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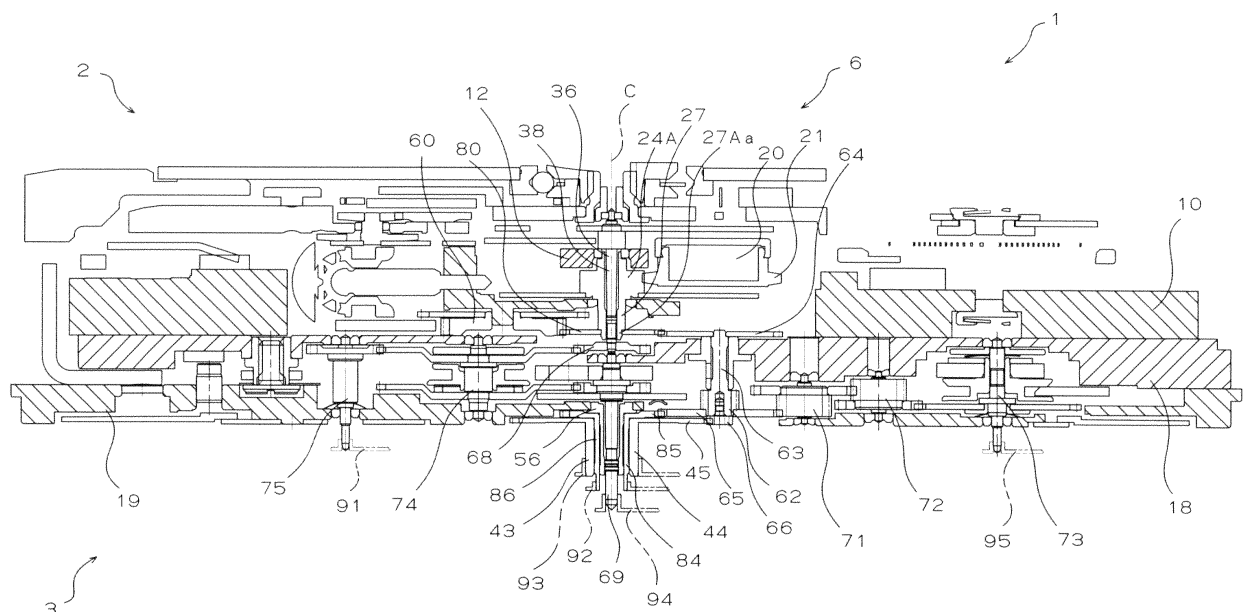
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Chiba-shi, Chiba (JP)(74) Representative: **Cloughley, Peter Andrew**
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London WC2N 2ES (GB)**(54) Timepiece movement main body and chronograph function attached thereto**

(57) A timepiece movement main body (6) constituting a base unit (2) of a chronograph function attached timepiece (1) includes a barrel complete (20), a center wheel and pinion (24A) rotated in accordance with rotation of the barrel complete, a third wheel and pinion rotated in accordance with rotation of the center wheel and pinion, a fourth wheel and pinion (36) coaxial with the center wheel and pinion (24A) and rotated in accordance

with rotation of the third wheel and pinion, and a minute transmission wheel (80) slippingly engaged with the center wheel and pinion (24A) on a dial side of a main plate (10) brought in mesh with minute wheels (60,62). The minute transmission wheel (80) is a wheel in a shape of a flat plate, engaged with the center wheel and pinion (24A) at an elastic engaging portion of a center thereof, and slipped when the elastic engaging portion achieves a predetermined or more torque.

FIG. 1**EP 2 085 834 A2**

Description

[0001] The present invention relates to a timepiece movement main body easy to be added with a chronograph function and a chronograph function attached timepiece including the timepiece movement main body.

[0002] It has been proposed to form a chronograph function attached timepiece by coupling a chronograph function portion to a movement main body by overlapping the chronograph function portion on a dial side of the timepiece movement main body having a normal hand moving function and a normal time setting function (for example, JP-A-5-215868 or JP-A-2004-294276). Particularly, JP-A-2004-294276 discloses a specific structure of a chronograph function attached timepiece in details.

[0003] In this way, a base unit 201 of a chronograph function attached timepiece 200 formed by combining a chronograph unit 202 with the base unit 201 comprising a timepiece movement main body is normally on a premise of a movement comprising a specific train wheel referred to as 'eta train wheel' (ETA (eta) is a corporation name and a registered trade mark) as is known from Fig. 7 through Fig. 9. The train wheel is referred to as E train wheel in the following. Further in details, the train wheel is as follows.

[0004] As shown by Fig. 7, the chronograph function attached timepiece 200 of a unit overlapping type of a background art includes the base unit 201 comprising the timepiece movement main body of a mode of E train wheel, and the chronograph unit 202 connected to the base unit 201 on a dial side of the base unit 201.

[0005] The base unit 201 of the chronograph function attached timepiece 200 of Fig. 7 utilizes a movement 204 of a timepiece 203 of E train wheel shown in Fig. 8 and Fig. 9.

[0006] The timepiece 203 of E train wheel is provided with a structure shown in sectional views of Fig. 8 and Fig. 9 and provided with function related or transmission paths as shown by block diagrams of Figs. 10C and 10D.

[0007] With regard to normal hand moving, as is known mainly from Fig. 8 and Fig. 10C, the movement 204 of E train wheel includes a barrel complete 220 supported by a main plate 210 and a barrel bridge 211, a center wheel and pinion 223 rotated by a pinion portion (second pinion) 222 by a barrel wheel 221 of the barrel complete 220, a third wheel and pinion 226 supported by the main plate 210 and the train wheel bridge 212 and rotated by a wheel portion (second wheel) 224 of the center wheel and pinion 223 at a pinion portion (third pinion) 225 disposed on a dial side of the main plate 210, a fourth wheel and pinion 230 including a stem 228 and rotated by a wheel portion (third wheel) 227 of the third wheel and pinion 226 at a pinion portion (fourth pinion) 229, a minute indicator 233 including a minute indicator main body 232 rotated by a wheel portion (minute wheel) 231 in a circular disk shape by a third pinion 225 and slippingly engaged with the minute wheel 231, a minute wheel 236 (Fig. 9) disposed on a dial side of the main plate 210 and rotated by a

wheel portion (minute wheel) 235 by a pinion portion 234 of the main body 232 of the minute indicator 233, and an hour wheel 239 disposed on a dial side of the main plate 210 and rotated by a wheel portion (hour wheel) 238 by a pinion portion (cannon pinion) 237 of the hour wheel 236.

[0008] In E train wheel, the fourth wheel and pinion 230, the minute indicator 233 and the hour wheel 239 are arranged along a center axis line C1. That is, in E train wheel, the center wheel and pinion 223 is arranged in a state of being shifted from a center axis line C1, and a second hand, a minute hand and an hour hand are attached to a front end portion of the fourth stem 228 disposed along the center axis line C1, a front end portion of a cylindrical portion 241 of the minute main body 232 arranged by way of a center pipe 240, and a front end portion of a cylindrical portion 242 of the hour wheel 239 fitted to the cylindrical portion 241 of the minute wheel main body 232. Further, a wheel portion (fourth wheel) 243 of the fourth wheel and pinion 230 is brought in mesh with a pinion portion 249 of an escape wheel and pinion 248 a speed of which is controlled by a balance with hairspring 246 supported by a balance bridge 244 and a pallet fork 247 supported by a pallet fork bridge 245 to control the speed.

[0009] Further, according to the timepiece 203 having E train wheel, in setting time, as is known from Fig. 9 and Fig. 10D, when a hand setting stem 250 drawn to a hand setting position is rotated, the minute wheel 236 is rotated by way of a clutch wheel 252 a position in an axial direction of which is rectified by a yoke 251 or the like, and a setting wheel 253 brought in mesh therewith, the minute wheel main body 232 and the hour wheel 239 brought in mesh with the minute wheel 236 are rotated to set the minute hand and the hour hand. Here, the minute wheel portion 231 in the shape of the circular disk of the minute indicator 233 is slippingly engaged with a base end portion 232a of the minute indicator main body 232, rotation of the third wheel and pinion 226 (Fig. 8) with which the wheel portion 231 of the minute indicator 233 is brought in mesh by the pinion portion 225 in a speed increasing direction is actually rectified by other speed increasing train wheel, and therefore, the minute wheel 231 is not rotated, the minute indicator main body 232 is rotated relatively while being slipped at the engaging portion 232a relative to the minute wheel 231 against a friction force. Notation 254 designates a winding pinion.

[0010] Here, in order to form the chronograph function attached timepiece 200 having the base unit 201 utilizing the movement 204 of the timepiece 203 shown in Fig. 8 and Fig. 9 as it is as much as possible, generally speaking, the base unit 201 may be formed by cutting by an imaginary line A in Fig. 8 and Fig. 9 (line of dividing the pinion portion 234 of the minute indicator main body 232 by a middle portion in a thickness direction), the chronograph unit 202 may be connected to the cut portion, further, a remaining portion cut by the imaginary line A may be brought to a dial side of the chronograph unit 202.

[0011] In details, as shown by Fig. 7 and Figs. 10A and 10B, the chronograph function attached timepiece 200 of the background art using E train wheel includes a first minute indicator 280 and a second minute indicator 284 in place of the minute indicator 233. Further, the chronograph function attached timepiece 200 includes a first minute wheel 260 and a second minute wheel 262 in place of the minute wheel 236. The first minute indicator 280 is constituted by the minute wheel 231, a first minute indicator main body 282 including a first minute pinion 281 actually the same as the base end portion 232a slippingly engaged with the minute wheel 231 and the minute pinion 234, and a position in an axis line direction is restricted by a minute indicator holder 283. The second minute indicator 284 is concentric with the first minute indicator 280 and is disposed on a dial side of the chronograph unit 202. The second minute indicator 284 includes a second minute pinion 285 and a cylindrical portion 286 of a shape similar to that of the cylindrical portion 241 by a shape actually similar to that of the minute pinion 234 and a portion on a dial side of the minute pinion 234 in the minute indicator 233. The second minute wheel 262 includes wheel portions 264, 265 concentrically mounted to a shaft 263 by the same diameter, connects a first and a second pinion 281, 285 by being brought in mesh with the first minute pinion 281 and the second minute pinion 285, and rotates the hour wheel 239 by way of the hour wheel 238 by a minute pinion 266 disposed on a dial side of the wheel portion 265.

[0012] Further, the fourth stem 228 is connected to a second indicator 275 by way of a second transmission wheel 268 and an intermediate second counter 274. On the other hand, the second minute wheel 262 rotates a minute counter 273 by way of first and second intermediate minute counters 271, 272 from the wheel portion 265. Further, a second counter 269 is arranged concentrically with the hour wheel 239 and the second minute indicator 284, and is rotated by way of the intermediate second counter 274 in operating the chronograph.

[0013] Here, as is known by comparing Fig. 7 with Fig. 8 and Fig. 9, according to the movement of E train wheel, by only cutting the minute indicator 233 and the minute wheel 236 by the middle portion in the thickness direction of the minute pinion 234 and the hour wheel 235, the base unit 201 for the chronograph function attached timepiece 200 can actually be formed. Further, in the chronograph function attached timepiece 200 of Fig. 7, notation 218 designates a chronograph main plate, and notation 219 designates a chronograph bridge.

[0014] In contrast thereto, in a case of a train wheel of a type which has been used for a long period of time as a basic structure of a movement of a mechanical wristwatch, a structure thereof differs from E train wheel, and therefore, a base unit capable of being overlappingly connected to a chronograph mechanism cannot be formed by the above-described cutting.

[0015] That is, the train wheel which has been used for a long period of time as the basic structure of the

movement of the mechanical wristwatch includes a barrel complete, a center wheel and pinion rotated in accordance with rotation of the barrel complete, a third wheel and pinion rotated in accordance with rotation of the second wheel and pinion, a fourth wheel and pinion coaxial with the center wheel and pinion and rotated in accordance with rotation of the third wheel and pinion, and a cannon pinion slippingly engaged with a cylindrical portion of the center wheel and pinion by being fitted around the cylindrical portion of the center wheel and pinion on a dial side of a main plate. Here, a wheel portion of the hour pinion is brought in mesh with the cannon pinion, and a minute pinion is brought in mesh with a wheel portion of an hour wheel fitted slidably rotatably around a cylindrical portion of the cannon pinion. Such a train wheel is referred to as 'main center three hands', and is referred to as H train wheel in the following specification.

[0016] The H train wheel is constituted such that a desired friction engagement or slip engagement is realized between the cylindrical portion of the cannon pinion and the cylindrical portion of the center wheel and pinion by partially crushing the cylindrical portion of the cannon pinion around the cylindrical portion of the center wheel and pinion, in normal hand moving state, the center wheel and pinion and the cannon pinion are integrally rotated, in setting time (setting hand), the cannon pinion is slippingly rotated relative to the center wheel and pinion.

[0017] Therefore, in order to realize the chronograph function attached timepiece realized by the E train wheel by the H train wheel, on one hand, it is indispensable to maintain the friction engagement between the cylindrical portion of the cannon pinion and the cylindrical portion of the center wheel and pinion, on the other hand, it is necessary to leave the friction engagement between the cylindrical portions at a base module on a case back side of a chronograph mechanism portion, and therefore, in a background art, it is conceived to be unable to realize such a chronograph function attached timepiece.

[0018] Further, even when a chronograph function attached timepiece is provided by changing a structure and an arrangement per se of the H train wheel, thereby, new design and fabrication are needed and it is difficult to avoid an increase in cost.

[0019] Under the situation, the inventors have found that when the structure of the H train wheel is compared with the E train wheel by going back to an essence thereof, contrary to a fixed idea of the background art, by only adding a minimum change, a base unit of a chronograph function attached timepiece actually using the H train wheel as it is can be formed, further, a chronograph function attached timepiece based on the H train wheel can easily be formed, further, even a chronograph mechanism portion can actually be used commonly to reach the invention.

[0020] The invention has been carried out in view of the above-described points and it is an object thereof to provide a timepiece movement main body constituting a base unit of a chronograph function attached timepiece

at minimum cost even in a train wheel of a type which has been conceived to be impossible or difficult in the background art, and provide a chronograph function attached timepiece using the same.

[0021] In order to achieve the above-described aspect, a timepiece movement main body of the invention includes a barrel complete, a center wheel and pinion rotated in accordance with rotation of the barrel complete, a third wheel and pinion rotated in accordance with rotation of the center wheel and pinion, a fourth wheel and pinion coaxial with the center wheel and pinion and rotated in accordance with rotation of the third wheel and pinion, and a minute transmission wheel slippingly engaged with the center wheel and pinion on a dial side of a main plate and coaxial with the center wheel and pinion and brought in mesh with a minute wheel.

[0022] The timepiece movement main body of the invention includes 'the barrel complete, the center wheel and pinion rotated in accordance with rotation of the barrel complete, the third wheel and pinion rotated in accordance with rotation of the center wheel and pinion, the fourth wheel and pinion coaxial with the center wheel and pinion and rotated in accordance with rotation of the third wheel and pinion, and the minute transmission wheel slippingly engaged with the center wheel and pinion on the dial side of the main plate and coaxial with the center wheel and pinion and brought in mesh with the minute wheel', and therefore, even in a movement based on so-to-speak main center three hands (hereinafter, as described above, referred to as 'H train wheel') realized when 'assumedly, it is assumed 'the center wheel and pinion includes a cylindrical portion, a minute pinion is slippingly engaged with the cylindrical portion of the center wheel and pinion at the cylindrical portion in place of the minute transmission wheel", by only substituting 'the minute transmission wheel slippingly engaged with the center wheel and pinion' for 'a cannon pinion slippingly engaged with the cylindrical portion of the center wheel and pinion', a base unit capable of connecting with a chronograph unit by overlapping can be constituted.

[0023] Further, although the base unit is based on the movement of the H train wheel, the base unit can be connected with the chronograph unit connected to the base unit based on the movement of the E train wheel actually as it is (by only selecting one having a fit size).

[0024] According to the timepiece movement main body of the invention, typically, the minute transmission wheel is a wheel in a shape of a flat plate, engaged with the second wheel and pinion at an elastic engaging portion at a center thereof and is constituted to slip when the elastic engaging portion receives a predetermined or more torque.

[0025] In this case, the base unit can be formed to be as thin as possible although the base unit is based on the movement of the H train wheel.

[0026] A chronograph function attached timepiece of the invention typically includes the timepiece movement main body as described above and a chronograph struc-

ture portion including a second minute wheel coaxially including two wheel portions and one pinion portion and brought in mesh with a minute transmission wheel by one of the wheel portions, a second minute indicator brought in mesh with another of the wheel portions of the second minute wheel and concentric with the minute transmission wheel attached with a minute hand at a cylindrical portion thereof, and an hour wheel portion coaxial with the second minute indicator, brought in mesh with a pinion portion of the second minute wheel and attached with an hour hand at a cylindrical portion thereof.

[0027] In this case, a modification of the movement main body of the H train wheel may be minimised, and therefore, the chronograph function attached timepiece including the base unit based on the movement of the H train wheel can be formed at minimum cost.

[0028] According to the chronograph function attached timepiece of the invention, typically, the chronograph structure portion includes a second transmission wheel and a second counting wheel coaxial with a stem of the fourth wheel and pinion.

[0029] In this case, the typical chronograph function attached timepiece in which a second counting hand is disposed at the center and the second hand is arranged at a location shifted from the center can be formed.

[0030] According to the chronograph function attached timepiece of the invention, typically, the chronograph structure portion is applicable to a timepiece movement main body (that is, a movement main body of a so-to-speak E train wheel) of other kind of a type of including a minute indicator slippingly engaged with a minute wheel brought in mesh with the third wheel and pinion as it is.

[0031] In this case, the chronograph unit can commonly be used, and therefore, cost of the chronograph unit can be restrained, as a result, cost of the chronograph function attached timepiece can be restrained to be minimum.

[0032] Embodiments of the present invention will now be described by way of further example only and with reference to the accompanying drawings, in which:

Fig. 1 is a sectional explanatory view of a chronograph function attached timepiece of a preferable embodiment of the invention including a timepiece movement main body of a preferable embodiment of the invention as a base unit and connected to a chronograph unit.

Fig. 2 is an enlarged plane explanatory view of a minute transmission wheel of the chronograph function attached timepiece of Fig. 1.

Fig. 3 is a plane explanatory view viewing the timepiece of Fig. 1 from a dial side.

Figs. 4A, 4B, 4C and 4D show related functions of the chronograph function attached timepiece of Fig. 1 and a timepiece of H train wheel of Fig. 5, Fig. 4A is a function related block diagram of normal hand moving operation of the timepiece of Fig. 1, Fig. 4B is a function related block diagram of a setting oper-

ation of the timepiece of Fig. 1, Fig. 4C is a function related block diagram of a normal hand moving operation of the timepiece of Fig. 5, Fig. 4D is a function related block diagram of a setting operation of the timepiece of Fig. 5.

Fig. 5 is a sectional explanatory view showing to center on a normal hand moving function portion of the timepiece including a movement of H train wheel constituting a basis of a base unit of the chronograph function attached timepiece of Fig. 1.

Fig. 6 is a sectional explanatory view showing to center on a setting function portion of the timepiece of Fig. 5.

Fig. 7 is a sectional explanatory view of a chronograph function attached timepiece of a background art including a timepiece movement main body of E train wheel as a base unit and connected with a chronograph unit.

Fig. 8 is a sectional explanatory view showing to center on a normal hand moving function portion of a timepiece including a movement of E train wheel constituting a basis of the base unit of the chronograph function attached timepiece of Fig. 7.

Fig. 9 is a sectional explanatory view showing to center on a hand setting function portion of the timepiece of Fig. 8.

Figs. 10A, 10B, 10C and 10D show related functions of the chronograph function attached timepiece of Fig. 7 and the timepiece of E train wheel of Fig. 8, Fig. 10A is a function related block diagram of a normal hand moving operation of the timepiece of Fig. 7, Fig. 10B is a function related block diagram of a hand setting operation of the timepiece of Fig. 7, Fig. 10C is a function related block diagram of a normal hand moving operation of the timepiece of Fig. 8, Fig. 10D is a function related block diagram of a hand setting operation of the timepiece of Fig. 8.

[0033] A preferable embodiment of the invention will be explained based on a preferable example shown in the attached drawings.

[Example]

[0034] A chronograph function attached timepiece 1 in which a movement of a mode of H train wheel is constituted by a base unit 2 and a chronograph unit 3 will be described with reference to Fig. 1, Fig. 3 and Figs. 4A and 4B.

[0035] However, before going to a detailed explanation with regard to the chronograph function attached timepiece 1, a brief explanation will be given of a timepiece 5 having a movement 4 of a mode of H train wheel constituting a basis of the base unit 2 of the timepiece 1 in reference to Fig. 5, Fig. 6 and Figs. 4C and 4D.

[0036] The movement 4 of the mode of the H train wheel of the timepiece 5 includes a barrel complete 20 supported by a main plate 10 and a first bridge 11, a

center wheel and pinion 24 rotated around a center axis line C by being brought in mesh with a barrel wheel 21 of the barrel complete 20 at a pinion portion (second pinion) 25, a third wheel and pinion 32 rotated by a wheel portion (center wheel) 26 of the center wheel and pinion 24 by a pinion portion (third pinion) 33, and a fourth wheel and pinion 36 coaxial with the center wheel and pinion 24 and rotated by a wheel portion (third wheel) 34 of the third wheel 32 at a pinion portion (fourth pinion) 37. On a dial side of the main plate 10, at a surrounding of a cylindrical portion 27 of the center wheel and pinion 24, a cannon pinion 30 integrally including a pinion portion 28 and a cylindrical portion 29 is frictionally engaged and fitted with the cylindrical portion 29. At the dial side of the main plate 10, further, a minute wheel 40 is brought in mesh with the pinion portion 28 of the cannon pinion 30 at a wheel portion (minute wheel) 41, and is brought in mesh with a wheel portion (hour wheel) 45 of an hour wheel 44 at a pinion portion (minute portion) 42. Notation 12 designates a second bridge.

[0037] In the H train wheel, the fourth wheel and pinion 36, the center wheel and pinion 24 and the hour wheel 44 are disposed around the center axis line C. That is, in the H train wheel, a second hand, a minute hand and an hour hand are attached to the front end portion of a stem (fourth stem) 38 of the fourth wheel and pinion 36 disposed along the center axis line C, a front end portion of the cylindrical portion 29 of the cannon pinion 30 is frictionally engaged with the cylindrical portion 27 of the center wheel and pinion 24 slidably rotatably fitted to the fourth stem 38, and a front end portion of a cylindrical portion 43 of the hour wheel 44 is slidably rotatably fitted to the cylindrical portion 29 of the cannon pinion 30. Further, a wheel portion (fourth wheel) 39 of the fourth wheel and pinion 36 is brought in mesh with a pinion portion 49 of an escape wheel and pinion 48 a speed of which is controlled by a balance with hairspring 46 supported by a balance bridge 13 and a pallet fork 47 supported by a pallet fork bridge 14.

[0038] Further, according to the timepiece 5 having the H train wheel, in setting time, as is known from Fig. 6 and Fig. 4D, when a hand setting stem 50 drawn to a hand setting position is rotated, the minute wheel 40 is rotated by way of a clutch wheel 52 a position in an axial direction of which is rectified by a yoke 51 or the like, the pinion portion 28 of the cannon pinion 30 brought in mesh with the minute wheel 40 and the wheel portion 45 of the hour wheel 44 are rotated, and the minute hand and the hour hand are set. Here, the cylindrical portion 29 of the cannon pinion 30 is frictionally engaged with the cylindrical portion 27 of the center wheel and pinion 24 to be able to slippingly rotate, the wheel portion (center wheel) 26 of the center wheel and pinion 24 is coupled with the third pinion 33 in a speed increasing direction to actually restrict rotation thereof, and therefore, the center wheel and pinion 24 is not rotated, the cannon pinion 30 is relatively rotated while being slipped from the center wheel and pinion 24 against a frictional force. That is, according

to the movement 4 of the mode of the H train wheel, a frictional engagement between the cylindrical portion 29 of the cannon pinion 30 and the cylindrical portion 27 of the center wheel and pinion 24 is apparently indispensable. Notation 54 designates a winding pinion.

[0039] Next, the chronograph function attached timepiece 1 constituted by the base unit 2 including a movement main body 6 of an H train wheel type constituted by partially changing the movement 4 based on the movement 4 of the mode of the H train wheel and the chronograph unit 3 by constituting a premise by the above-described situation will be explained in reference to Fig. 1, Fig. 3 and Figs. 4A and 4B. In the chronograph function attached timepiece 1 of Fig. 1, elements actually the same as elements of Fig. 5 and Fig. 6 are attached with the same notations. Further, with regard to constituent elements of the chronograph unit 3, when the constituent elements are actually the same as the constituent elements of the chronograph unit 202, basically, the constituent elements are designated by notations (numbers of order of 10 and numbers of order of 1 are the same numbers) excluding a number '2' of order of 100 from notations of the constituent elements of the chronograph unit 202. For example, reference numeral '275' in fig. 7 becomes reference numeral '75' in fig. 1. However, when the constituent elements are the same as elements shown in Fig. 5 and Fig. 6, there is also case of using notations used in Fig. 5 and Fig. 6 as they are.

[0040] As can be seen from Fig. 1 and Figs. 4A and 4B, the chronograph function attached timepiece 1 including the base unit 2 constituted by the movement main body 6 of the H train wheel type includes a center wheel and pinion or a kind of a minute indicator 24A modified in including a short cylindrical portion 27A in place of the center wheel and pinion 24 including the long cylindrical portion 27, and includes the minute transmission wheel 80 and the second minute indicator 84 in place of the cannon pinion 30. Further, the chronograph function attached timepiece 1 including the H train wheel type base unit 2 includes the first minute wheel 60 and the second minute wheel 62 in place of the minute wheel 40. The minute transmission wheel 80 is frictionally engaged or slippingly engaged with a small diameter portion 27Aa formed at a dial side end portion of the short cylindrical portion 27A of the modified center wheel and pinion 24A. As shown by, for example, Fig. 2, the minute transmission wheel 80 typically includes an elastic engaging portion 80a in a mode of a spring at an inner peripheral edge thereof and is frictionally engaged or slippingly engaged with the small diameter portion 27Aa of the modified center wheel and pinion 24A at a front end portion 80b of the elastic engaging portion 80a. The elastic engaging portion 80a may be a both end supporting spring in place of a cantilever spring. Therefore, when a torque is applied to the pinion portion 25 of the modified center wheel and pinion 24A from the barrel wheel 21, the minute transmission wheel 80 is rotated integrally with the modified center wheel and pinion 24A, and when a torque is ap-

plied from the first minute wheel 60 to the minute transmission wheel 80, the minute transmission wheel 80 is rotated to slip relative to the modified center wheel and pinion 24A connected to the speed increasing side.

[0041] The second minute indicator 84 is concentric with the minute transmission wheel 80 and is disposed on the dial side of the chronograph unit 3. The second minute indicator 84 is constituted by a shape substantially similar to that of the pinion portion 28 of the cannon pinion 30 of the timepiece 5 of Fig. 5 and Fig. 6 and that of the cylindrical portion 29 on the dial side of the pinion portion 28.

[0042] Further in details, the second minute indicator 84 is constituted by a structure and a shape rather substantially the same as those of the second minute indicator 284 of the chronograph unit 202 of the timepiece 200 shown in Fig. 7, and includes the second minute pinion 85 in correspondence with the pinion portion 28, and the cylindrical portion 86 in correspondence with the cylindrical portion 29 and constituted by the shape the same as that of the cylindrical portion 286. The cylindrical portion 86 is fitted slidably rotatably around the center pipe 56 of a structure and a shape the same as those of the center pipe 256 of the timepiece 200 of Fig. 7.

[0043] The second minute wheel 62 is constituted by a structure and a shape substantially the same as those of the second minute wheel 262 of the chronograph unit 202 of the timepiece 200 of Fig. 7, includes the wheel portions 64, 65 having the same diameter and concentrically mounted to the shaft 63, connects the two wheel portions 80, 85 by being brought in mesh with the minute transmission wheel 80 and the second minute pinion 85 and rotates the hour wheel and pinion 44 by way of the hour wheel 45 at the minute pinion 66 disposed on the dial side of the wheel portion 65. Here, the hour wheel 44 is provided with a structure and a shape similar to those of the hour wheel 239 of the chronograph unit 202 of the timepiece 200 of Fig. 7.

[0044] The fourth stem 38 is connected to the second indicator 75 by way of the second transmission wheel 68 and the intermediate second counter 74 similar to the case of the fourth stem 228 of the timepiece 200 of Fig. 7. On the other hand, the second minute wheel 62 rotates the minute counting wheel 73 from the wheel portion 65 by way of the first and second intermediate minute counting wheels 71, 72 similar to the case of the second minute wheel 262 of the chronograph unit 202 of the timepiece 200. Further, similar to the case of the chronograph unit 202 of the timepiece 200, the second counting wheel 69 is arranged concentrically with the hour wheel 44 and the second minute indicator 84 and is rotated by way of the intermediate second counter 74 when the chronograph works.

[0045] Thereby, as shown by Fig. 3, there is provided the chronograph timepiece 1 including a second hand 91, a minute hand 92, an hour hand 93, a chronograph second hand 94, a chronograph minute hand 95, and a chronograph hour hand 96. Further, in Fig. 1, notation

18 designates a chronograph main plate, notation 19 designates a chronograph bridge.

[0046] Here, the chronograph unit 3 of the chronograph function attached timepiece 1 in which the base unit 2 is based on the movement of the H train wheel is provided with a structure and a shape substantially the same as those of the chronograph unit 202 of the chronograph function attached timepiece 200 in which the base unit 201 is based on the movement of the E train wheel. However, diameters and distances from centers of respective wheels depend on diameters and distances from centers of corresponding parts of the base units 2, 201, and therefore, these are excluded. When these are the same, the chronograph unit 3 of the chronograph function attached timepiece 1 in which the base unit 2 is based on the movement of the H train wheel can be quite the same as the chronograph unit 202 of the chronograph function attached timepiece 200 in which the base unit 201 is based on the movement of the E train wheel.

[0047] The chronograph function attached timepiece 1 can be formed as a whole by being connected with the chronograph unit 3 of the structure and the shape of the embodiments the same as those of the chronograph unit 202 connected to the base unit 201 based on the movement of the E train wheel although the base unit is the base unit 2 including the movement main body 6 based on the movement of the H train wheel, because in the base unit 2, the center wheel and pinion 24 and the cannon pinion 30 of the timepiece 5 of the H train wheel are constituted by the modified center wheel and pinion 24A and the minute transmission wheel 80, and the second minute indicator 84, particularly, the minute transmission wheel 80 slippingly engaged with the modified center wheel and pinion 24A is constituted by a thin wheel in a shape of a circular plate. Here, the second minute indicator 84 is to be integrated to the chronograph unit 3, and is substantially the same as the second minute indicator 284 integrated to the chronograph unit 202 in the case of the E train wheel.

[0048] The chronograph function attached timepiece 1 constituted as described above can enlarge a range of utilizing the movement of the H train wheel in being able to be simply coupled to the chronograph mechanism similar to the movement of the E train wheel also in the case of the movement of the H train wheel by being slightly modified as described above. Further, according to the chronograph function attached timepiece 1, when the above-described modification is carried out, the possibility of utilizing the chronograph unit can considerably be enlarged in that the same chronograph train wheel can commonly be used actually as it is even by the base unit based on the E train wheel or the base unit based on the H train wheel so far as the size stays the same.

[0049] The foregoing description has been given by way of example only and it will be appreciated by a person skilled in the art that modifications can be made without departing from the scope of the present invention.

Claims

1. A timepiece movement main body including:

- 5 a barrel complete (10);
- a center wheel and pinion (24A) rotated in accordance with rotation of the barrel complete;
- a third wheel and pinion (32) rotated in accordance with rotation of the center wheel and pinion;
- 10 a fourth wheel and pinion (36) coaxial with the center wheel and pinion and rotated in accordance with rotation of the third wheel and pinion; and
- 15 a minute transmission wheel (80) slippingly engaged with the center wheel and pinion (24A) on a dial side of a main plate and coaxial with the center wheel and pinion and brought in mesh with a minute wheel (62).

- 20 2. A timepiece movement main body, wherein a minute transmission wheel (80) is a wheel in a shape of a flat plate, engaged with a center wheel and pinion (24A) at an elastic engaging portion (80a) at a center thereof, and constituted to slip when the elastic engaging portion receives a predetermined or more torque.

3. A chronograph function attached timepiece including:

- 30 the timepiece movement main body according to Claim 1 or 2; and
- a chronograph structure portion including a second minute wheel (62) coaxially including two wheel portions (64, 65) and one pinion portion and brought in mesh with the minute transmission wheel (80) by one of the wheel portions (64), a second minute indicator (84) brought in mesh with the other of the wheel portions (65)
- 35 of the second minute wheel (62) and attached with a minute hand (92) at a cylindrical portion thereof and concentric with the minute transmission wheel (80), and an hour wheel (44) portion coaxial with the second minute indicator (84), brought in mesh with a pinion portion of the second minute wheel and attached with an hour hand (93) at a cylindrical portion thereof.

- 40 4. A chronograph function attached timepiece according to Claim 3, wherein the chronograph structure portion further includes a second transmission wheel (68) and a second counting wheel (74) coaxial with a stem of a fourth wheel and pinion (36).

- 45 5. A chronograph function attached timepiece according to Claim 3 or 4, wherein the chronograph structure portion is applicable to a timepiece movement main body of other kind of a type of including a minute

indicator slippingly engaged with a minute wheel brought in mesh with the third wheel and pinion as it is.

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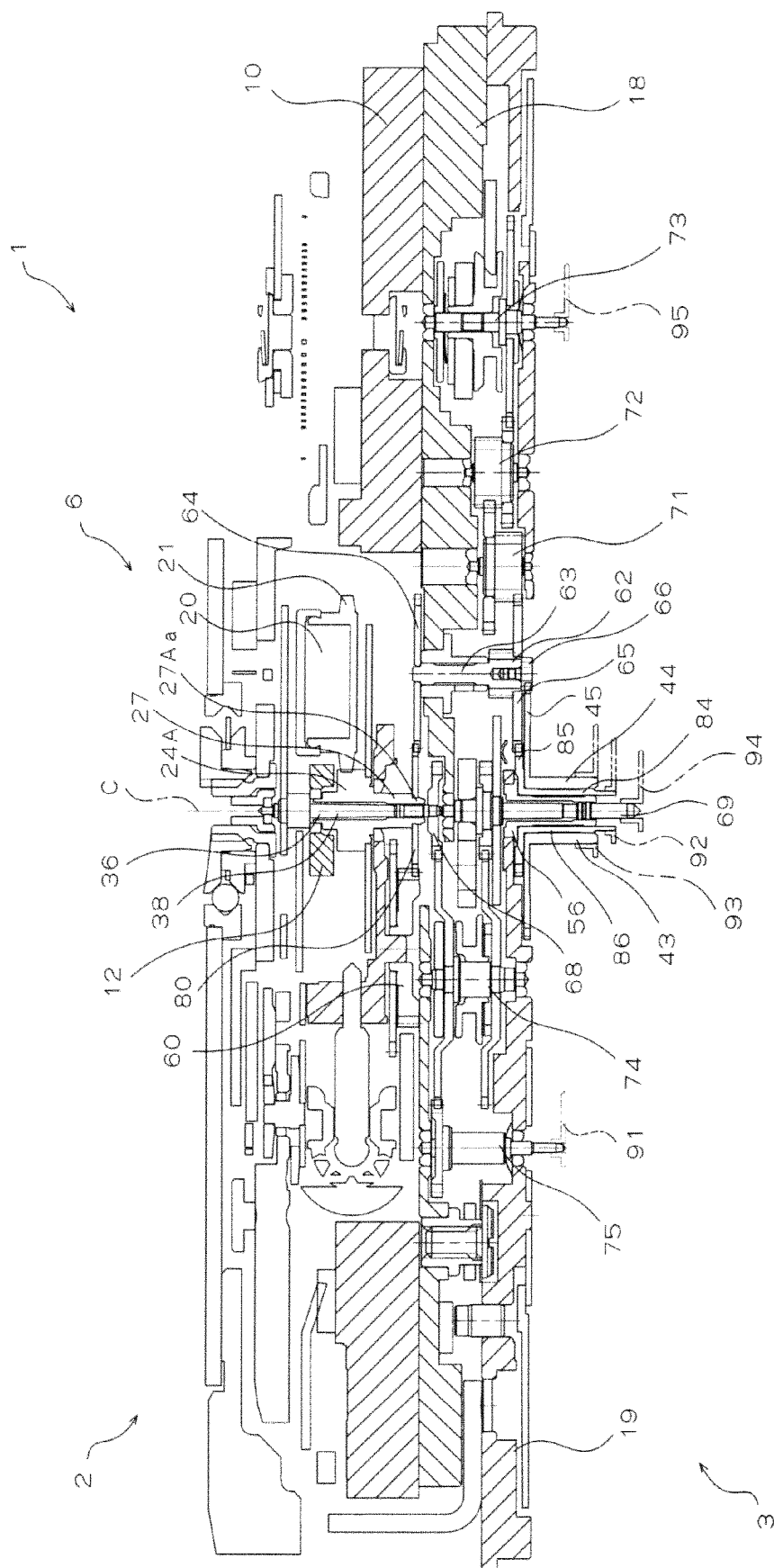
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FIG. 1



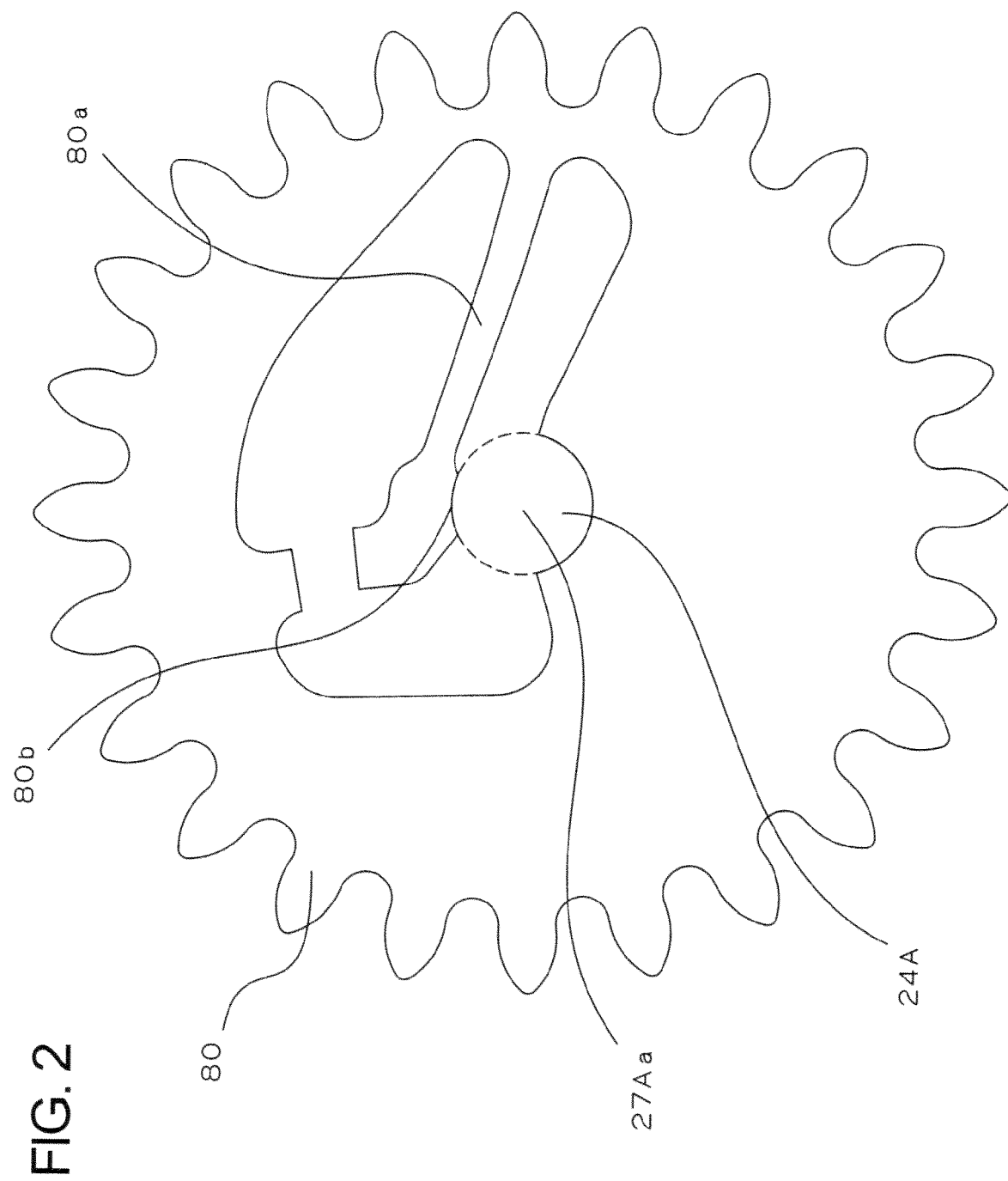
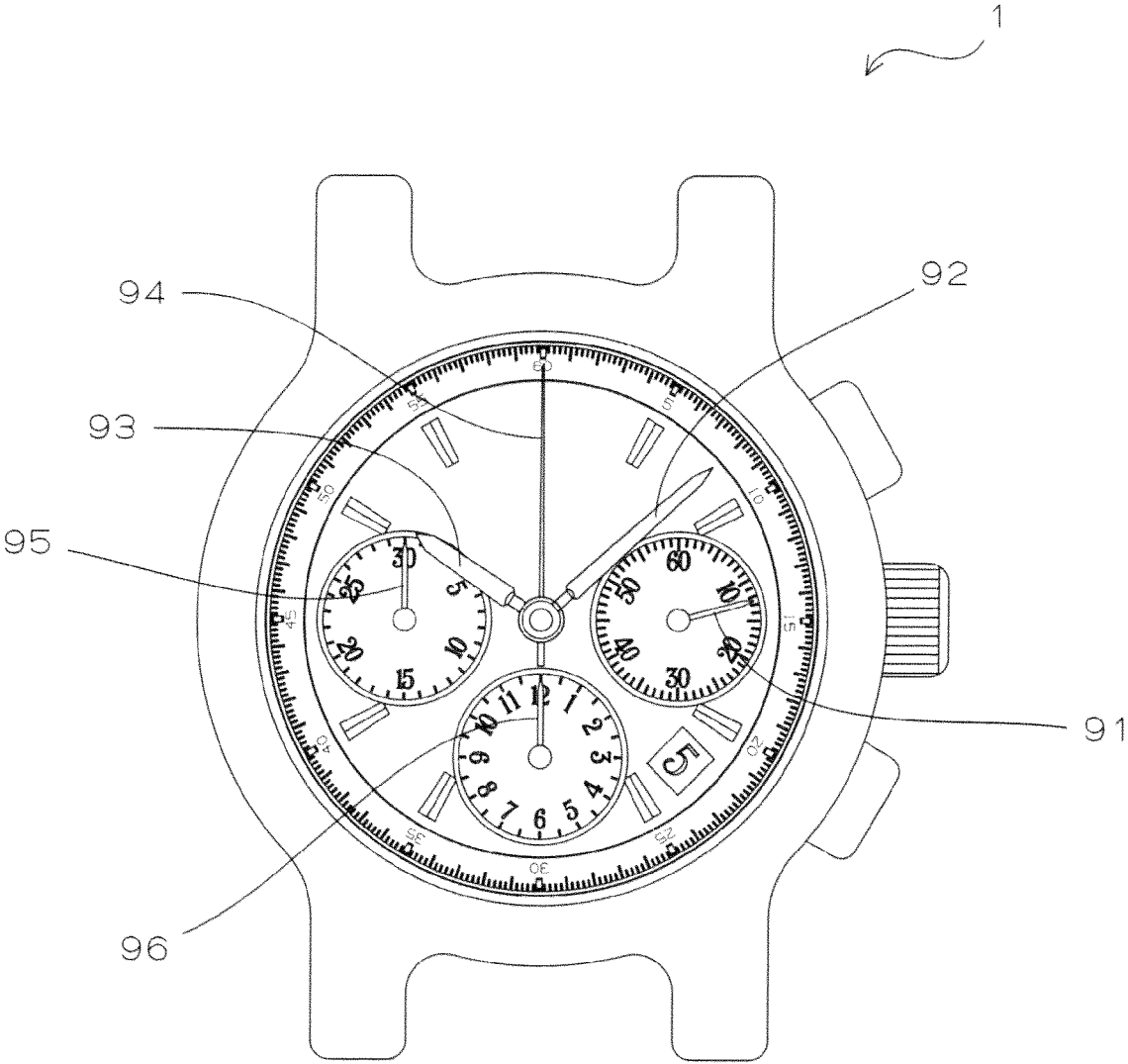


FIG. 3



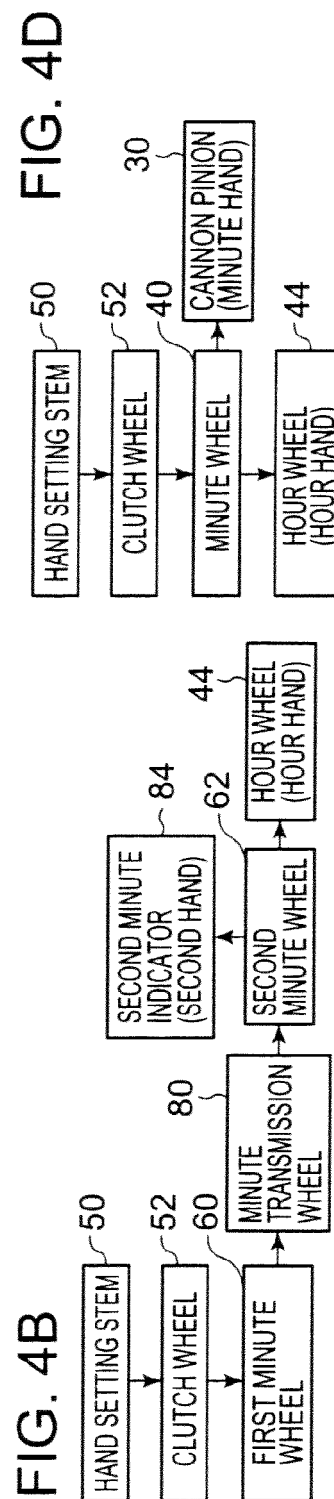
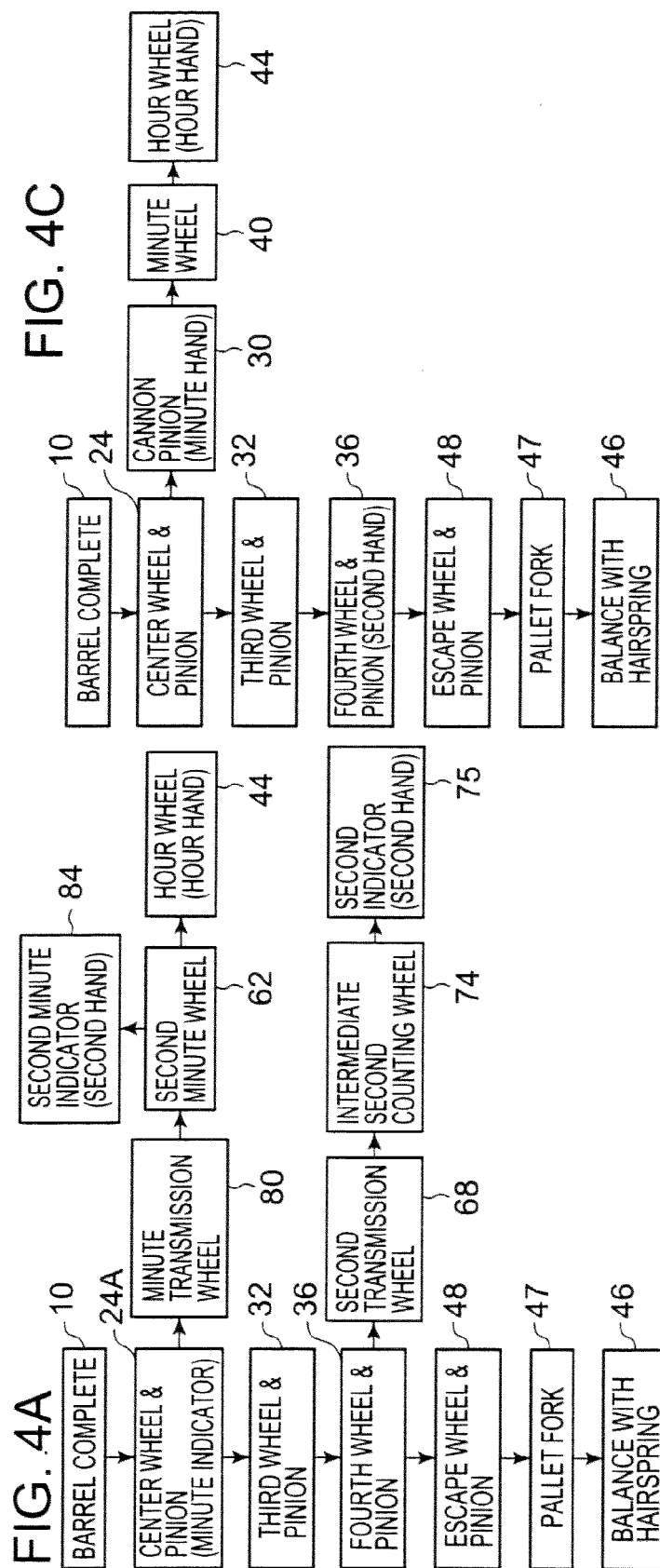


FIG. 5

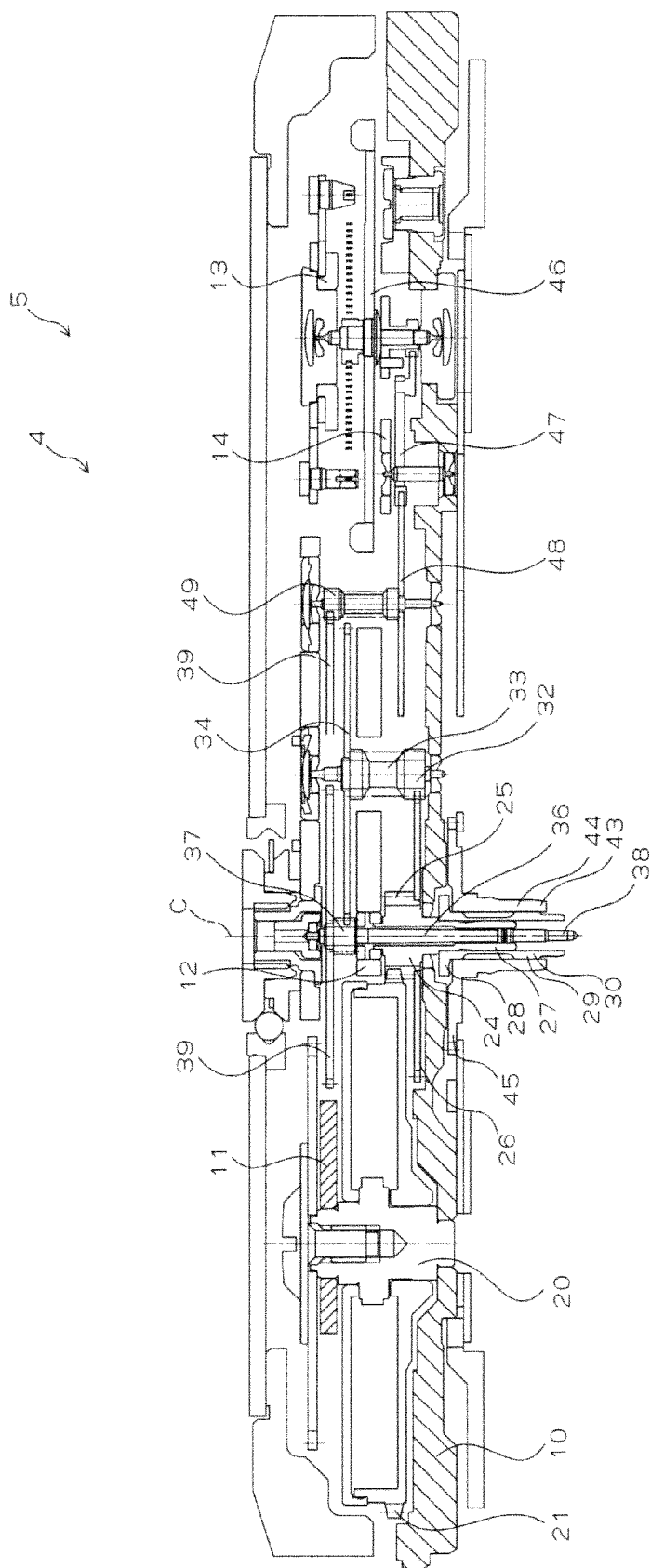


FIG. 6

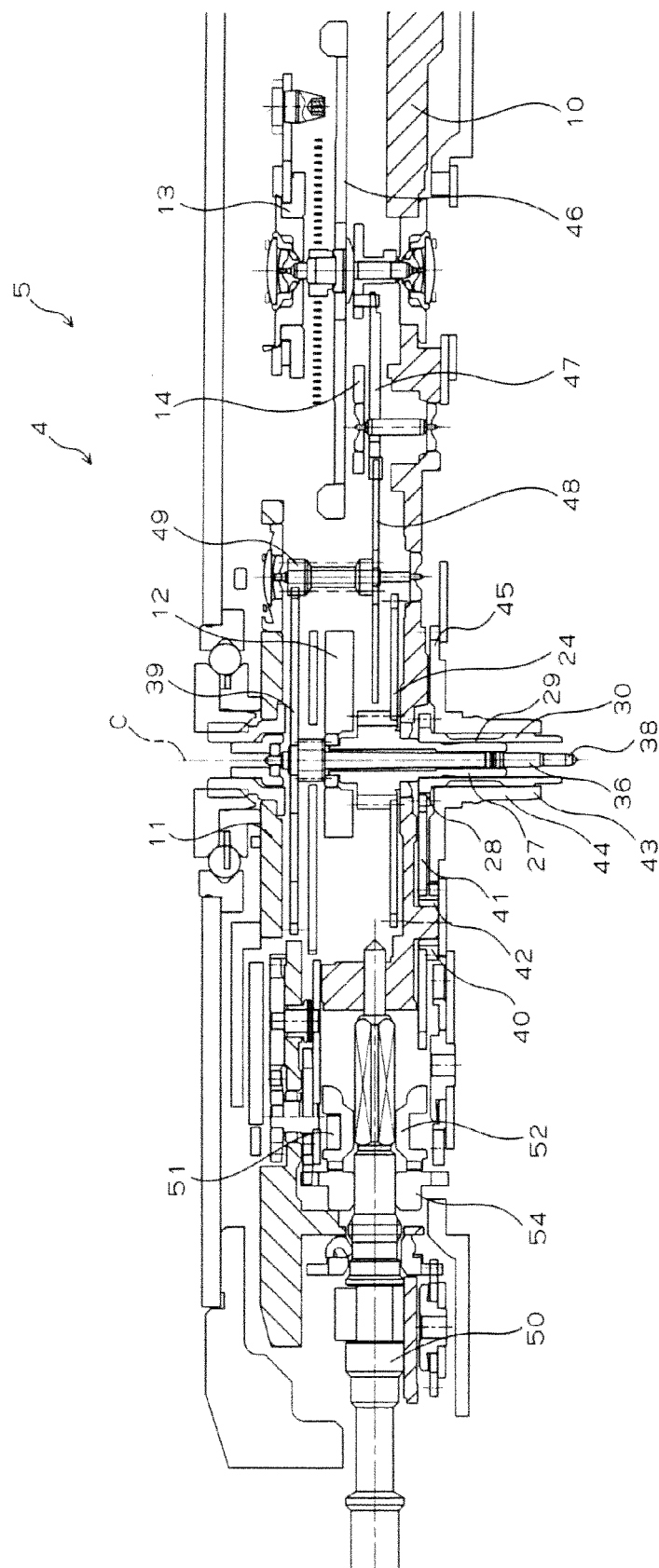


FIG. 7

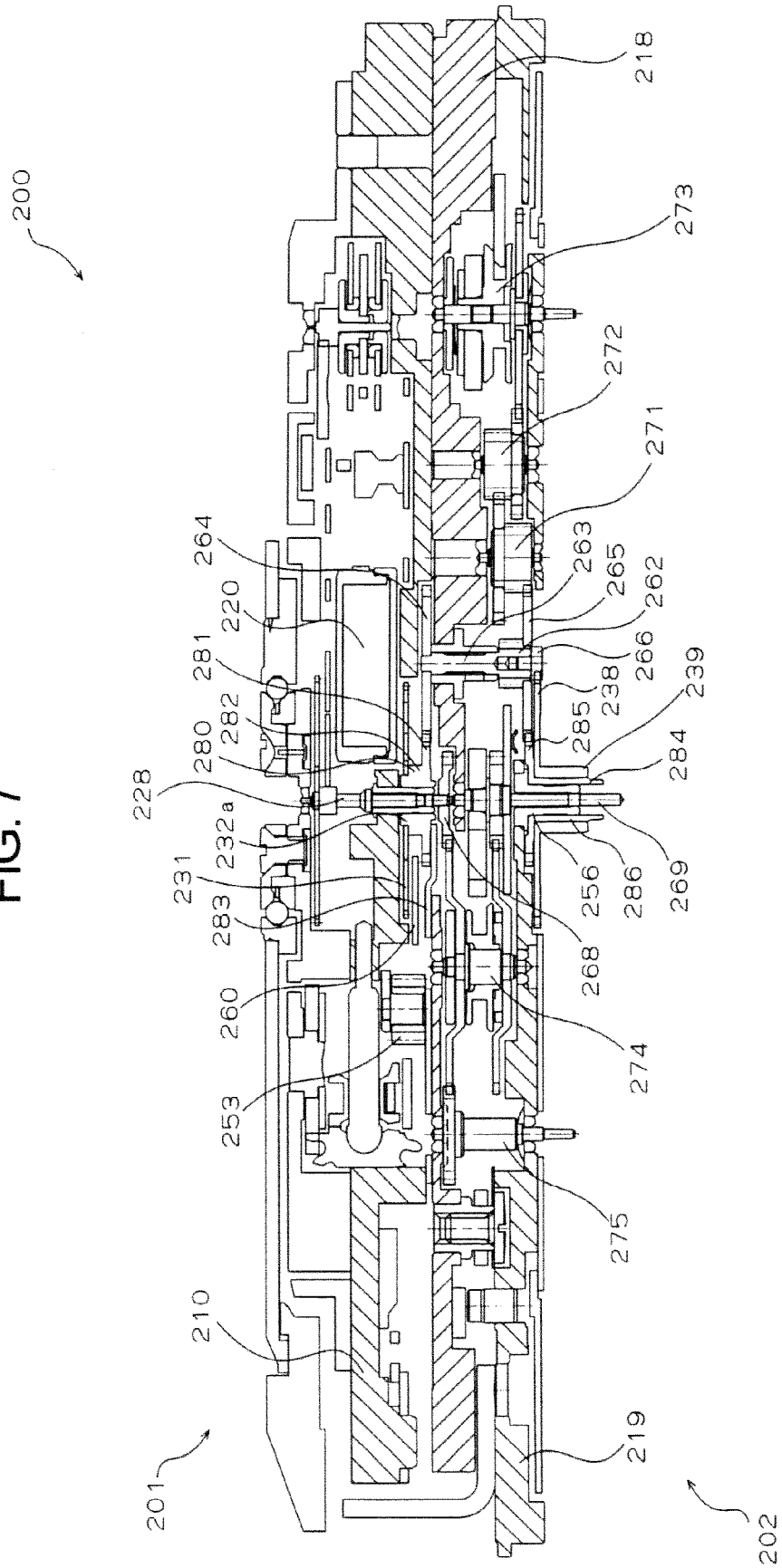


FIG. 8

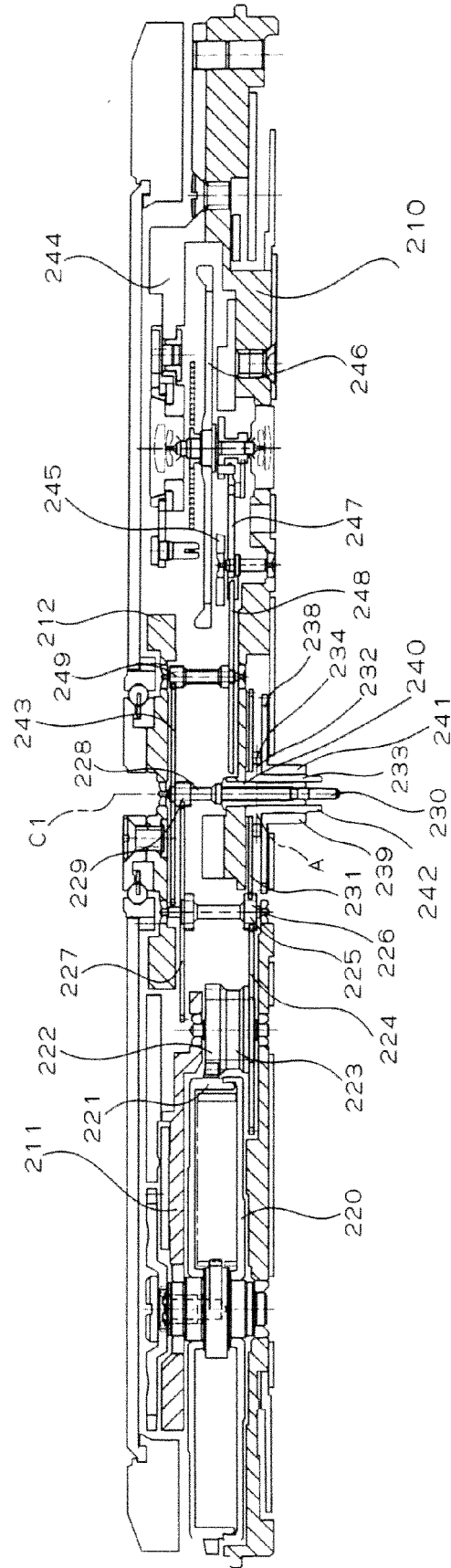
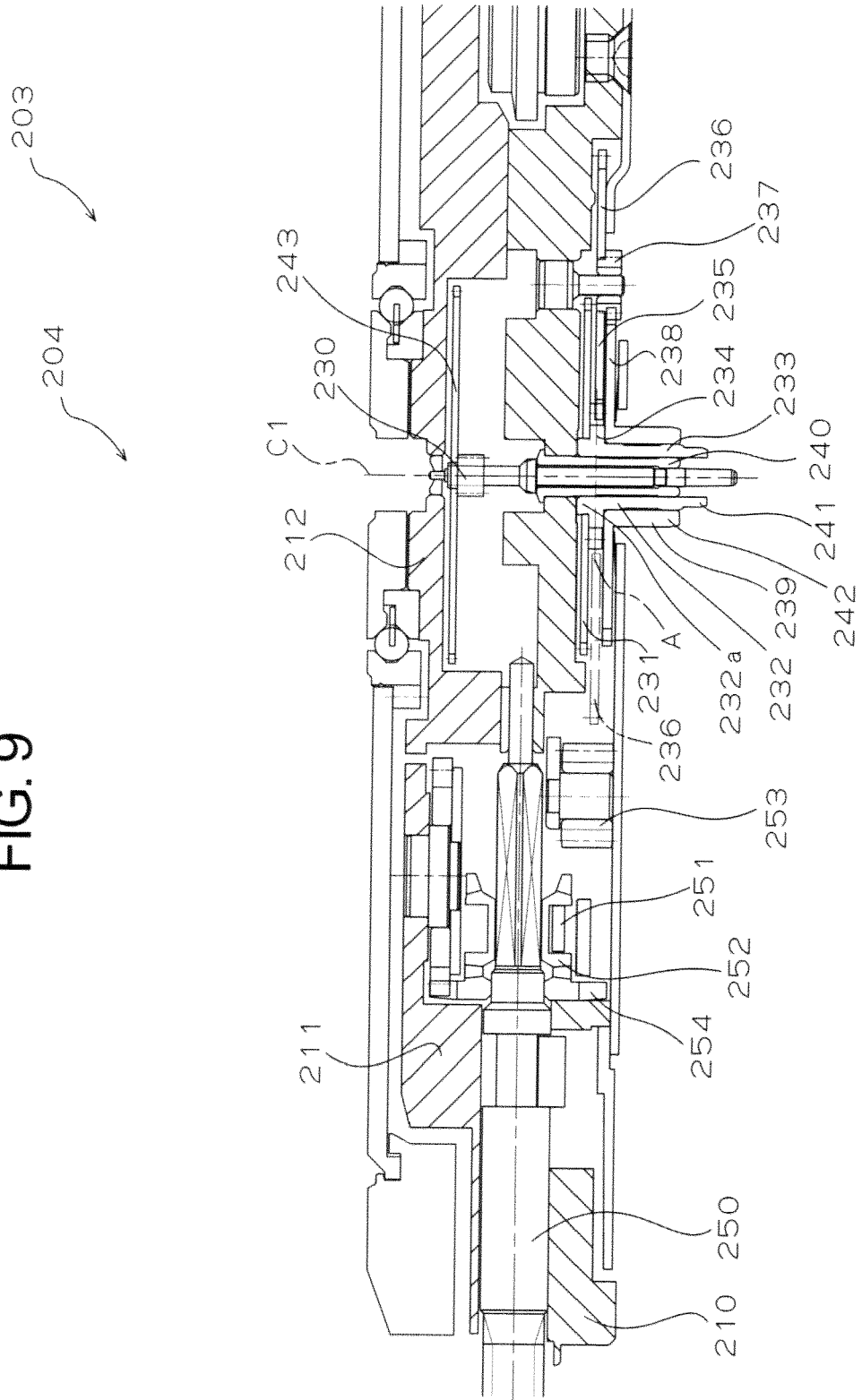


FIG. 9



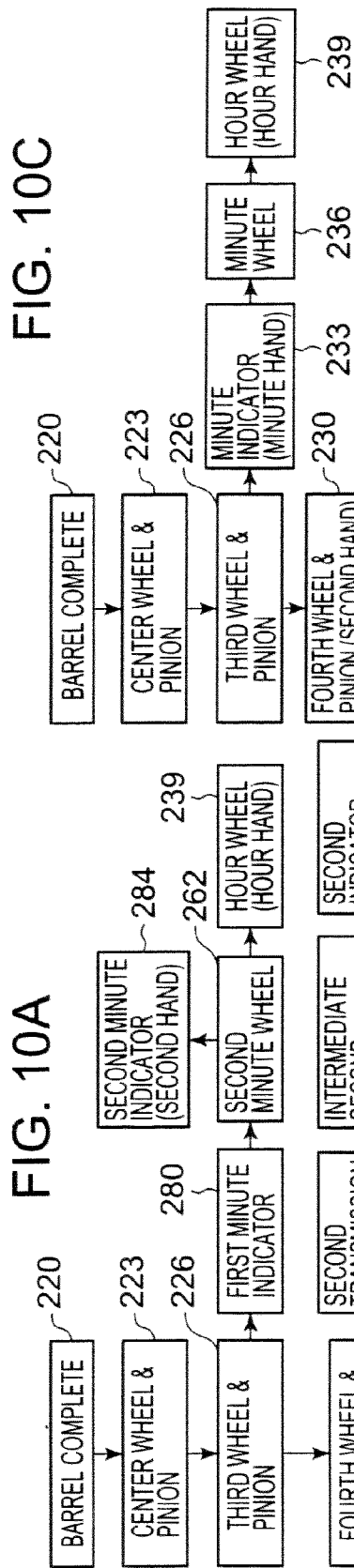


FIG. 10C

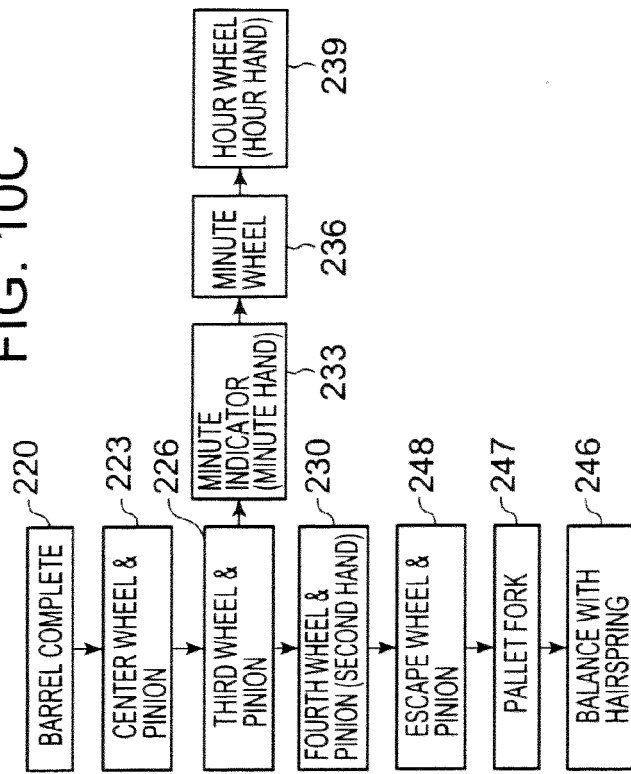


FIG. 10D

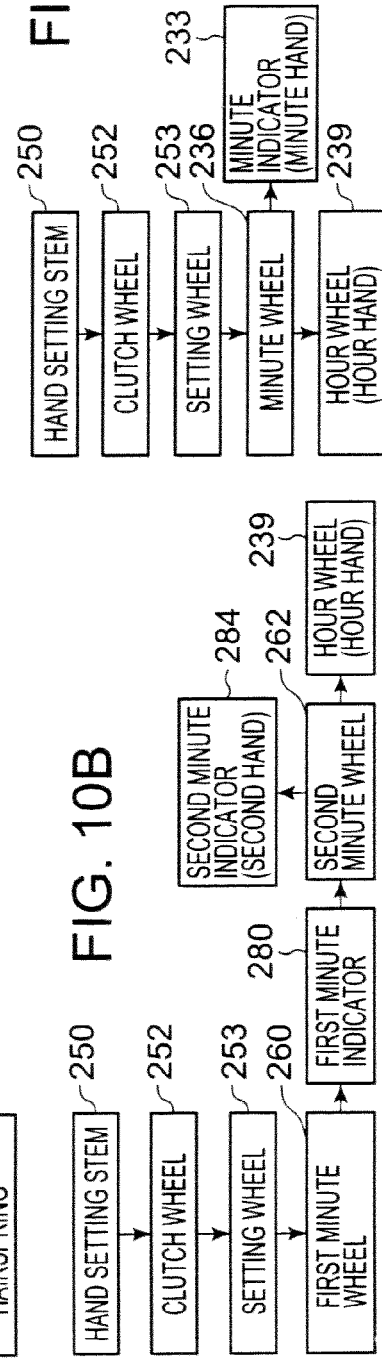
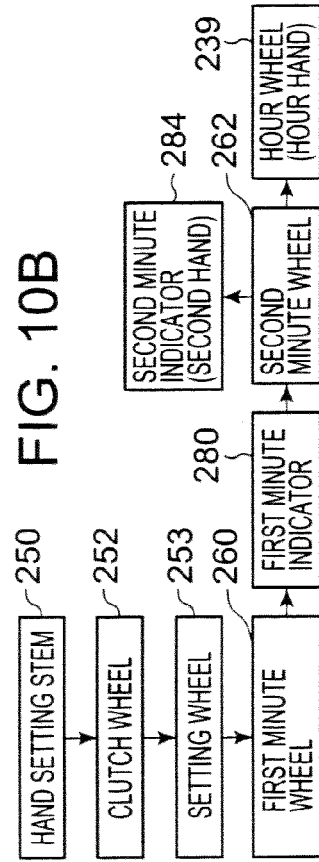


FIG. 10B



REFERENCES CITED IN THE DESCRIPTION

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