Oct. 28, 1947. A. TELLIER 2,429,853

WORLD CLOCK

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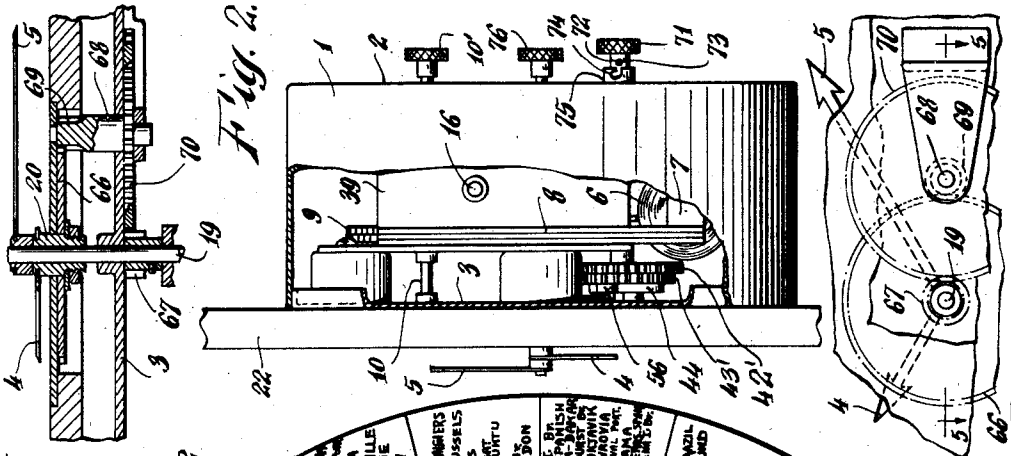


Fig. 2.

Fig. 5.

Fig. 6.

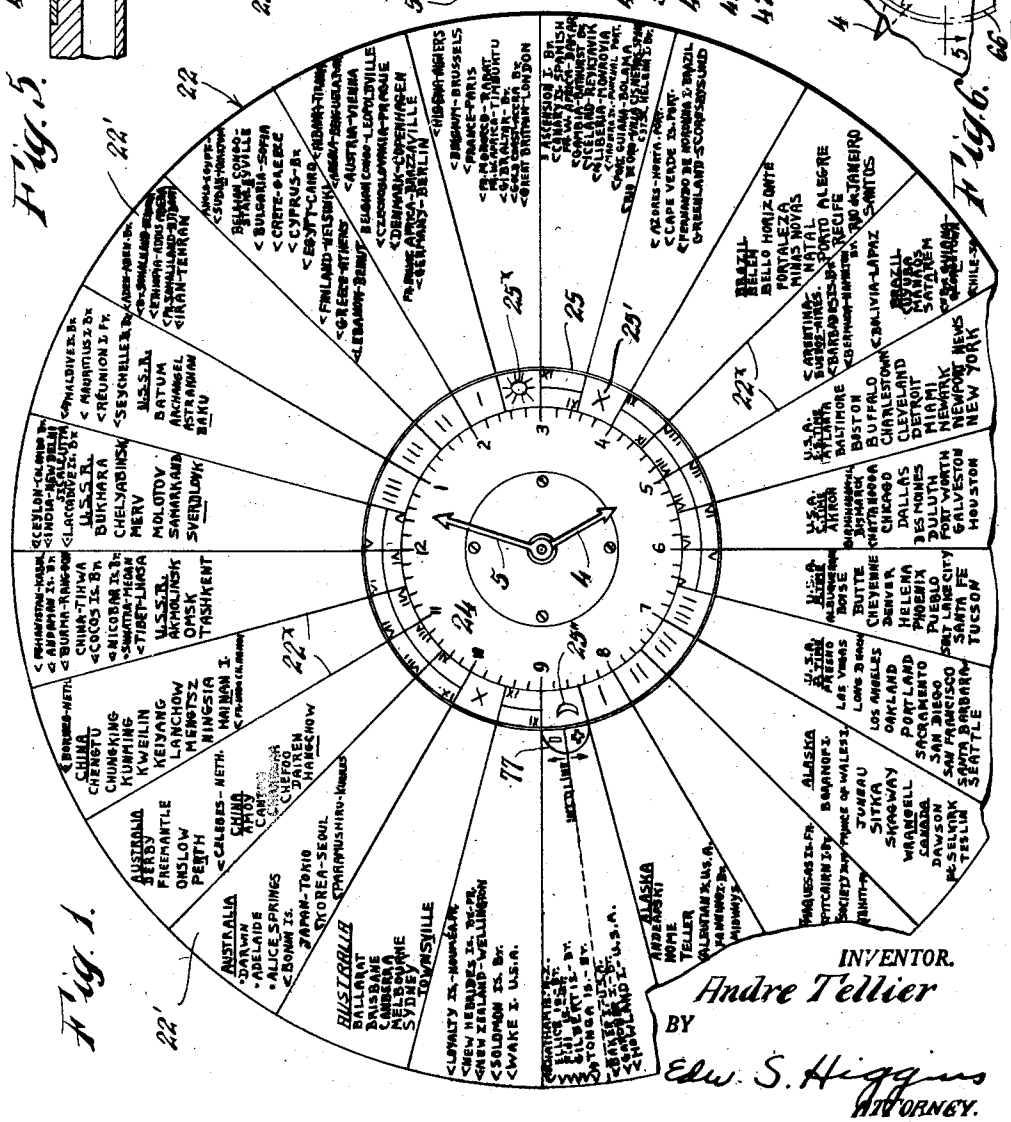


Fig. 1.

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Oct. 28, 1947. A. TELLIER 2,429,853

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Filed Oct. 26, 1946 4 Sheets-Sheet 2

Fig. 3.

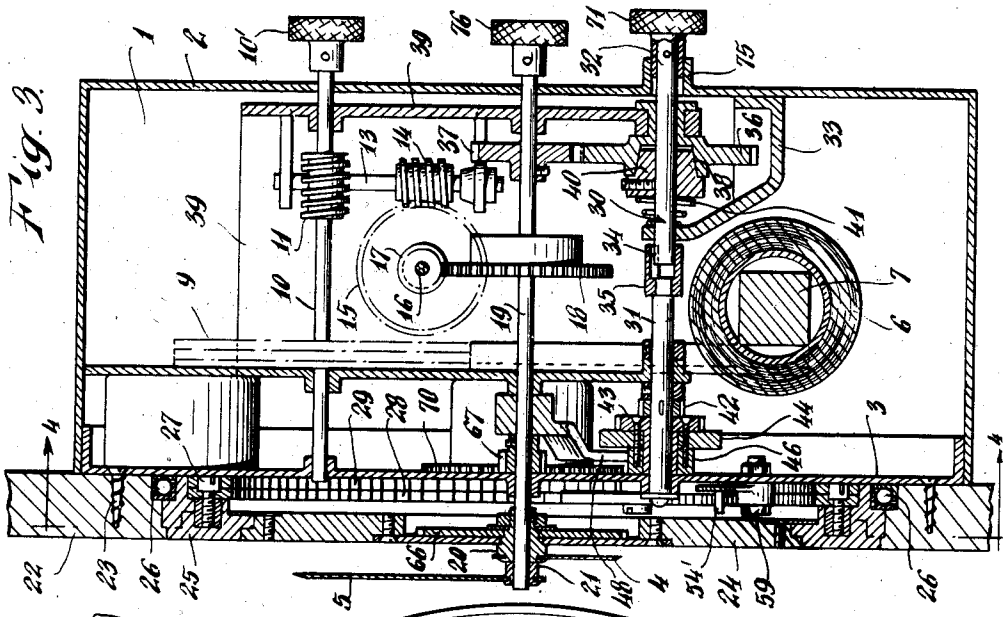
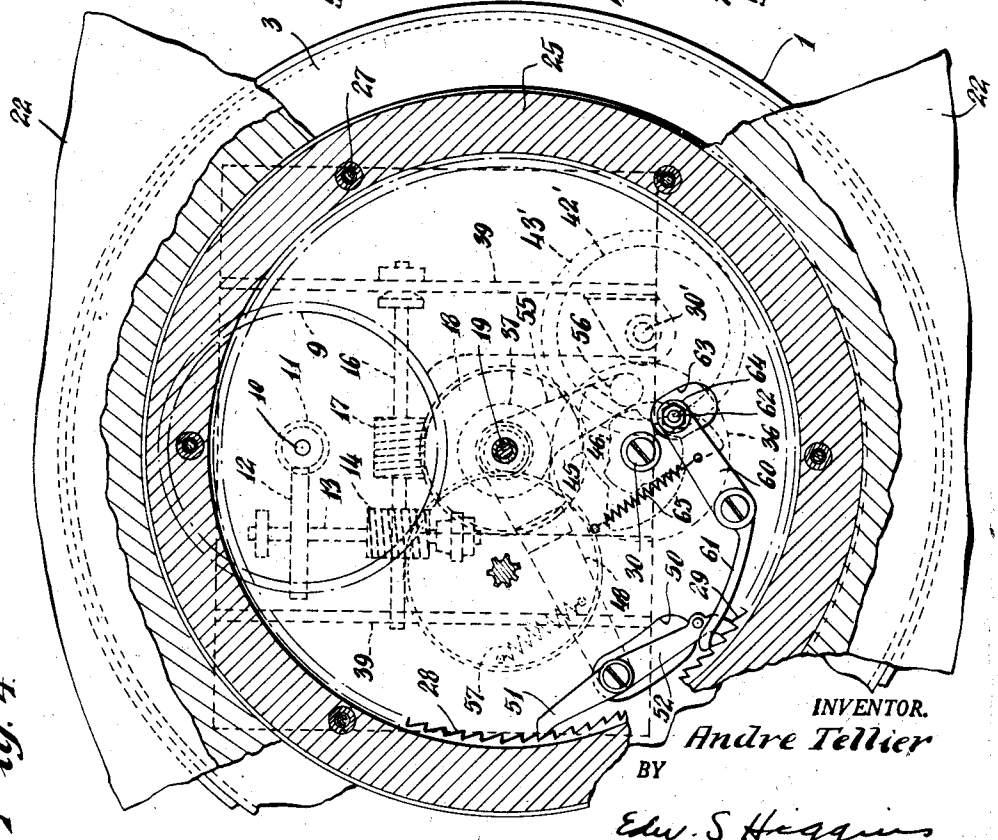


Fig. 4.

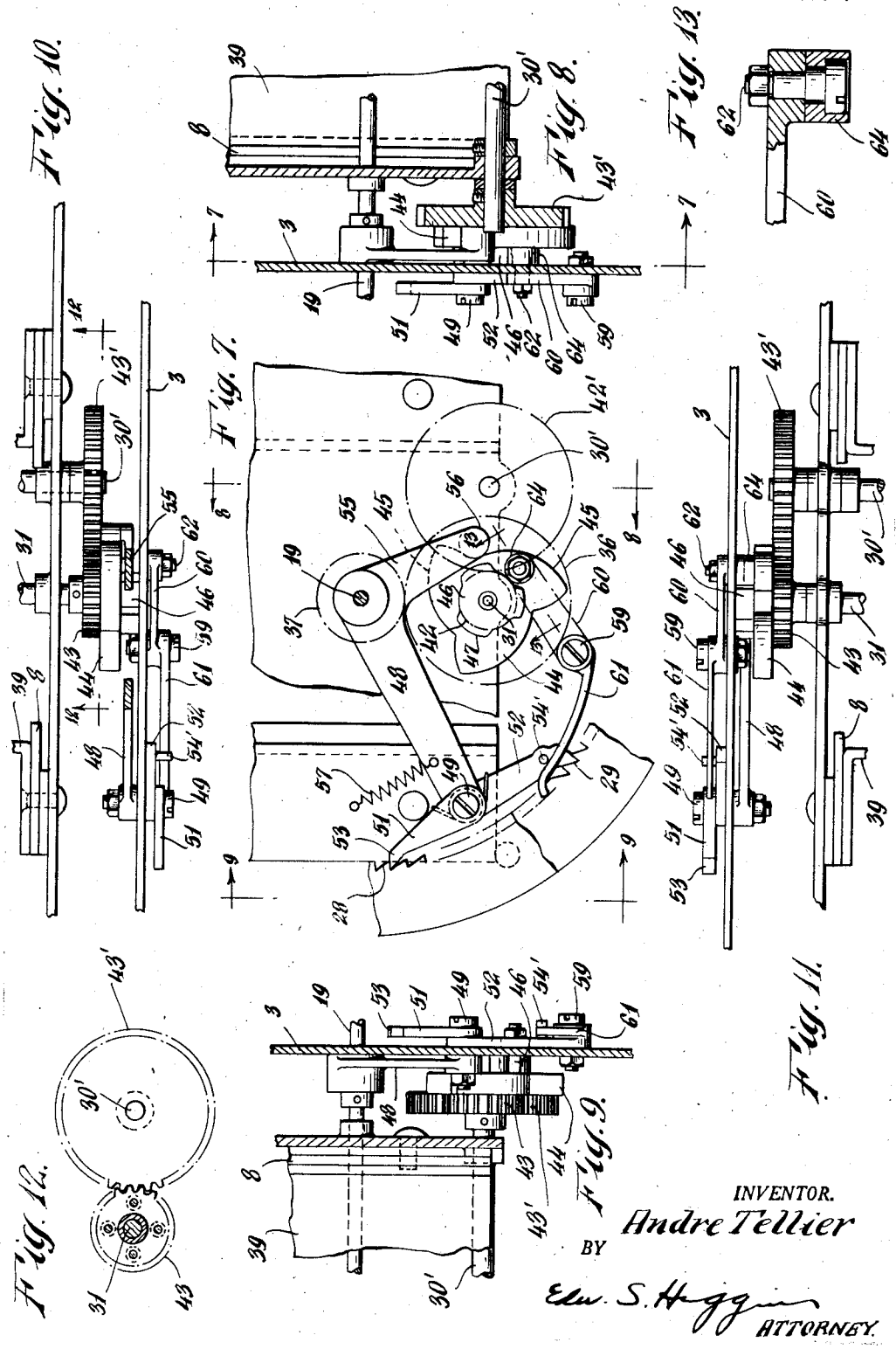


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WORLD CLOCK

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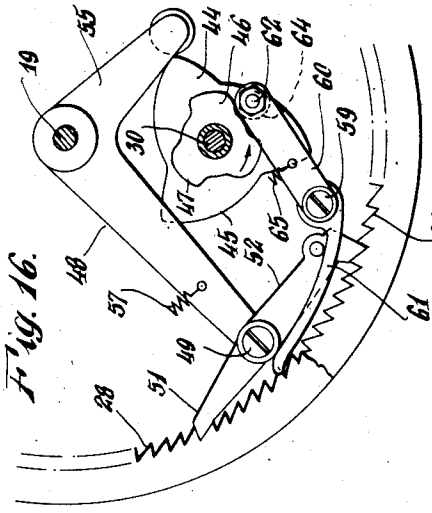


Fig. 16.

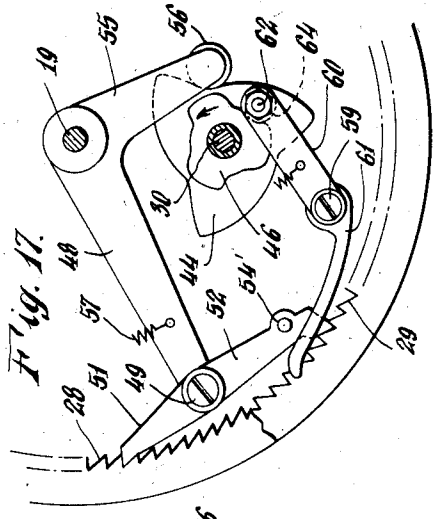


Fig. 17.

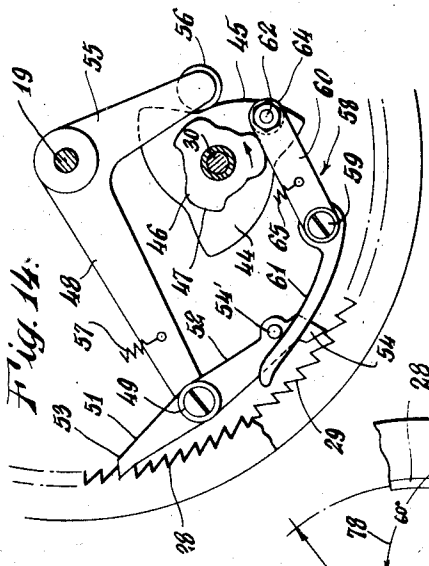


Fig. 14.

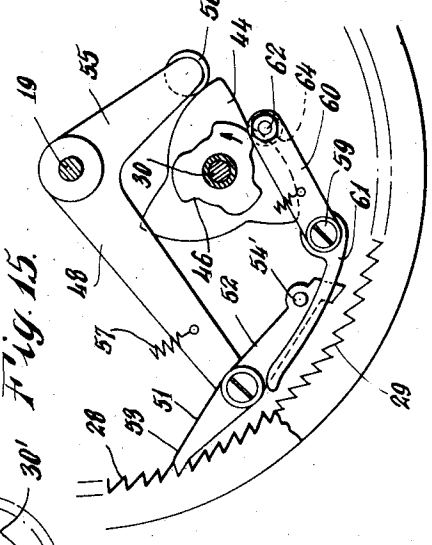


Fig. 15.

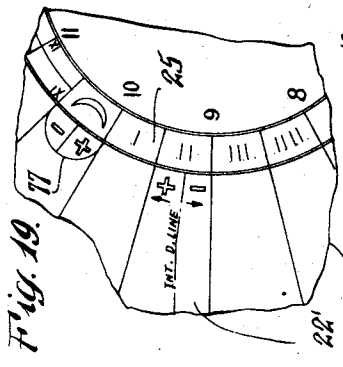


Fig. 19.

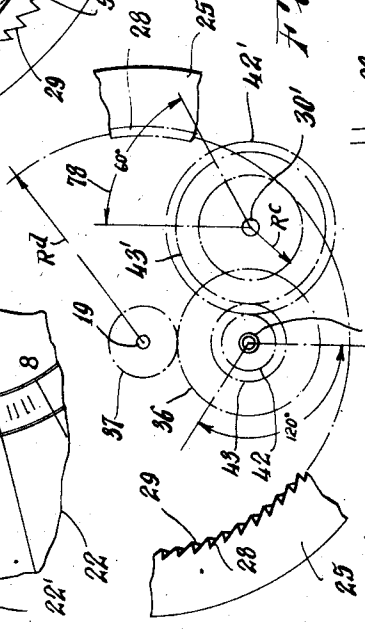


Fig. 18.

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UNITED STATES PATENT OFFICE

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WORLD CLOCK

Andre Tellier, New York, N. Y.

Application October 26, 1946, Serial No. 705,975

3 Claims. (Cl. 58—43)

1

This invention relates generally to clocks and more particularly to a clock which will serve not only for the purpose of telling local time but also to indicate the time at selective zones and cities throughout the world.

A primary object of the invention is to provide a clock which will indicate to the observer the time of day or night in any other zone or section of the world which corresponds to the prevailing local time.

A further object is to provide a clock of this kind that is simple in construction, inexpensive to manufacture and highly efficient in use.

Other objects and advantages of the present invention will be apparent from the description thereof to follow taken in connection with the accompanying drawings in which—

Fig. 1 is a front view of a clock embodying my invention.

Fig. 2 is a side view thereof, parts being broken away and parts being shown in section.

Fig. 3 is an enlarged vertical sectional view thereof.

Fig. 4 is a sectional view taken on the plane of the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on the plane of the line 5—5 of Fig. 6.

Fig. 6 is a bottom plan view of the parts shown in Fig. 5.

Fig. 7 is a fragmentary sectional view showing the bell crank lever and associated parts for moving the internal gear and taken on the plane of the line 7—7 of Fig. 8.

Fig. 8 is a sectional view taken on the plane of the line 8—8 of Fig. 7.

Fig. 9 is a sectional view taken on the plane of the line 9—9 of Fig. 7.

Fig. 10 is a top plan view of the parts shown in Fig. 7.

Fig. 11 is a bottom plan view thereof.

Fig. 12 is a sectional view taken on the plane of the line 12—12 of Fig. 10.

Fig. 13 is a sectional view taken on the plane of the line 13—13 of Fig. 7.

Figs. 14 to 17, inclusive, are enlarged detail views showing the bell crank lever and associated parts for moving the internal gear at various stages during a cycle of movement.

Fig. 18 is a diagrammatic view showing the directions of movement and ratios of various gears.

Fig. 19 is an enlarged fragmentary front view showing the ring member of the clock moved from its position of Fig. 1.

Referring to the drawings in detail, a casing 1 including a rear wall 2 and a front wall 3 supports and houses the clock mechanism for rotating the hour and minute hands 4 and 5, respectively. This mechanism is the conventional electric clock mechanism and forms no part of the present invention and only a part thereof is illustrated including a magnetic coil 6 which is connected to the motor (not shown). When the coil is energized, its core 7 transmits impulses to armature members 8 connected thereto which impulses are transmitted by said armature members to a laminated disc member 9 positioned between them whereby said disc member is rotated. Disc member 9 is fastened to a shaft 10 carrying a worm 11 which meshes with a gear 12 on a shaft 13 disposed at right angles to shaft 10. Shaft 13 carries a worm 14 which meshes with a gear 15 on a shaft 16 disposed at right angles to shaft 13. Shaft 16 carries a worm 17 meshing with a gear 18 fastened to a shaft or arbor 19 for driving the hour and minute hands. The hour hand 4 is fastened to a bushing or sleeve 20 loosely mounted on the arbor 19 adjacent its outer end, and minute hand 5 is secured to a bushing 21 fastened to the outer end of the arbor.

2

A disc member or plate 22 is secured to the exterior of the front wall 3 of the casing by screws 23. Suitably fastened to the outer surface of the front wall 3 is the clock face or dial 24. Interposed between the inner periphery of the outer disc and the clock face or dial is a ring member 25. This ring member rotates on a ball bearing device 26 secured to the front wall of the casing and to the ring member. The disc member, ring member and clock face are disposed in the same plane. The ring member 25 is divided into twenty-four sections 25′ representing the twenty-four hours of the day and this ring member moves only one-twenty-fourth as fast as the minute hand 5 of the clock dial.

The sections of the ring member are marked to indicate the hours of the day. The hour of midday or noon is marked with the representation of the sun as indicated at 25x and the hour of midnight is marked with the representation of the moon as indicated at 25″. Reading anticlockwise from noon as viewed in Fig. 1, the sections 25′ representing the hours of one o'clock p. m. to four o'clock p. m. inclusive are marked with the numerals "I," "II," "III," and "IIII," and the sections representing the hours from five o'clock p. m. to eleven o'clock p. m. inclusive are marked by the Roman numerals "V" to "XI" inclusive, midnight being represented by the representation of the moon. The sections representing the hours from twelve o'clock midnight

to four o'clock a. m. are marked with the numerals "I," "II," "III," and "IIII." The sections representing the hours from five o'clock a. m. to eleven o'clock a. m. are marked with the Roman numerals "V" to "XI" inclusive, said sections with the exception of the section representing the hour of ten o'clock a. m. and p. m. being divided into outer and inner sections by a line running across the center of said sections, with the Roman numerals appearing above and below the lines in reversed positions as seen in Fig. 1. The sections 25' representing the p. m. hours are also divided into outer and inner sections the same as a. m. The p. m. numerals are white on black background and the a. m. numerals are black on white background for night and day, respectively.

Disc member 22 is divided into twenty-four sections or segments 22' by radial lines 22x in line with the sections 25' and form continuations thereof. The segments bear the names or initials of the countries, principal cities and islands of the world located in the same time belt or zone, for example, "U. S. R. R.," "Archangel," Astrakhan," "Baku," "Batum" etc. The segments bear only a portion of such names as it is believed that this is sufficient for illustration purposes.

The mechanism for rotating the ring member 25 at the calculated speed includes an internal gear member disposed between the ring member 25 and the front wall 3 and is fastened by bolts 27. This gear member comprises an outer ring member with teeth 28 on its inner periphery and an inner ring member with teeth 29 on its inner periphery. A shaft 30 is journaled in the walls of the casing parallel to the arbor 19 and is divided into a front shaft section 31 rotatably mounted in the front wall 3 and a rear shaft section 32 slidably and rotatably mounted in the rear wall of the casing and in the wall of a bracket 33 secured to the rear wall. The inner end of shaft section 32 has a keyway coacting with a key 34 on a coupling member 35 fastened on front section 31 whereby the sections 31 and 32 are connected for rotation in unison. Loose on shaft section 32 is a gear 36 meshing with gear 37 on shaft 19. Gear 36 has a wedge-shaped socket portion 38 supported by a U-shaped plate or support 39 secured in the casing. Fastened to the shaft section 32 adjacent the gear 36 is a clutch member 40 shaped to conform to the shape of the socket portion and movable into and out of engagement with said socket portion whereby said gear 36 is made fast and loose respectively on said shaft section 32. A coil spring 41 urges the clutch member 40 into engagement with the socket portion 38. A pinion or gear 42 is fastened to the front shaft section 31 adjacent the front of said shaft section, and loosely mounted on said shaft section in front of the gear 42 is a gear 43 having an elongated hub portion extending toward the outer end of the shaft section. Fastened to the front face of the gear 43 is a large cam member 44 having three working faces 45, and in front of said cam member 44 is another smaller cam member 46 fastened to the larger cam member, said smaller cam member 46 having three working faces 47. The gear 43 and the cam members rotate in unison loosely around the shaft section 31 inside the casing.

Pivotally mounted on arbor 19 inside the casing is a bell crank lever, the long arm 48 of which carries a pivot pin 49 which extends outwardly through a slot 50 in the front wall 3 of the casing. On the outer end of the pin on the outside of the wall are opposed pivoted pawl members 51 and 52, the nose portion 53 of pawl member 51 engaging the teeth 28 of the outer ring member of the internal gear for moving said gear clockwise as viewed in Fig. 4, and the nose portion 54 of pawl member 52 engaging the teeth 29 of the inner ring member for holding the internal gear member against rotation. Nose portion 54 of pawl 52 carries a protruding pin 54'. On the outer end of the short arm 55 of the bell crank lever is a roller 56. A spring 57 having one end fixed to the front wall of the casing and its other end fixed to the long arm 48 of the lever urges the bell crank lever in a clockwise direction as viewed in Fig. 4.

Another lever member 58 is pivotally supported at its center on the outside of the casing by means of a pivot pin 59 mounted on the front wall 3. This lever comprises a wide flat arm 60 extending in the direction of the cam members and a narrower arm 61 extending in the opposite direction toward the pawl members. On the outer free end of arm 60 is a pin 62 extending inwardly through a slot 63 in the front wall of the casing into the inside of the casing and mounted on this pin inside of the wall is a roller 64 engaging the small cam member 46. Arm 61 engages the pin 54' on the nose 54 of the pawl member 52. A spring 65 has one end fixed to the front wall 3 and its other end fixed to the arm 60 of the lever 58 for urging said lever in a counterclockwise direction as viewed in Fig. 4.

Referring to Fig. 3, when the arbor 19 is rotated by the clock mechanism, its drive is carried to shaft 30 by means of the meshing gears 37 and 36. When shaft 30 rotates it carries the cam members 44 and 46 around with it in the direction of the arrow in Fig. 14. Small cam 46 will engage the roller 64 on arm 60 of lever member 58 and thereby rock said lever member clockwise on its pivot so that its arm 61 will lift the nose 54 of pawl member 52 up out of engagement with the teeth 29 of the inner ring member of the internal gear member, thus permitting the bell crank lever to be rotated. Cam member 44 following will engage the short arm 55 of the bell crank lever rocking said lever in a counterclockwise direction as viewed in Figs. 4 and 14 thereby dragging the nose portion 53 of pawl member 51 downwardly over the teeth 28 in a counter-clockwise direction as viewed in Figs. 4 and 14 from the position of Fig. 14 to the position of Fig. 16. When the working face 47 of the cam member 46 is moved away from the roller 64 on the short arm 55 of the bell crank lever, the spring 57 pulls the bell crank lever in a clockwise direction and the nose portion 53 of the pawl member 51 in engagement with the teeth 29 of the outer ring member rotates the internal gear member and attached ring member 25 clockwise to the position of Fig. 17. When the working face 47 of the small cam member 46 moves away from the roller 64 on the arm 60 of lever 58, the spring 65 pulls said lever 58 in a counter-clockwise direction moving the arm 61 away from the pin 54' permitting the nose portion 54 of the pawl member 52 to drop into engagement with the teeth 28 of the inner ring member to the position of Fig. 17 to prevent rotation of the internal gear member until the next working face of the cam member 46 engages the roller 64 again.

Referring particularly to Figs. 3 and 5, the drive is brought to the hour hand 4 by means of a gear 66 fastened to bushing 20 just inside the

clock face and fastened on the arbor 19 just inside the front wall 3 of the casing is another gear 67. Supported by the clock face and the front wall and extending parallel with arbor 19 is a stub shaft 68. The end of shaft 68 adjacent the clock face is formed with teeth 69 engaging the teeth of gear 66. The other end of the shaft 68 extends through the front wall 3 to the inside of the casing and supports a gear 70 which meshes with gear 67 on the arbor 19.

For adjusting the hands of the clock, shaft 30 is first disconnected from arbor 19 by sliding the shaft section 32 inwardly by means of a knob 71 on its outer end. This will move the clutch member 40 away from the socket portion 38 of the gear 36. The shaft section 32 is held in its inward unclutched position by means of a pin 72 on the sleeve portion 73 of the knob 71 engaging in a bayonet slot 74 formed in the hub portion 75 of the opening in the rear wall 2 through which the shaft extends as seen in Fig. 2. Arbor 19 is then rotated by means of a knob 76 on its outer end turning gear 67 which in turn rotates gear 70 and stub shaft 68 carrying teeth 69. Teeth 69 rotate gear 66 which rotates the bushing 20 supporting the hour hand 4 thereby turning the same for adjustment.

For adjusting the ring member 25 manually independently of the hands of the clock, shaft section 32 is moved inwardly to unclutch clutch member 40 from the socket 38 to disconnect shaft 30 from shaft 16. When in this unclutched condition, turning of shaft 30 will rotate the cam members thereby permitting the bell crank lever to rotate the ring member for necessary adjustment.

Shaft 10 may be turned manually for adjusting purposes by means of the knob 10' on its outer end.

To use the clock, the ring member 25 is adjusted to bring the section 25' thereof to the sector 22' on the disc member 22 of the country or city where the user is located. For example, if the local time is seven a. m. and the user is in Atlanta, the ring member is turned to bring the section "VII" to the section containing "Atlanta." When the ring is thus adjusted, one can tell the time difference between Atlanta and any other city for example "Paris." In Paris it is twelve o'clock noon as indicated by the symbol of the sun, in the section 25' in front of the section 22' containing Paris. There is therefore five hours difference. When the hour is up, the ring member 25 will move to "VIII" and so on.

A caret sign (<) alongside a name indicates that the time is the same throughout that country or city or island, and a dot sign alongside a name indicates that thirty minutes must be added in order to arrive at the correct time of said country, city or island. Where the difference is more or less than thirty minutes, the figures appearing before the name of the city or country must be added to the time indicated on the ring member 25, such as, fifty-three for Calcutta.

The novel features by means of which the extent of the zones throughout which each of the two days simultaneously in progress may be readily ascertained is disclosed in Figs. 1 and 19.

In the appropriate segment 22' on the outer disc 22 appears the international date line and adjacent said line to one side thereof (above the line as viewed in Fig. 19) is a plus (+) sign, and closely adjacent to and on the other side of said line is a minus (—) sign. Formed along the periphery of the rotatable ring member 25 is a tab

or extension piece 77. A center line divides this tab and on one side of this center line (to the right and above the line as viewed in Fig. 19) is a minus (—) sign and on the other side of the line is a plus (+) sign. The arrangement of the plus and minus signs is just the reverse of that on the outer disc.

Referring to Fig. 19, the plus sign indicates that it is one day of the week (for instance, Monday) in all of the territory extending from the international date line clockwise to the central dividing line on the tab 77 on the rotatable ring member; and the minus sign indicates that it is the preceding day of the week (for instance, Sunday) in all of the territory from the international date line in the direction of the minus sign, anticlockwise around to the central dividing line of the tab 77 in the direction of the minus sign on said tab.

Fig. 18 shows diagrammatically how the ring member 25 revolves suddenly one-twenty-fourth of the circumference once every hour on the hour. As shaft 19 makes 1 R. P. M. gear 37 on shaft 19 makes 1 R. P. M., said gear driving gear 36 on shaft 30. Gear 36 makes one-half R. P. M. since gears 37 and 36 are in 2:1 ratio respectively. Gear 42 on shaft 30 drives gear 42' on shaft 30' in a ratio of 3:1, respectively. This steps shaft 30' down to a ⅙ R. P. M. in regard to 1 R. P. M. of shaft 19.

Gear 43' fastened to one face of gear 42' now turns gear 43 which is loosely mounted on shaft 30 in a 1:2 ratio, respectively. During a travel of 60° of gear 43' as indicated at 78 a relative portion of 120° is taken upon gear 43. Fastened to gear 43 is cam 44, a travel of 120° of which forms one-third of a cycle of operation. Since gear 43 traveled 120° the cam 44 has made one-third of a cycle. The cycle of cam 44 operates crank arms 48 and 55. As one-third cycle of cam 44 is traversed, the roller 56 which rides on cam surface 45 has caused the crank arm 48 to rotate suddenly in an arcuate direction equal to exactly one-twenty-fourth of the distance around gear ring 25. Shafts 30' and 19 are so located in relation to one another that a theoretic ratio of 4:1 exists between radii R^e and R^d.

I claim:

1. A clock comprising hour and minute hands, a stationary dial plate positioned behind the hands and having a local time-indicating dial shown thereon, a rotatable ring member positioned around the outer periphery of said dial plate, a stationary disc member positioned around the outer periphery of said ring member, said ring member and said disc member having correlated and coindicative indicia displayed thereon indicating the time at various global zones and in coordinated and calculated proportionate time indications in relation to the time indicated on the local time-indicating dial of the clock and mechanism for rotating said ring member in calculated time speed with the arbor of the hour hand including an internal gear fastened to said ring member, a spring-pressed bell crank lever having a pawl engaging said internal gear, means for holding said bell crank lever against movement and camming means operatively connected to the arbor of the hour hand for releasing said holding means to permit said bell crank lever to move said internal gear.

2. A clock as defined in claim 1 wherein the holding means comprises a spring-pressed lever and wherein the camming devices are operatively

connected to the arbor for the hour hand and to the levers for releasing the holding lever and permitting actuation of the bell crank lever by its spring for moving the internal gear.

3. A clock comprising hour and minute hands, automatic mechanism for moving said hands, a stationary dial plate positioned behind said hands, and having a local time-indicating dial shown thereon, a rotatable ring member positioned around the outer periphery of said dial plate, an internal gear member fastened to the rear of said ring member, means of connection between said internal gear member and said arbor of the hour hand, a stationary disc member positioned around the outer periphery of said ring member, said ring member and disc member being correlated and having coindicative indicia displayed thereon indicating the time at various global zones and in coordinated and calculated proportionate time indications in relation to the time indicated on the local time-indicating dial of the clock, said

means of connection including a gear fixed on said arbor of the hour hand, a shaft parallel with the arbor of the hour hand and having a gear member loosely mounted thereon and in mesh with the gear on said arbor, a clutch member for fastening said latter gear on the shaft, a bell crank lever on said arbor in line with the internal gear member and a pawl member carried by said lever in engagement with the teeth of said internal gear member for moving the same.

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