United States Patent [19]

Goto

[11] **3,906,715**

[45] **Sept. 23, 1975**

[54] **DIGITAL CLOCK**

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[30] **Foreign Application Priority Data**

Nov. 9, 1972 Japan 47-129308

[52] **U.S. Cl.** ..... **58/125 C**; 58/126 E; 235/115

[51] **Int. Cl.**[2] **G04B 19/02**

[58] **Field of Search** ..... 58/125 C, 128, 126 E, 16, 58/19 R, 19 A, 21.1, 152 B; 235/115, 117 R

[56] **References Cited**

UNITED STATES PATENTS

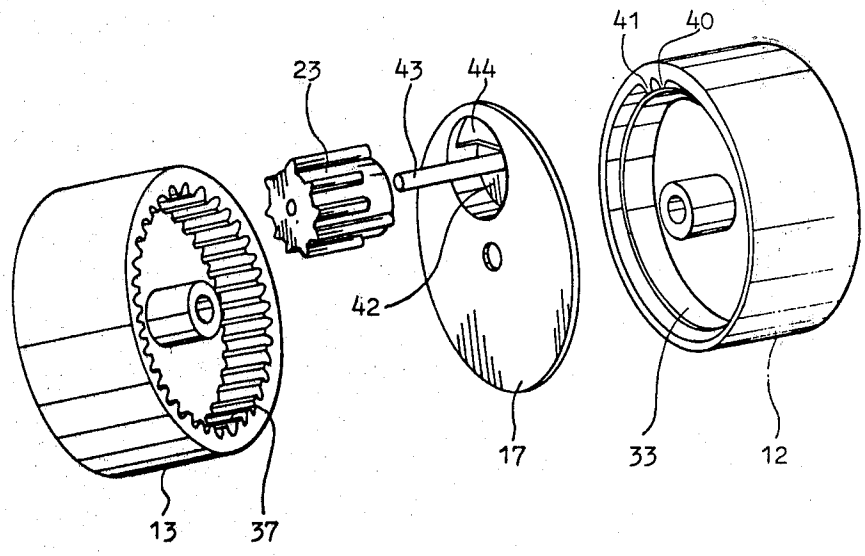
2,343,613	3/1944	Goldsmith	58/125 C
2,459,107	1/1949	Johnson	58/126 E
2,734,338	2/1956	Uhlig et al.	58/125 C
3,611,705	10/1971	Niznik	58/125 C
3,712,050	1/1973	Kawada	58/125 C

Primary Examiner—Joseph W. Hartary
Assistant Examiner—U. Weldon
Attorney, Agent, or Firm—Armstrong, Nikaido & Wegner

[57] **ABSTRACT**

A digital clock is provided which includes a main shaft rotatably supporting a plurality of time indicating drums which have inner teeth on one side and driving teeth on the other side of their inner periphery. The clock also includes pinion locking means arranged within the time indicating drums on the same side as said driving teeth. A plurality of intermediate pinions are arranged within the drums to engage the pinion locking means and driving teeth on one side and with the inner teeth on the other side so that said drums are driven. One or two of the pinions consist of two parts which are slippable relative to each other by application of a predetermined torque therebetween for the purpose of time adjustment or day of week indication adjustment. A time mechanism installed in the clock includes a cam drum which is within a time setting drum.

12 Claims, 11 Drawing Figures



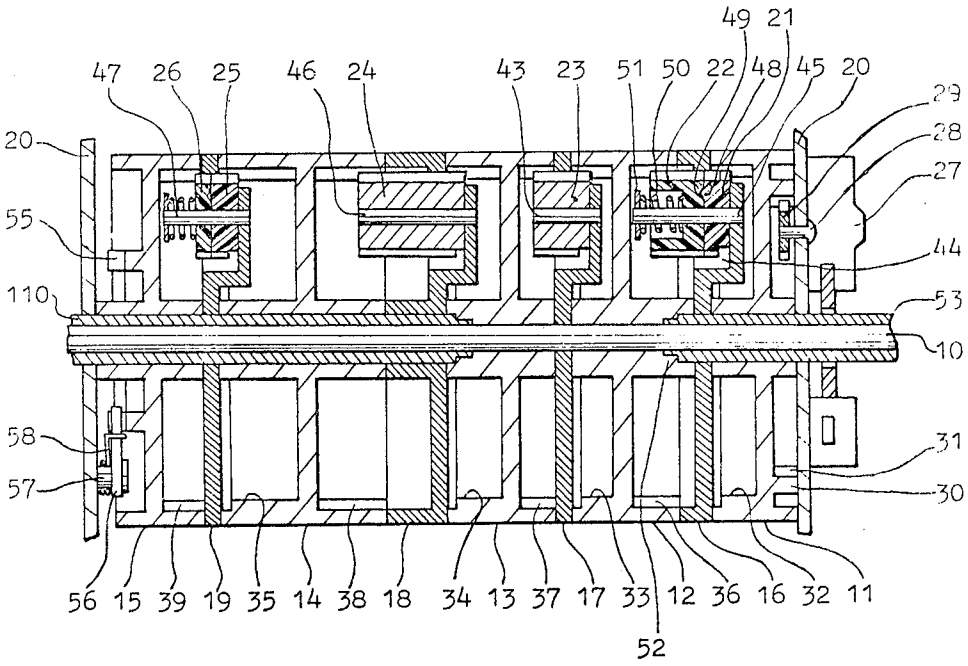


FIG. 2

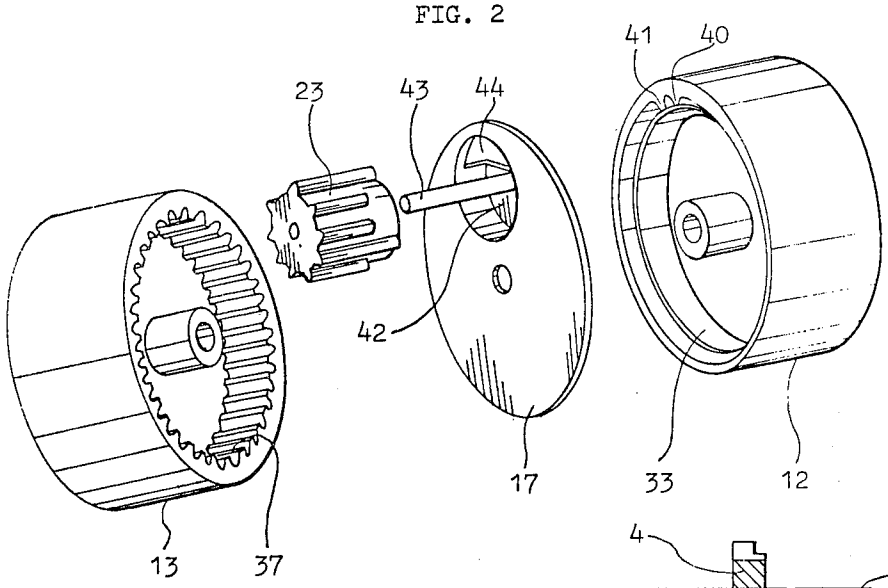


FIG. 3

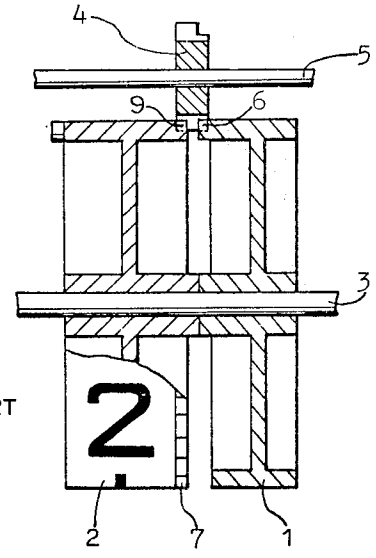


FIG. 1

PRIOR ART

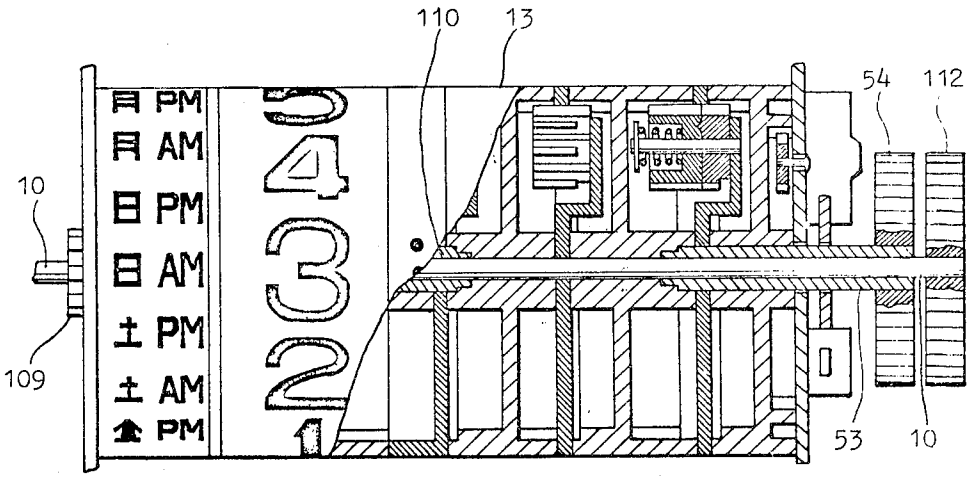


FIG. 4

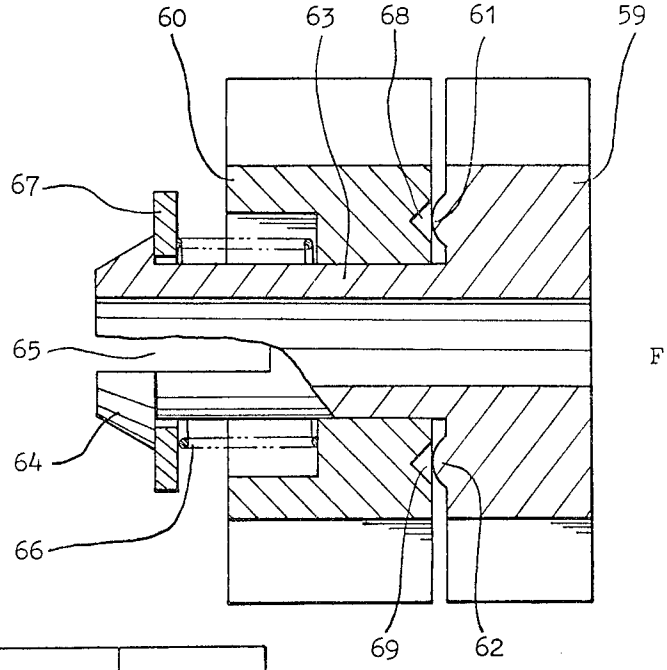


FIG. 5

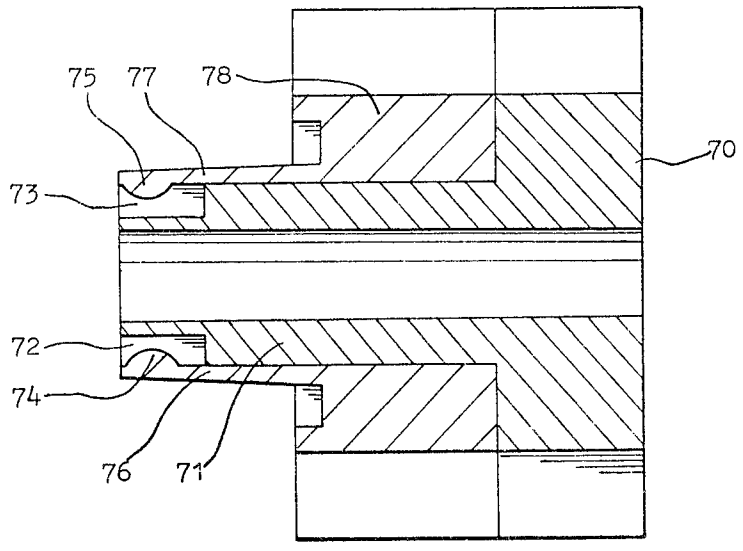


FIG. 6

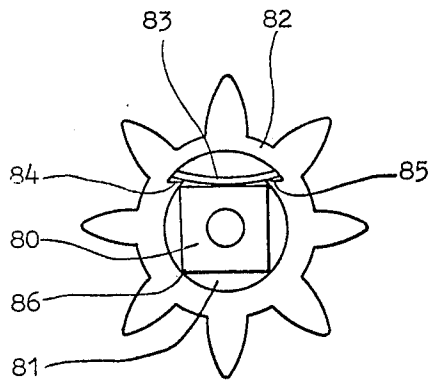


FIG. 8

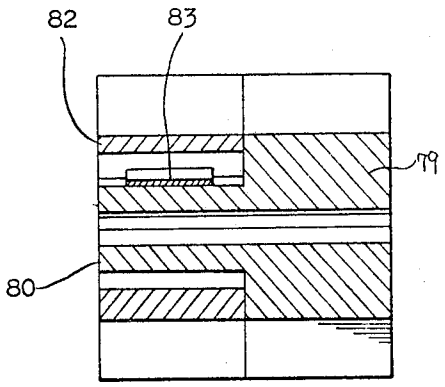
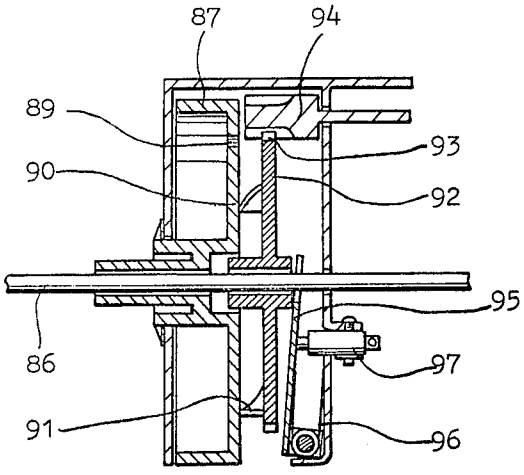


FIG. 7



PRIOR ART
FIG. 9

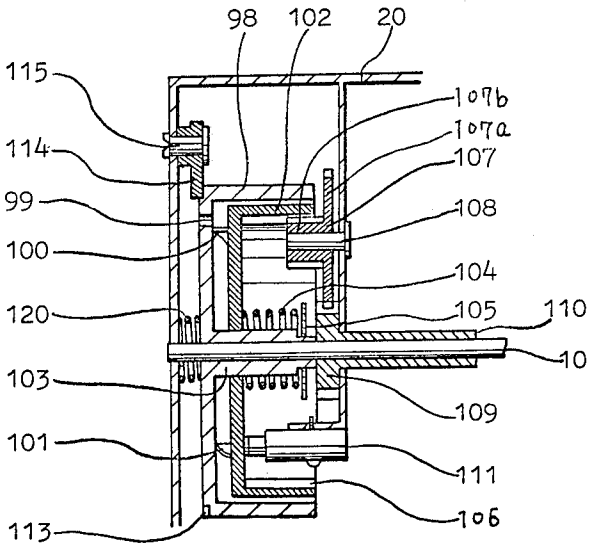


FIG. 10

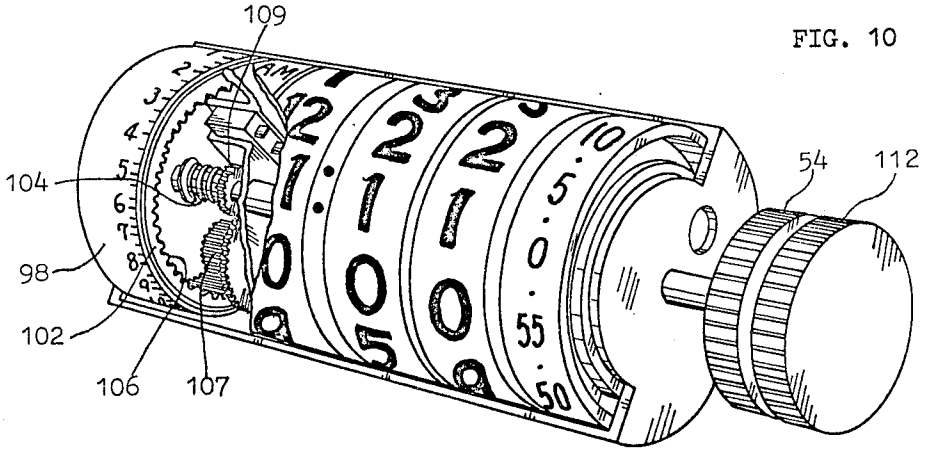


FIG. 11

DIGITAL CLOCK

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an improved digital clock mechanism including a timer for operating a switch, and an alarm.

2. Description of the Prior Art

Heretofore, a clock mechanism has been disclosed wherein a plurality of time indicating drums are mounted on a main shaft so that the drums may be driven intermittently through a double-profile pinion which is mounted on another shaft outside of the time indicating drums (U.S. Pat. No. **3,495,396**). However, in such a mechanism, mounting space required for the pinion and its shaft causes bulkiness of the clock and pinion clearing gap between the adjacent time indicating drums, especially between the ten minute indicating drum and the unit minute indicating drum, resulting in difficulty in reading time.

Further, in a conventional digital clock, a time adjusting mechanism comprises a particular clutch means arranged between a driving motor and a time indicating drum or between adjacent time indicating drums (U.S. Pat. No. **3,690,063**). It has been found, however, that such a clutch means involves a complicated structure. The structure is especially difficult to make using injection molding for the time indicating drums of synthetic resin due to their complicated shape which is caused by the clutch means and a pinion gear disposed inside of the time indicating drums.

A conventional timer device used in a digital clock comprises a cam disk provided with outer teeth for mating with a pinion gear which is driven in unison with the time indicating drums. At least one lug is formed on the cam disk, and at least one cut out portion is formed on time setting wheel whereby a timer switch is so arranged that the switch is operated when the lug on the cam disk enters into the corresponding cut out portion on the time setting wheel. However, such a timer construction requires not only considerable space in a digital clock but also relatively complicated assembling process.

Further, in a conventional digital clock, a driving motor generally drives directly a second indicating drum or a unit minute indicating drum which is disposed at right-hand side in a succession of time indicating drums. Therefore, a time adjusting wheel and/or a timer adjusting wheel are conventionally disposed separately from each other resulting in difficulty in operation or complicated structure of the clock.

SUMMARY OF THE INVENTION

Accordingly, one of the features of present invention is to provide an improved digital clock mechanism comprising a plurality of time indicating drums having inner peripheral teeth the driving torque for which is transmitted through double-profile pinions arranged inside of the time indicating drums. The pinions are carried on shafts fixed on plate members which are interposed between the adjacent time indicating drums to be carried on a main shaft. Such pinions may selectively comprise two parts which are resiliently coupled with each other but slippable relative to each other by application of a predetermined torque for the purpose of time adjustment or day of week indication adjustment.

Still another feature of the present invention is to provide an improved timer mechanism for use in a digital clock, comprising a time setting drum carried on a shaft, a cam drum positioned within the time setting drum carried on said shaft, inner teeth formed on the inner periphery of the cam drum, the inner teeth mated with a pinion which is driven through an idler gear by a driving shaft, a lug arranged on the cam drum, and a cut out portion arranged on the time setting drum, whereby a switch means is operated when the lug enters into the cut out portion.

Still another feature of the present invention is to provide an easily handled adjusting mechanism for time indication and a timer setting in a digital clock wherein time indicating drums are carried rotatable around a main shaft. A time setting drum for a timer is fixed on the left end of the main shaft and a timer adjusting wheel is fixed to the right end. The unit minute indicating drum is fixed on the left end of a hollow outer shaft through which the main shaft extends and a time adjusting wheel is fixed on the right end of the outer shaft adjacent to the timer adjusting wheel. Thus the two adjusting wheels are arranged adjacent to each other at the right side of the clock.

Accordingly, it is a general object of the present invention to provide an improved digital clock mechanism overcoming aforementioned difficulties in conventional digital clocks.

More specifically, it is an object of the present invention to provide an improved driving mechanism in a digital clock to drive a succession of the time indicating drums.

It is another object of the present invention to provide an improved adjusting mechanism for time indication in a digital clock.

It is still another object of the present invention to provide an improved quick changer mechanism for day of week indication in a digital clock.

It is still another object of the present invention to provide an improved adjusting mechanism of easy adjusting of the time indication and timer setting in a digital clock.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the present invention will be apparent from the following description of preferred embodiment of the invention taken in connection with the accompanying drawings forming a part thereof in which:

FIG. **1** is a fragmentary view partly in section showing a conventional driving mechanism in a digital clock.

FIG. **2** is an axial sectional view showing the improved driving mechanism and time adjusting mechanism of the invention.

FIG. **3** is an exploded perspective view showing a pair of adjacent time indicating drums in FIG. **2**.

FIG. **4** is a front elevation partly in section showing an improved arrangement of adjusting wheels for time indication and timer setting.

FIG. **5** is an enlarged sectional view showing a pinion in a modified embodiment according to the invention.

FIG. **6** is an enlarged sectional view showing a pinion of another embodiment.

FIG. **7** is an enlarged sectional view showing a pinion of still another embodiment.

FIG. **8** is an enlarged left side elevation in FIG. **7**.

FIG. 9 is a fragmentary sectional view showing a conventional timer mechanism for a digital clock.

FIG. 10 is a fragmentary sectional view showing an improved timer mechanism in a digital clock according to the present invention.

FIG. 11 is a perspective view broken in part showing the timer mechanism in FIG. 10 mounted in a digital clock.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now referring to FIG. 1, there is shown a conventional driving mechanism in a digital clock, wherein a lower order time indicating drum 1 and an upper order time indicating drum 2 are mounted rotatably around a common main shaft 3 passing therethrough. A double-profile pinion 4 rotatably supported on a pinion shaft 5 which is arranged outside of the time indicating drums 1 and 2 is adapted to mate with outer driving teeth or lugs 6 on the lower order drum 1 and with outer peripheral teeth 9 on the upper order drum 2 so that driving torque may be transmitted intermittently through the pinion 4 between the adjacent drums.

Referring to FIGS. 2 and 3, there is shown an improved clock mechanism according to the present invention, wherein a second time indicating drum 11 is numbered on the outer periphery thereof from "0" to "55" with five graduations therebetween, a unit minute indicating drum 12 is numbered on its outer periphery from "0" to "9", a ten minute indicating drum 13 is numbered on its outer periphery in two repeating series of numbers from "0" to "5", an hour indicating drum 14 is numbered on its outer periphery from "1" to "12", and a day of week indicating drum 15 is numbered on its outer periphery from "SUN.AM" to "SAT.PM". A main shaft 10 extends through a pair of opposing walls of frame 20 and rotatably supports thereon the second drum 11, the unit minute drum 12, the minute drum 13, and the hour drum 14 and the day of week drum 15. Between adjacent drums circular support plates 16, 17, 18 and 19 are interposed and are pierced by the main shaft 10 and which support double-profile pinions 21, 22, 23, 24, 25 and 26 respectively thereon in such a manner that the pinions are arranged inside of the time indicating drums. The outer configuration of the support plates 16, 17, 18 and 19 are generally flush with the adjacent time indicating drums, but some lugs (not shown) may be formed on the support plates for fixation onto frame 20.

An electric motor 27 is fixed on the frame 20 adjacently to the second drum 11 for supplying a driving torque to the second drum 11. A pinion 29 carried on a driving shaft 28 of the motor 27 extends through the wall of the frame 20 to mate with inner teeth 31 formed on the inner face of a concentrically projecting wall 30 on the right side of the second drum 11. The teeth 31 mate with the pinion 29 on the motor and may be formed on the outer side periphery of the second drum 11 because of the location of the motor and its driving shaft. On the inner periphery at the left side of the second drum 11, there is provided a pair of driving teeth and a pinion locking face 32.

The relation between the driving teeth, a pinion locking face and a double-profile pinion is described in connection with the unit minute drum 12, ten minute drum 13 and double-profile pinion 23 as illustrated in FIG. 3. On the inner periphery at the left side of the unit minute drum 12 there is provided a pair of driving teeth 40 and 41 and a pinion locking face 33 which is a little shorter in the axial direction of the drum 12 than the driving teeth 40 and 41. The support plate 17 has an eccentric recess 42. A shaft 43 rotatably carrying the double-profile pinion 23 passes through. This pinion is of the same type as a known double-profile pinion for use in a digital counter and constructed such that the left-hand side thereof is 9-toothed, whereby the three teeth on the left-hand side of the pinion 23 extend to form the three teeth on the right-hand-side thereof and the remaining teeth of the left-hand-side are not extended. The pinion 23 is arranged on the shaft 43 in such a manner that the 3-toothed side thereof protrudes through a cut out portion 44 of the recess 42 on the support plate 17 such that the 3-toothed side mates with the driving teeth 40 and 41 and the pinion locking face 33 on the unit minute drum 12, wherein the six teeth on the pinion 23 are short enough not to reach the locking face 33 but long enough to engage the pair of driving teeth 40 and 41 for smooth driving of the pinion 23 by the driving teeth. The 9-toothed side of the pinion 23 is adapted to engage the 36-toothed inner periphery 37 of the ten minute drum 13.

In operation, one revolution of the unit minute drum 12 causes the pair of driving teeth 40 and 41 thereon to advance only the three teeth on the left-hand side of the double-profile pinion 23, and thereafter, the pinion locking face 33 of the drum 12 steps the rotating movement of the pinion 23 at its 3-toothed side until the pair of driving teeth 40 and 41 mate again with the 3-toothed side. Therefore one revolution of the unit minute drum 12 causes 1/12 of a revolution of the ten minute drum 13.

In the substantially same manner as mentioned above, the pair of driving teeth (not shown) and pinion locking face 32 on the second drum 11 are adapted to mate with the righthand side 21 of the double-profile pinion 21 and 22, the lefthand side of which engages with 30-toothed inner periphery 36 of unit minute drum 12. The pinion 21 and 22 is rotatably carried on a shaft 45 on the support plate 16 and comprises two parts 21 and 22 as described hereinafter. Diametrically opposed two pairs of driving teeth (not shown) and two pinion locking faces 34 on the left-hand side of the ten minute drum 13 are adapted to mate with the right-hand side of the double-profile pinion 24, the left-hand side of which engages with 36-toothed inner periphery 38 of the hour drum 14. The pinion 24 is rotatably carried on a shaft 46 on the support plate 18. A pair of driving teeth (not shown) and a pinion locking face 35 on the left-hand side of the hour drum 14 are adapted to mate with the right-hand side 25 of the double-profile pinion 25 and 26 the left-hand side of which engages with a 42 toothed inner periphery 39 of the day of week drum 15. The pinion 25 and 26 is rotatably carried on a shaft 47 on the support plate 19 and comprises two parts 25 and 26 as described below. All of the double-profile pinions 21, 22, 23, 24, 25 and 26 are 3-toothed on the right-hand side and 9-toothed on the left-hand side. The support plate 16 or 18 between the drum 11 and unit minute drum 12 or between the ten minute drum 13 and hour drum 14 is formed thicker than the other support plates 17 and 19 so that adjacent drums 11 and 12 or 13 and 14 may be clearly separated in location for easy reading of the time. For the same purpose, a colon mark (see FIG. 11) may be impressed

on the support plate **18**. Further, a neon lamp (not shown) may be installed at the inner hollow of the support plate **18** and/or **16** for illuminating the time indicating drums from the inside when the drums are made of translucent or transparent material such as synthetic resin.

Thus one revolution of the second drum **11** causes **1/10** revolution of the unit minute drum **12**, one revolution of which causes **1/12** revolution of the ten minute drum **13** as already described, one revolution of which causes **1/12** revolution of the hour drum **14**, one revolution of which causes **1/14** revolution of the day of week drum **15**, and as a result, each drum digitally indicates minutes, hours and day of week.

The double-profile pinion **21** and **22** between the second drum **11** and the unit minute drum **12** comprises two parts **21** and **22**. One part **21** is provided with a least one and at the most three projections **48** on its side end facing the part **22** while the other part **22** is provided with three recesses **49** on its side end facing the part **21** such that the recesses **49** may receive the projections **48**. The two parts **21** and **22** are so arranged on the shaft **45** that the part **22** is biased toward the part **21** by a coil spring **50** around the shaft **45**, one end of which abuts against a washer-like retainer **51** fixed on the shaft **45** and the other end of which pushes the part **22**. These two parts are thus pressed against each other in engaged driving but slippable relation. The part **22** is formed with a central recess to partially accommodate the spring **50**. The bushing **52** of the unit minute drum **12** is detachably fixed on an end of a first outer shaft **53** through wich the main shaft **10** rotatably extends. A time adjusting wheel **54** is fixed on the other end of the outer shaft **53** (see FIG. **4**) to operate the unit minute drum **12**.

In operation, the time adjusting wheel **54** rotates, through the first outer shaft **53**, the unit minute drum **12** which is rotatable together with the left-hand part **22** of the double-profile pinion since the part **22** is rotatably slippable against the pressing force of the spring **50** relative to the part **21** which is stopped by the pinion locking face **32** on the second drum **11**. Thus the indicated time is adjustable by revolution of the time adjusting wheel **54** which is transmitted incrementally to the unit minute drum **12**, the ten minute drum **13**, the hour drum **14**, and finally the day of week drum **15**.

FIG. **5** illustrates another embodiment of the double-profile slippable pinion of the type described above, wherein a first part **59** is provided on one end facing a second part **60** with plural projections **61** and **62**. A central bushing **63** is formed thereon with an enlarged head **64** and with one or more slits **65** such that the central bushing **63** may bear resiliency in the diametrical direction of the bushing which will permit the second part **60** to fit onto the central bushing **63** over the enlarged head **64**. The central bushing **63** extends beyond the second part **60**. The second part **60** may be slid when the double-profile slippable pinion is in an operative condition. A coil spring **66** is positioned between the second part **60** and an "E" ring **67** supported on the head **64** of the central bushing **63** so that the second part **60** is held against the first part **59** whereby recesses **68** and **69** on the second part, facing the first part **59**, receive the corresponding projections **61** and **62**.

FIG. **6** illustrates still another embodiment of the double-profile slippable pinion wherein a first part **70** is provided with a central bushing **71** on the outer end of which is formed plural circumferential recesses **72** and **73**. The recesses **72** and **73** are adapted to receive corresponding projections **74** and **75** formed on plural resilient tongues **76** and **77** which extend from a second part **78** around the central bushing **71** of the first part **70**. Thus the second part **78** is rotatable by application of a predetermined torque thereon relative to the first part **70** whereby the projection **75** on the resilient tongue **77** is positioned in the adjacent recess (not shown) on the central bushing **71**. The central bushing **71** may be formed with an extension (not shown) beyond the resilient tongues **76** and **77** so that a washer-like retainer (not shown) may be fixed on the extension to prevent the second part **78** from disengaging the central bushing **71**.

FIGS. **7** and **8** illustrate still another embodiment of the double-profile pinion wherein a first part **79** is provided with a central bushing **80** of square cross section which is received within a cylindrical inner space **81** of a second part **82**. The circumferential face of the central bushing **80** abuts against an arcuated leaf spring **83** both ends of which are supported on step portions **84** and **85** on the inner periphery of the second part **82**, to control the intermittent revolutions of the bushing **80**. The second part **82** is rotatable by a predetermined torque relative to the first part **79** with the leaf spring **83** moving over the corner edges **86** of the central bushing **80**.

The double-profile pinions shown in FIGS. **5** to **8** are as seen from the drawings, **4**-toothed on the right side and **8**-toothed on the left side. It is to be understood that the number of teeth on each side of the pinion can be altered for the purpose of the present invention and within the scope of the invention. It is also advantageous to make the pinions of synthetic resin.

FIG. **9** shows a conventional timer mechanism for a digital clock, wherein a time setting drum **87** is rotatably carried on a shaft **86**. The side face of the drum has one or more recesses or cut out portions **89** which are adapted to accommodate corresponding projections **90** and **91** formed on a side end of a cam disk **92** rotatably carried on the shaft **86** and arranged outside of the time setting drum **87**. Circumferential gear **93** on the cam disk **92** mates with a pinion **94** driven by, for instance, a drum such as the drum shown in FIG. **1** so that the cam disk **92** may be rotated to move the projections **90** and **91** thereon into the corresponding recesses **89** on the time setting drum **87**. The cam disk **92** is thus pushed toward the time setting drum **87** by a plate **95** biased by spring **96**, and thus a switch **97** is operated.

Referring to FIGS. **4**, **10** & **11**, a timer mechanism according to the present invention is shown wherein a time setting drum **98** is fixed on the main shaft **10**. The drum **98** accommodates a cam drum **102** of smaller diameter in such a manner that the cam drum **102** is rotatable around a bushing **103** of the time setting drum **98**. The drum **102** is biased axially toward the time setting drum **98** by a spring **104** interposed between the drum **102** and a washer-like retainer **105** fixed on the outer end of the bushing **103**. The cam drum **102** is provided with one or more projections **100** and **101** which are adapted to be received, when the timer is actuated, within corresponding slots or cut out portions **99** formed on the time setting drum **98**. The time setting drum **98** is biased together with the cam drum **102** by a spring **120** disposed between the frame **20** and the

time setting drum **98** toward the time indicating drum so that the extreme end of the bushing **103** abuts the side face of a pinion **109** on the second outer shaft **110.**

A reduction gear **107** is rotatably carried around a shaft **108** on the frame **20.** The reduction gear comprises a pinion side **107b** to gear with inner peripheral teeth **106** on the cam drum **102** and a wheel side **107A** to mate with the pinion **109** at one end of the second outer shaft **110** disposed around the main shaft **10.** The pinion **109** is formed integrally on one end of the second outer shaft **110** to transmit the rotational movement of the ten minute drum **13.** The **10** minute drum **13** is indetachably fixed relation with the other end of the second outer shaft **110** (see FIG. **2** or **4**).

A switch **111** such as a microswitch is arranged on the frame **20** to be operated by horizontal axial movement of the cam drum **102** around the bushing **103** of the time setting drum **98.** The projections **100** and **101** on the cam drum **102** are adapted to separate the drum **102** from the time setting drum **98** in the inoperative position of the timer, and are so arranged at radially different positions on the side face of the cam **102** that the projections enter into the correspondingly disposed slots **99** on the time setting drum **98** only one time each revolution of the cam drum **102.** Thus one complete revolution of the cam drum **102** causes one operation of the switch **111.**

The time setting drum **98** is numbered at its outer periphery from "**1**" to "**12**" or "**24**" and is formed at the peripheral side portion with ratchet gears **113** mated with a spring biased pawl **114** carried around a shaft **115** on the frame **20.** Thus the time setting drum **98** rests in the respective setting position and may be rotatable in one direction to protect other mechanisms in the digital clock. The time setting drum **98** is adjustable from the outside through the main shaft **10.** The main shaft **10** fixedly supports on one end the time setting frum **98** and fixedly supports on the other end a timer adjusting wheel **112** adjacent to and outside of the time adjusting wheel **54** at the righthand side of the digital clock as shown in FIG. **4.**

The present invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The presently disclosed embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraces therein.

What is claimed:

1. A digital clock comprising:

a frame means;

a main shaft supported on said frame means;

a driving source;

A plurality of time indicating drums rotatably mounted on said main shaft each time indicating drum including inner teeth on one side and driving teeth on the other side of the inner periphery thereof;

coupling means for coupling said driving source to the lowest order time indicating drum and for transmitting a driving force from said driving source to the lowest order time indicating drum;

a plurality of intermediate pinions respectively arranged inside each of said time indicating drums and adapted to engage said inner teeth on one side and said driving teeth on the other side thereof so as to transmit the driving force from said lowest order time indicating drum to the upper order time indicating drums;

a plurality of pinion support plates positioned between each of said time indicating drums each pinion support plate having a cut out, a cover, parallel to said pinion supported plate which covers one part of said cut out;

a pinion shaft fixedly arranged through said cut out to rotatably support each said pinion thereon; and

a pinion locking means arranged on said other side of the inner locking means arranged on said other side of the inner periphery of said drums and adapted to engage said intermediate pinions on said other side thereof to prevent rotational movement of said intermediate pinions whereby the driving force exerted on said lowest order time indicating drum from said driving source is transmitted intermittently to each of said upper order time indicating drums.

2. A digital clock as set forth in claim **1,** wherein said main shaft passes through said pinion support plates and wherein said pinion shaft is fixed to said cover at one end thereof.

3. A digital clock as set forth in claim **2,** wherein said cut out includes said covered portion and an uncovered portion and wherein said uncovered portion is positioned on said support plate such that said pinion on said pinion shaft engages said driving teeth and said pinion locking means of the adjacent time indicating drums.

4. A digital clock as set forth in claim **3,** wherein the outer periphery of each said pinion support plate is generally flush with the outer peripheries of the adjacent time indicating drums.

5. A digital clock as set forth in claim **1,** wherein said coupling means includes a driving pinion and a driving shaft of said driving source adapted to carry said driving pinion and wherein said driving pinion engages the inner teeth on said lowest order time indicating drum so as to supply the driving force from said driving source to said lowest order time indicating drum.

6. A digital clock as set forth in claim **1,** wherein at least one of said intermediate pinions includes first and second means rotatably carried around said pinion shaft one of which is provided with a projection and the other of which is provided with a recess adapted to receive said projection and wherein said projection and said recess are normally resiliently biased against each other by resilient means whereby said first and second means of said pinion are slippable relative to each other by application of a predetermined torque therebetween.

7. A digital clock as set forth in claim **6,** wherein said first means of said slippable pinion is provided with a central bushing around which said second means of said slippable pinion is rotatably carried whereby said bushing extends beyond said second means and wherein a spring is positioned between the outer end of said bushing and said second means whereby said second means is biased resiliently toward said first means.

8. A digital clock as set forth in claim **7,** wherein said first means of said slippable pinion is provided with a central bushing around which said second means of said slippable pinion is carried wherein said second

means includes an axial resilient extension extending coaxially with said bushing whereby said projection formed on either said bushing or extension is received in one of said recesses formed on one of the bushing or extension.

9. A digital clock as set forth in claim **8,** wherein said first means of said slippable pinion includes a central bushing of polygonal cross section around which said second means of said slippable pinion is rotatably carried and said second means includes at the inside thereof a resilient member adapted to abut said bushing.

10. A digital clock as set forth in claim **9,** wherein said resilient member is an arcuated leaf spring which is fixed in an inner space formed in said second means.

11. A digital clock as set forth in claim **6,** wherein said slippable pinion is arranged between a second indicating drum and a unit minute indicating drum.

12. A digital clock as set forth in claim **11,** wherein an outer shaft is rotatably arranged around said main shaft supporting said plurality of time indicating drums, and wherein said outer shaft engages a unit minute indicating drum at one end and a time adjusting wheel at the other end thereof.

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