs of the intermediate wheel and disks having bearing portions adjacent their outer ends engaging said shaft and longitudinally grooved bores and a tube of angular cross-section engaging said bores and forming a telescoping connection for said hubs, substantially as described.

BURNS S. WATLING.