Aug. 28, 1962 M. I. GLASS ET AL 3,050,900

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Fig. 1

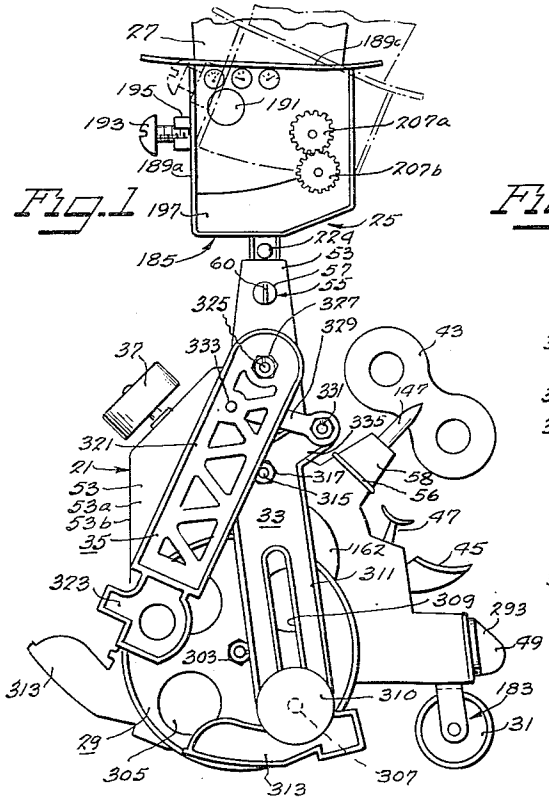



Fig. 2

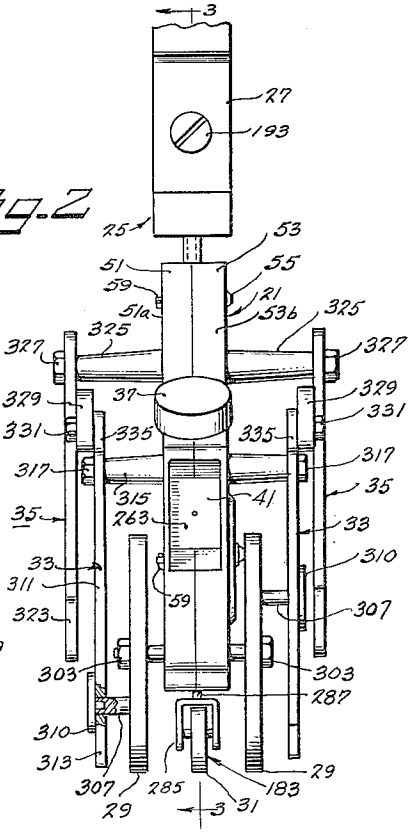



Fig. 5

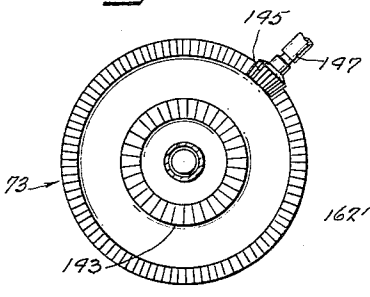



Fig. 6

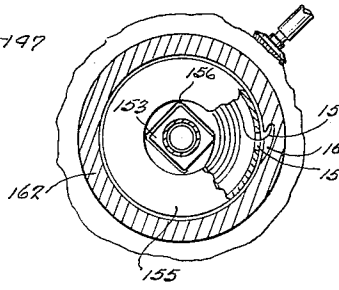
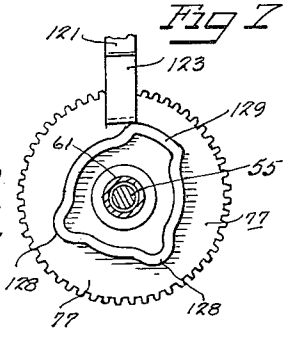



Fig. 7




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Fig. 3

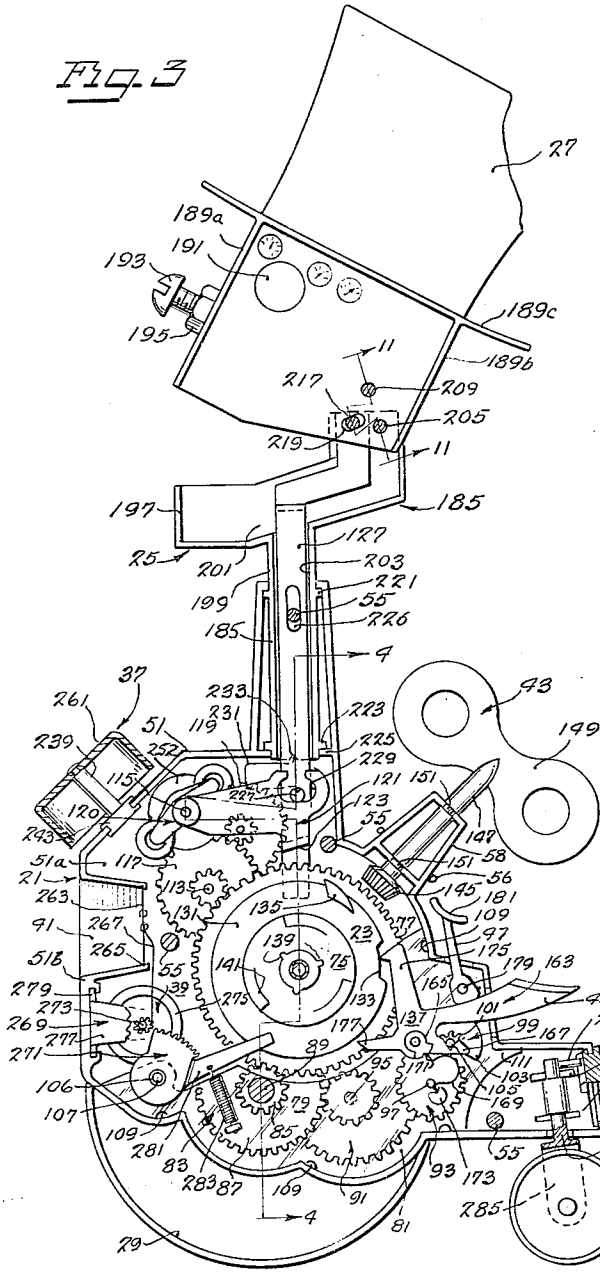



Fig. 11

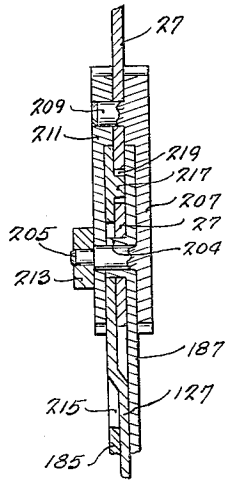
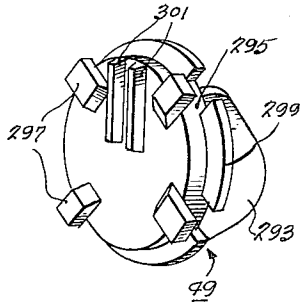



Fig. 12




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Fig. 4

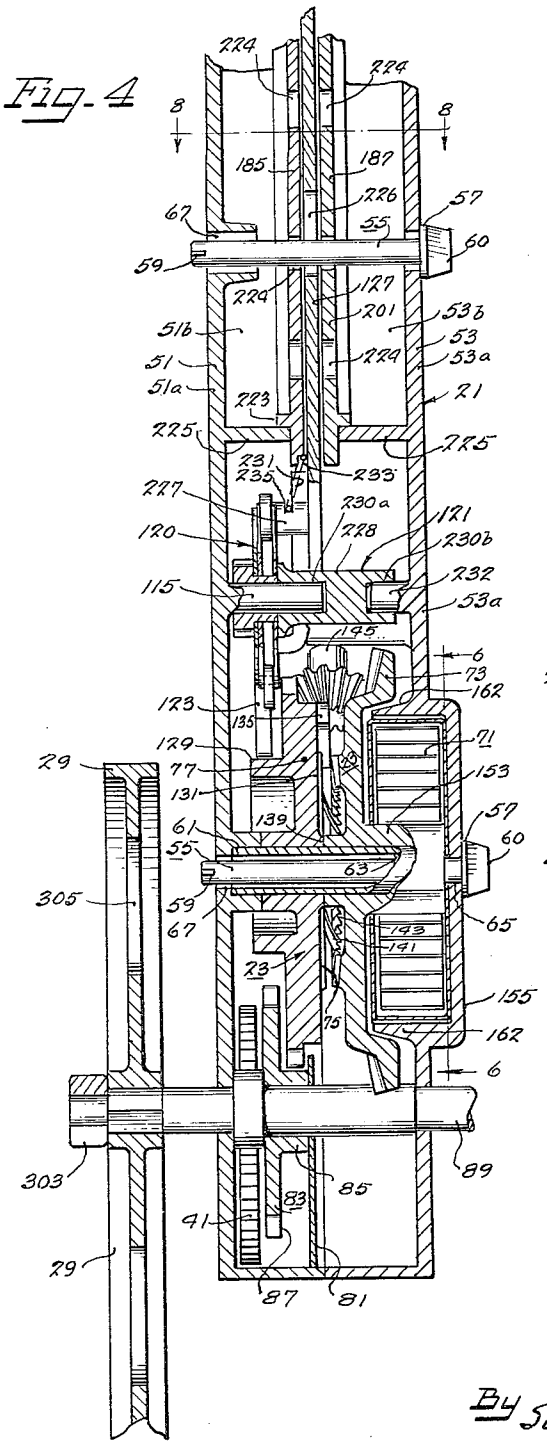



Fig 8

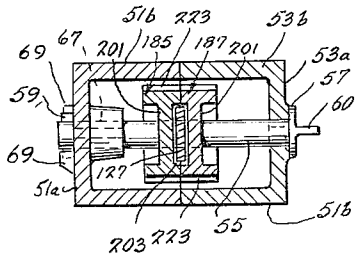



Fig. 9

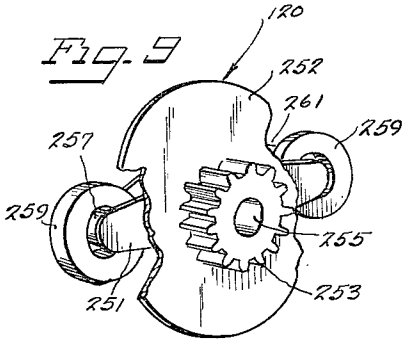
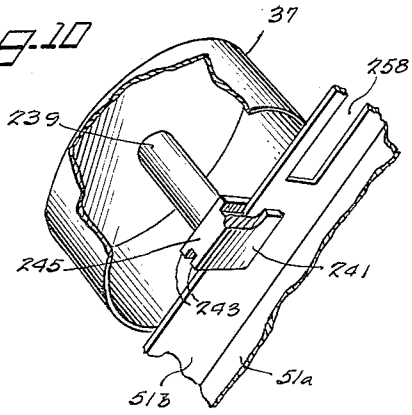



Fig. 10




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United States Patent Office 3,050,900 Patented Aug. 28, 1962



3,050,900

# TOY

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7 Claims. (Cl. 46—22)

This invention relates generally to, and has for its principal object, an animated toy. More particularly, the invention relates to, and has for a further object, a mobile toy including a construction and arrangement of the parts which can be readily assembled and disassembled, which resembles a mechanical man incorporating various interest attracting features, and which are generally fabricated of translucent, differently colored plastic materials so that a fascinating mechanical, multicolored activity is observed during operation of the top.

A still further object of the invention is the provision of a toy of the type described which is of inexpensive construction, which has educational value in developing the mechanical skill of a child through assembly, disassembly and operation of the toy, and which will attract and maintain the attention of children over an extended period of time.

Other objects and advantages of the disclosed construction will be understood by reference to the following description and accompanying drawings in which:

FIGURE 1 is a side view of an animated toy embodying various features of the invention;

FIGURE 2 is a front view, partially broken away, of the toy shown in FIGURE 1;

FIGURE 3 is an enlarged, partially sectioned view taken generally along line 3—3 of FIGURE 2;

FIGURE 4 is a further enlarged and partially broken away section view taken along line 4—4 of FIGURE 3;

FIGURE 5 is a view taken from the left of FIGURE 4 showing the undersurface of the bevel gear and its engagement with the winding key;

FIGURE 6 is a view somewhat reduced in size, taken along line 6—6 of FIGURE 4;

FIGURE 7 is a view of the main drive gear taken from the left of FIGURE 4;

FIGURE 8 is a sectional view taken along line 8—8 of FIGURE 4;

FIGURE 9 is a perspective view, partially broken away, of the striker unit utilized to cause ringing of the bell;

FIGURE 10 is a perspective view, partially broken away, of the bell illustrating its assembly within one of the case sections;

FIGURE 11 is a vertically enlarged sectional view taken along line 11—11 of FIGURE 3; and

FIGURE 12 is a perspective view of the button by which the direction of toy movement can be controlled.

The animated toy figure shown in FIGURES 1 and 2 can be readily assembled and disassembled and embodies the various action features of the invention. Moreover, except as otherwise indicated, the various components are formed of differently colored, translucent plastic material so that the inner working of the mechanism is visible and so that operational movement of the variously colored components produces changing color effects. As shown, the toy is fancifully designed to represent a mechanical man or robot and comprises a body 21 containing a removably mounted power mechanism 23 (see FIGURE 3). Carried at the top of the body 21 is a head sub assembly 25 including a head member 27 which is rockable back and forth. The body 21 is mounted on a tricycle support including a pair of spaced drive wheels 29 and a rearward caster wheel 31 providing directional guidance. Hinged to the opposed sides of the body 21 are a pair of leg members 33 which are connected with the drive wheels 29 for



coordinated oscillatory movement, giving the impression that the robot is walking. Also hingedly carried by the body 21 are a pair of arm members 35 which are mechanically connected with leg members so that the arms swing rearwardly when the legs move forwardly and vice versa, thereby further simultating a natural walking movement. Also provided are a pair of sound producing devices including a bell 37 supported on the chest or front of the body and a siren noisemaker 39 carried in a well 41 (see FIGURE 2) in the middle-front of the body.

The external controls for operating the mechanical man extend rearwardly from the body 21 and include a winding key 43 operable to store energy in the power mechanism, a release lever 45 functioning to permit operation of the toy for one complete cycle, a control post 47 enabling continued operation of the toy until complete dissipation of the stored energy, and a button 49 by means of which the direction of movement of the toy can be controlled.

Considering now in greater detail the arrangement and construction of the parts which facilitate assembly and disassembly and result in operative engagement of the various components, the body 21 is formed of two mating half sections 51 and 53 including respective side walls 51*a* and 53*a* and transverse or end walls 51*b* and 53*b*. The case half sections are detachably secured together by several spaced locking pins 55 and by a ring 56 surrounding the rearward projection 58 housing the winding key 43, to thereby form a case which is suggestive of the body of a mechanical man or robot and in which various operating components are removably contained. The locking pins 55 are individually insertable through aligned apertures in the half case sections 51 and 53 to detachably secure these sections together between (see especially FIGURE 4) a shoulder 57 and a pair of radially extending wings 59 at the outer end of the pin. In addition, each pin 55 includes a fin 60 for grasping and twisting the pin into locked relation to the case sections.

More particularly, the left hand case section 51, as seen in FIGURE 4, includes a central guide tube 61 which is formed at one end for telescopic receipt of a short sleeve 63 surrounding a central aperture 65 in the other case section. At the other end of the guide tube 61, the casing side wall 51*a* is apertured and slotted, as at 67, so that one of the locking pins 55 can be inserted through the sleeve 63, guide tube 61, and slotted aperture 67, to facilitate twisting engagement of the wings 59 against the outer surface of the casing section. Preferably, the inner surface of the wings 59 is rounded, as seen in FIGURE 8, to provide a camming action to assist movement of the wings 59 past the edge surface of the aperture 67 and to tightly lock the case sections together. In addition, the case wall 51*a* is provided with a pair of lugs 69 which limit locking movement to a quarter of a turn. The locking pins employed at the other points of connection are of similar construction but the sleeve on the half section is omitted and the guide tubes are foreshortened (see FIGURE 8).

Because various parts of the power mechanism 23 must be initially assembled within the case section 51 and as the driven components can generally be assembled after installation of the power mechanism, this mechanism will first be described. In essence, the power mechanism includes (see especially FIGURES 3 and 4) a main coil spring 71, a bevel gear 73 which winds the coil spring and forms, together with a ratchet 75, a one-way clutch, a main drive gear or bull wheel 77 drivingly engaged with the ratchet 75, a speed governing gear train 79 engaged with the main gear 77, and a series of take-offs, also powered by the main gear 77.

In assembling the power mechanism 23 within the case, the gear train 79 is positioned between the side wall 51*a* and a removable bridge plate 81. More particularly, the

gear train includes a first gear and pinion assembly **83** including an integral pinion **85**, gear **87**, and drive shaft **89**, the latter of which extends, when the case is completely assembled, through suitable apertures in the case side walls. Also included are second and third gear and pinion assemblies **91** and **93** which are respectively mounted on short stub shafts **95** and **97** projecting from the side wall **51***a*, and a metal high-speed pinion assembly **99** including a pinion **101**, an eccentric weight **103** and an integral shaft **105**. Due to the high speed of the pinion assembly **99**, metal bearings in the form of eyelets, are secured in the case side wall **51***a* and in the bridge plate **81**.

In assembly, the second pinion and gear assembly **91** is slipped over the stub shaft **95** and the shaft **105** of the high speed pinion assembly **99** is then inserted through the eyelet bearing in the side wall **51***a*. The third gear and pinion assembly **93** is then slipped over the stud **97**, and the shaft **89** of the first gear and pinion assembly **83** is slipped through the case side wall **51***a* to complete internal engagement of the gear train **79**. The bridge plate **81** is then laid in place with the end of the shaft **105** extending through the eyelet bearing and with the shaft **89** extending through a suitable aperture. Support for the bridge plate **81** is provided by a shoulder **106** on a full-length stud **107** which extends from the case wall **51***a* through the bridge plate **81** and serves as a mounting for other components, still to be described, by the ends of the foreshortened studs **95** and **97**, and by a suitable number of ribs **109** spaced along the transverse wall **51***b*. Retention of the bridge plate **81** against shifting in its own plane is provided through cooperation of the stud **107** and a rearwardly extending ear **111** in engagement with a portion of the transverse wall **51***b*.

Prior to assembly of the main drive gear **77** on the guide tube **61**, the gear train for ringing the bell **37** is assembled on three stub shafts **113**, **114**, and **115** extending from the case side wall **51***a*. This gear train comprises first and second intermeshing gear and pinion assemblies **117** and **119** and a striker sub-assembly **120** mounted respectively on stub shafts **113**, **114** and **115**. Pivotally assembled next on the stub shaft **115** is a link **121** which includes a downwardly directed arm **123** engageable by the drive gear **77**, as will shortly be explained, and which is connectable with a drive rod **127** to animate the head member **27**. A fuller description of the subassembly **120** which strikes the bell **37**, and of the link **121** will be reserved until the completion of the power mechanism **23**.

At this point, the main gear **77** can be assembled on the guide tube **61**. This gear has integrally molded on its underside two small lobes **128** and a large lobe **129** (see especially FIGURE 7) which are engaged by the link arm **123** to respectively cause a head nodding action and a mouth opening action in coordination with operation of the siren maker **39**. The outer periphery of the main drive gear **77** is formed with gear teeth engageable with the gear and pinion assembly **83** to drive the toy along a supporting surface as well as to drive the gear train **79**, and with the gear and pinion assembly **117**, thereby providing for operation of the bell **37**. On its upper surface, the main gear **77** includes a raised cylindrical hub or plateau **131** having a notch **133** on its side surface and a boss **135** which projects along the top of the hub as well as along its cylindrical side surface. The notch **133** and the boss **135** both function in connection with a release mechanism **137**, still to be described, while the boss **135** also serves to actuate the siren noisemaker **39**.

At its center, the upper surface of the main gear **77** includes three lugs **139** which interfit in three mating notches in the ratchet **75** which is fabricated of spring steel or other suitable material. As shown in FIGURE 3, the ratchet also includes three arcuate wings **141** which are inclined upwardly out of the plane of the ratchet in the counterclockwise direction for alternate driving and slipping engagement with a circular series of wedges **143** molded on the undersurface of the bevel gear **73**. Thus, when the bevel gear is driven clockwise by the spring, the wedges **143** are in driving engagement with the ratchet wings **141**, but when the bevel gear **73** is rotated counterclockwise to wind the spring **71**, the wings slip relative to the wedges.

Before slipping the bevel gear **73** around the guide tube **61** into overlying relation to the ratchet **75** and drive gear **77**, the winding key **43**, the siren noisemaker **39**, and its actuating pawl **271** are positioned in the case section **51**. A complete description of the latter two components will be reserved until later herein in order to complete the description of the power mechanism **23**.

The illustrated winding key **43** includes a bevel pinion **145** having a short, square shaft (not shown) which is frictionally insertable within a mating recess (not shown) in the stem **147** of the key handle **149**. As shown, the stem also includes two annular grooves **151** which receive portions of the transverse walls and a pair of mating cross ribs to thereby locate the key for rotation and, at the same time, prevent its displacement from the assembled toy. Prior to assembly of the key **43** in the case section **51**, the locking ring **56** is slipped over the stem **147** so that subsequently, when locking the case sections **51** and **53** together, the ring **56** can be slipped over the projection **58** and frictionally seated to maintain the case sections in tight engagement, regardless of the winding forces transmitted through the key **43**.

The bevel gear **73**, as previously indicated, includes a central bore permitting mounting of the gear on the guide tube **61**, the circular concentric series of wedges **143** on its undersurface which, together with the ratchet wings **141** constitute the one-way clutch, an outer periphery of bevel gear teeth which are meshable with the bevel gear pinion **145** and a central upstanding post **153** (see FIGURES 4 and 6) of square cross section which is drivingly engageable with the main spring **71**.

The main spring **71** is enclosed within a cylindrical housing **155** having a central hole **156** (see FIGURE 6) in each of its side faces to permit assembly of the housing around the square post **153** of the bevel gear **73**. The housing also includes a transverse slot **157** in its outer wall through which the outer end of the spring extends. The main spring itself is a coiled strip of spring steel having at its inner end five segments of equal length which are bent at right angles to one another to form a square opening, one side of which has two thicknesses, for receiving the post **153**. When the inner end of the spring and the post are thus assembled, power can be transmitted in either direction.

At its outer end, the spring has a retroverted ear **159** which extends through the slot **157** and engages a groove **161** in the case half section **53**. In this regard, the case section **53** includes an upright angular wall **162** forming a well which, when the toy is assembled, closely surrounds the housing **155** and includes the just mentioned groove **161**. During winding of the spring **71**, the retroverted ear **159** locks against the edge of the slot **157** and in the groove **161**, thereby anchoring the outer end of the spring while its inner end is rotated to store energy therein.

Release of the energy thus stored in the spring is accomplished by the mechanism **137** including the lever **45** which constitutes one arm of a release member **163** pivotally carried on a stud **165** projecting from the bridge plate **81**. The release member also includes an arm **167** having a V-shaped cut-out which is frictionally engageable with the end of the shaft **105** to halt rotation of the pinion assembly **99**, thereby also halting release of energy from the main spring.

Positioning of the release member **163** relative to such a braking position is provided, in part, by an over-the-center spring **169**. One end of the spring **169** is insertable within a V-shaped groove **171** in a central upright hub

on the release member 163 while the other end of the spring is insertable in a similar groove formed on a stud 173 projecting from the bridge plate 81. At their outer ends, the grooves in both the hub and stud are closed so that when the spring is properly seated, it cannot pop out axially of the hub and/or stud.

Also included in the formation of the release member are a pair of arms 175 and 177 which are engageable with the cylindrical hub 131 on the main drive gear 77. As shown particularly in FIGURE 3, the arm 175 includes a hook at its outer end designed for entrance into the notch 133 to permit swinging of the release member 163 to its braking position. The other arm 177 is proportioned so that when the spring 169 is thrown over the center to the release side, the outer end of the arm 177 rides in close adjacent relation to the cylindrical surface of the hub 131.

Thus, when the lever 45 is depressed to overcome the action of the spring 169, the release member 163 is swung from its braking position to the release position, the hook being removed from the notch 133, and the arm 177 being located adjacent the cylindrical hub 131. In this position of the release member, the rearward arm 167 no longer functions to brake the shaft 105 and the main spring 71 begins to unwind, driving the main gear 77 clockwise. Such movement of the main gear causes sufficient engagement by the boss 135 with the arm 177 to throw the spring 169 over center to the braking side, complete movement of the release member 163 to its braking position, as shown in FIGURE 3, being restrained by riding engagement of the hook on the arm 175 with the side surface of the hub 131. However, when the notch 133 becomes aligned with the hook, additional over-the-center movement is permitted, causing braking engagement of the arm 167 with the shaft 105 and consequent interruption in the release of energy from the main spring 71. Thus, one complete cycle of operation can be obtained by a single depression of the lever 45.

However, the release mechanism 137 also includes the post 47 which is shiftable to permit continued animated operation of the toy until the spring 71 is completely unwound. The post 47 is mounted on a pin 179 projecting from the bridge plate 81 and includes an enlarged lower end which is proportioned so that when the post is moved rearwardly from a generally upright position, its lower end engages the upper edge of the lever 45 to partially depress the lever, thereby locating the release member 163 in a position comparable to that already described when the hook rides on the outer surface of the hub, i.e., on the braking side of center but with the brake arm 167 out of engagement with the shaft 105. Thus, although the spring action tends to move the release member toward its braking position, the engagement of the post 47 with the lever 45 restrains this movement to permit uninterrupted operation.

Preferably, the mating edges of the casing sections 51 and 53 are cut away to permit passage of the post 47 so that it is not freely swingable between its lever engaging and generally upright positions. Instead, it is preferred that a small amount of force be required to overcome frictional resistance between the post and the casing edge surfaces intermediate limiting post positions. In addition, the post 47 preferably includes an upper quarter-moon segment 181 by means of which the post can be shifted by finger pressure.

Returning now to the siren noisemaker 39 and its actuating pawl 271, which components are laid in place in the case section 51 after the main gear 77 and before the bevel gear 73, the siren noisemaker 39, as seen particularly in FIGURE 3, includes a fish paper diaphragm 263 which is receiveable in a continuous recess 265 adjacent the bottom of the stomach well 41. Riveted to the fish paper diaphragm 263 is a vibrator 267 which is operably flexed by a pinion drive 269 set in motion by the pawl 271.

The pinion drive 269 constitutes an elongated metal pinion 273 and a fly wheel 275, both carried by a shaft which is supported by two parallel ears 277 bent out and up from the plane of a metal base plate 279. In assembly, the plate edges are received into a pair of spaced grooves formed in the transverse walls 51*b* and 53*b*.

The drive pawl 271 is rotatably mounted above the level of the bridge plate 81 on the top half of the previously mentioned stud 107. Included in the construction of the pawl 271 is an arcuate segment of gear teeth located for meshing engagement with the pinion 273 and an elongated leg 281 which is offset for projection below the level of the bridge plate in position for operating engagement by the boss 135 on the main drive gear 77. Extending between a pin on the leg 281 and an anchor on the bridge plate 81 is a tension spring 283 which biases the pawl clockwise toward a limiting position with the edge surfaces of the leg and bridge plate in contact.

In operation, the boss 135 engages the leg 281 incident to clockwise rotation of the main gear 77 and swings the pawl counterclockwise against the action of the spring 283. During this counterclockwise pawl movement, the pawl gear teeth segment intermeshes with the pinion 273. When the leg 281 rides off the boss 135, the spring 283 causes sudden clockwise pawl movement, thereby rapidly rotating the pinion 273 and fly wheel 275 in the counterclockwise direction, and then disengaging therefrom so that they can rotate freely to cause successive tensioning and releasing of the vibrator 267 at a gradually decreasing frequency. The consequent oscillation of the diaphragm 263 causes a realistic siren noise effect of decreasing volume and frequency. In connection with the operation of the siren noisemaker 39, the boss 135 is located on the main gear 77 with respect to the larger lobe 129, so that the head member 27 is rearwardly positioned during operation of the siren noisemaker 39.

Prior to placement of the other half casing section 53 in overlying relation to the mechanism already described, additional components of the toy should be assembled with the half section 51. These components include the head sub-assembly 25, the bell 37, and the caster wheel assembly 183, together with the control button 49, shown at the lower rear.

Considering first the head sub-assembly 25, the head 27 (as shown particularly in FIGURES 3, 4, 8 and 11) is pivotally mounted between a pair of associated neck members 185 and 187 which are subsequently assembled within a tapered upper portion of the casing or body 21. Essentially, the head 27 is a flat plastic piece having front and rear ribs 189*a* and 189*b* in addition to a cross rib 189*c* which is suggestive of the brim of a hat. Eyes 191 are located on each side face of the head member by permanently seated chrome plated disks. A nose structure is provided by a screw 193 threaded into a split nut 195 molded on the front surface of the rib 189*a*.

The neck members 185 and 187 each include a jaw part 197 and a stem 199, both of which include peripheral ribs forming extensions of the front and rear ribs 189*a* and 189*b* of the head member 27, thereby providing an overall pleasing appearance. In addition, the ribs of the neck members extend (see FIGURE 8) beyond the inner side of the web 201 so as to form a guideway 203 through which the drive rod 127 is operable to rock the head member 27 back and forth.

Pivotal assembly of the head member 27 with the neck members 185 and 187 is facilitated by a sleeve 204 (see FIGURE 11) which projects from the neck member 187 and is insertable through mating apertures in the head member 27 and neck member 185. Extending through the sleeve 204 for retaining the assembled relationship of the head and neck members is a shouldered stud 205 which projects from a unitary part 207 molded in the form of two intermeshing gears 207*a* and 207*b* (see FIGURE 1). Also carried by the part 207 is a second stud 209 which is insertable through a cooperating hole in the head member 27 so that when the head member is rocked

about the sleeve 204, the part 207 moves with the head to give the impression of a planetary gear action. On the other side of the head subassembly, the studs 205 and 209 are insertable through cooperating apertures in a second unitary part 211 molded in the form of a pair of mating gears which are similar to the gears 207*a* and 207*b*, also simulating planetary action during nodding of the head member. Maintenance of these parts in assembled relation is provided by a split nut 213 engageable against the shouldered end of the stud 205.

As previously indicated, the head member 27 is rockable through the reciprocatory action of the drive rod 127 extending within the guideway 203 between the neck members 185 and 187. At its upper end, the rod 127 is offset and rides in an elongated slot 215 in the neck member 185. Extending from the extreme upper end of the rod 127 is a pin 217 which is movable within an inclined slot 219 in that portion of the head member 27 received between the neck members 185 and 187 to thereby cause rocking of the head member as an incident to vertical reciprocation of the drive rod to simulate a mouth opening and nodding action.

Lateral shifting of the stems 199 of the neck members 185 and 187 relative to one another is prevented and positive location of the assembled neck members relative to the casing is provided, as illustrated in FIGURES 3 and 8, by two spaced pairs of lugs 221 and 223 on the neck member 185 which encompass the other neck member and respectively engage the upper transverse wall 51*b* and 53*b* and a lower rib 225 in each case section, thereby preventing axial movement of the neck members relative to the body 21. The web 201 of both neck members is also formed with an aligned series of circular openings 224 (see FIGURES 1 and 4) which generally contribute to the attractive appearance of the toy, although one of the aligned openings permits passage of one of the locking pins 55 therethrough (see FIGURES 4 and 8). In addition, the drive rod 127 is provided with an elongated slot 226 to permit its reciprocation relative to the just mentioned locking pin.

At its lower end, the drive rod 127 is operably connected to the link 121 which, as mentioned before in passing connection with the gear train for striking the bell, is mounted on the stub shaft 115. In this regard, the link 121 (as seen in FIGURE 4) includes a central hub 228 having aligned bores 230*a* and 230*b* in its opposed faces. In assembly, the link 121 is seated with the bore 230*a* enclosing the end of the stub shaft 115 to limit movement of the striker sub-assembly 120 axially of the stub shaft 115. The link 121 is retained on the shaft 115 by the seating in the bore 230*b* of an aligned post 232 extending from the case section 53.

Interconnection between the drive rod and the link, as seen especially in FIGURES 3 and 4, is provided by a pin 227 on the lower end of the drive rod which is engageable within an open horizontally elongated slot 229 in the upper edge of the link 121. Thus, the pin 227 is permitted lateral travel within the slot 229 during vertical movement when the link 121 rotates about the stud 115 under the influence of the main gear 77. The pin 227 is maintained within the open elonated slot 229 by a spring 231.

The spring 231 is generally U-shaped, having two generally parallel extending ends which are biased away from one another. One of these ends is insertable through an undercut slot or groove 233 in the lower end of the neck member 185 while the other end is engaged against the pin 227 in a transverse notch or groove 235. Retention of the spring in operating position results from the outwardly biased condition of the ends of the spring, coupled with the restraining engagement of the ends of the spring against the outer edges of the grooves 233 and 235. Thus, when assembled as shown, the spring urges the drive rod downwardly while the main drive gear 77 is operable through the link 121 to raise the rod against the action of the spring 231, thereby rocking the head member 27 rearwardly.

The bell 37 is sounded by the striker sub-assembly 120 (see FIGURES 3 and 9) which, as previously indicated, is driven through the gear and pinion assemblies 117 and 119, is a chrome plated, steel stamping, and, as seen particularly in FIGURE 10, is permanently fixed to a stud 239 integral with a generally H-shaped mounting plate 241. In assembly, the legs 243 on each side of the cross bar 245 are located in straddling relation to the adjacent portions of the case, the transverse walls 51*b* and 53*b* being notched, as shown at 247, for receipt of the cross bar.

Considering the striker sub-assembly 120, this unit is pivotally mounted on the stub shaft 115 (see FIGURE 3) and includes a transverse arm 251 (see FIGURE 9) having integrally molded therewith a disk 252, a pinion 253 which projects from the disk 252 and surrounds a central bore 255, and a shouldered stud 257 at each end of the arm 251. The disk 252 functions to override a part of the gear of the gear and pinion assembly 117 to prevent movement thereof axially on the stub shaft 113 into an interfering position with the undersurface of the main gear 77. Each of the studs 257 carries a metallic washer 259 having an inner diameter larger than the stud so there is considerable play therebetween. This feature, as will be more fully explained, permits travel of the washers past the skirt of the bell 37 after sounding impact. Permanently seated on the shoulders of the studs 257 to retain the washers 259 thereon is a retainer plate 261.

The location of the stub shaft 115 relative to the stub shaft 114 provides for intermeshing engagement of the pinion 253 with the gear and pinion assembly 119. At the same time, the location of stub shaft 115 and that of the stud 239 supporting the bell 37 are coordinated so that the lower edge of the bell is struck, with a glancing action, by the washers 259 at a point spaced laterally from its vertical center line. In this connection, the transverse wall 51*b* includes an aperture 258 (see FIGURE 10) through which the striker sub-assembly 120 rotates.

In operation, the striker sub-assembly 120 is rapidly rotated through the gear and pinion assemblies 117 and 119 by the main gear 77, causing the washers 259 to move radially outward under the influence of centrifugal force into a position for glancing impact against the edge of the bell skirt. This impact causes ring-sounding operation and also displaces the striking washer radially inward to permit continued rotation of the striker sub-assembly.

Directional guidance for the movement of the toy 21 is provided by the caster wheel assembly 183 which is controllable by the button 49. The wheel assembly comprises a bifurcated yoke 285 having two aligned, inwardly projecting stub shafts which can be snap-fitted into the central bore of the wheel 31. Extending from the yoke 285 is a vertical axle 287 having an enlarged section carried between mating semi-circular notches in a spaced pair of cross ribs 289 in each half case section. Extending rearwardly from the axle is a pin or lever 291 which is engaged by the button 49 and is caused to swing the wheel assembly about its axle incident to rotation of the button about a generally horizontal axis.

The button 49 comprises an annular disk having on its rearward exterior a central fin 293 which can be grasped to turn the button. Also, included is a peripheral groove 295 for receiving semi-circular portions of the rear transverse wall 51*b* and 53*b*. In the particular construction illustrated in FIGURE 12, the groove 295 is formed by a series of four tabs 297 spaced equi-angularly with respect to one another and spaced laterally from a collar 299 having corresponding cut-outs facilitating molding of the part. Extending centrally between a pair of adjacent

tabs 297 are a pair of parallel, spaced ribs 301 between which the outer end of the pin 291 projects. Thus, rotational movement of the button 49 to locate the ribs 301 relative to a vertical position causes rotation of the wheel assembly 183 about its axle 287, coupled with partial withdrawal of the pin 291 from between the ribs 301. Preferably, the inner surface of the casing wall 51*b* or 53*b* is provided with a lug (not shown) to limit rotative movement of the button so that disengagement between the ribs and pin is prevented. In assembly, it is preferred to first place the button 49 in place and then locate the wheel assembly 183, placing the pin 291 between the ribs 301.

When each of the above mentioned parts has been placed in its proper position in the case section 51, the other half section 53 can be slipped over the shaft 89, then aligned and abutted with the mating edge of the case half section 51. Such positioning will insert the sleeve 63 into the guide tube 61 and align the other partial guide tubes with the corresponding openings to permit insertion and locking of the several locking pins 55. At this point, the locking ring 56 can be frictionally seated around the projection 58 to additionally lock the case sections 51 and 53 together. When the case is assembled, several lugs (not shown), extending from the inner surface of the wall 53*a*, maintain the bridge plate 81 in parallel relation to the casing walls.

The drive wheels 29, arm members 35 and leg members 33 are now attached to the body 21 to complete assembly of the toy. In this connection, the outer ends of the shaft 89 include segments of square cross section over which the wheels 29 are slidably engaged in driving relation. Maintenance of the wheels 29 on the shaft 89 is provided by frictional engagement of a split nut 303 with each of the shouldered end portions of the shaft.

Each wheel 29 includes several round openings 305 which are provided to enhance the mechanical fascination of the toy and a pin 307 which is engaged within a slot 309 in the adjacent leg member 33 to cause oscillation thereof incident to movement of the toy. Preferably, as seen in FIGURE 2, a brightly colored disk 310 is frictionally seated in a hole in the end of each pin 307 so that the disks 310 move longitudinally of the slots 309 to provide another interest attracting feature when the toy is propelled.

The leg members 33 each include an elongated stem 311 in which the slot 309 is formed and a foot portion 313 movable through an arcuate path in close proximity to the supporting surface. Each of the leg members is pivotally supported on a stud 315 projecting from the body and is retained thereon by frictional engagement of a split nut 317 on the shouldered end of the stud. Preferably, when the wheels 29 are assembled on the shaft 89, the pins 307 are located 180 degrees apart so that a realistic walking action results.

The arm members 35 each include a main, fanciful, bridge-work portion 321 with hand elements 323 at their outer ends. Like the leg members, the arm members 35 are hinged to studs 325 projecting from the upper part of the body and are retained by split nuts 327. Movement of each of the arm members 35 in coordination with movement of the respective leg members 33 to further heighten realistic walking action is provided by a connecting link 329 hingedly attached at 333 to the arm members below their pivotal mounting on the studs 325 and extending to a pivotal connection, secured by a split nut 331, with a portion 335 of the associated leg member extending rearwardly and upwardly from the pivotal connection of the leg member with the body. Thus, forward movement of the leg members 33 causes related rearward swinging of the arm members 35, and vice versa.

When assembled in the sequence described, the disclosed toy can be operated to simulate a mechanical man by winding the key 43 to thereby store energy in the main spring 71. When the spring is coiled, the release mechanism 137 can be operated to cause either continual operation of the toy until complete unwinding of the coil spring, or to cause operation of the toy for a limited period, i.e., for one revolution of the main drive gear 77. When the lever 45 is depressed for limited operation, the resulting operational cycle includes advancing movement of the toy, a generally continual bell ringing activity, a one-time siren sounding action accompanied by a prolonged mouth opening, and two additional nods of the head member 27. If the post 47 is thrown to its rearward position, these activities will continue until the spring 71 is completely unwound. Movement of the toy along a straight or curved path can be controlled by adjustment of the button 49 to caster the wheel 31 to a preselected position.

Various features of the invention are set forth in the appended claims.

We claim:

1. An animated toy which can be readily disassembled and reassembled, said toy comprising a body constituting a hollow casing including two complementary sections and fastening means detachably assembling said sections together, a power mechanism removably supported within said casing for animating said toy, said power mechanism including a main spring capable of storing energy therein and selectively releasing the energy to animate said toy, a gear train terminating in a shaft, means for removably mounting said gear train within said hollow casing and removably connecting said gear train to said power mechanism, stopping means mounted on said casing and movable to frictionally engage said shaft and thereby arrest the release of energy from said main spring, a tricycle wheel means removably carried by said body for supporting said body on a supporting surface, said tricycle means including a pair of wheels mechanically connected with said power mechanism to thereby propel said body over the supporting surface, and a third wheel carried by said body for movement about a generally vertical axis, means removably carried by said body in mechanical connection with said third wheel and extending exteriorly of said body for angularly adjusting the position of said third wheel to control the direction of movement of said toy, leg members removably and hingedly carried by said body at a point above the supporting surface, said leg members extending in close proximity to the supporting surface and being mechanically connected with said wheels for oscillation thereby to simulate walking action of said body, arm members removably and hingedly carried by said body, said arm members being mechanically connected with said leg members for swinging movement in synchronism with the oscillatory movement thereof, sounding means including a siren noisemaker and a ring sounding noisemaker removably carried by said body, said noisemakers being mechanically connected to said power mechanism for sounding operation thereof, and a head member removably and hingedly attached to said casing, said head member being mechanically connected to said power mechanism and periodically driven thereby to provide a simulated head nodding action.

2. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually and without the aid of tools, said mechanical man comprising a hollow body, a power mechanism supported within said body, a drive axle passing through at least one wall of said body and coupled inside said body to said power mechanism, at least one drive wheel, first means for removably mounting said drive wheel on said drive axle outside said body for supporting said body on a supporting surface and moving it therealong, a leg member, second means for removably mounting said leg member on said body for rotation about an axis parallel to the axis of rotation of said wheel, said leg member extending downward in close proximity to said supporting surface, means slidably connecting said leg to said wheel eccen-

trically of said axle whereby rotation of said wheel produces oscillation of said leg, an arm member, third means for removably mounting said arm member on said body for rotation about an axis parallel to the axis of rotation of said wheel, and a rigid linkage connecting said arm member to said leg member to provide forward movement of said arm member upon backward movement of said leg member, whereby oscillation of said leg member produces oscillation of said arm member in the opposite direction in synchronism therewith, said first, second and third means being manually releasable without the aid of tools.

3. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually and without the aid of tools, said mechanical man comprising a hollow body, a power mechanism supported within said body, a drive axle passing through at least one wall of said body and coupled inside said body to said power mechanism, at least one drive wheel, first means for removably mounting said drive wheel on said drive axle outside said body for supporting said body on a supporting surface and moving it therealong, a leg member, second means for removably mounting said leg member on said body for rotation about an axis parallel to the axis of rotation of said wheel, said leg member extending downward in close proximity to said supporting surface, means slidably connecting said leg to said wheel eccentrically of said axle whereby rotation of said wheel produces oscillation of said leg, an arm member, third means for removably mounting said arm member on said body for rotation about an axis parallel to the axis of rotation of said wheel, and a rigid linkage connecting said arm member to said leg member to provide forward movement of said arm member upon backward movement of said leg member, whereby oscillation of said leg member produces oscillation of said arm member in the opposite direction in synchronism therewith, a head member, fourth means for removably mounting said head member on said body for rotation about an axis parallel to the axis of rotation of said wheel, and drive means connected between said power mechanism and said head member to rotate said head member relative to said body, said first, second, third and fourth means being manually releasable without the aid of tools.

4. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually and without the aid of tools, said mechanical man comprising a hollow body, a power mechanism supported within said body, a drive axle passing through at least one wall of said body and coupled inside said body to said power mechanism, at least one drive wheel, first means for removably mounting said drive wheel on said drive axle outside said body for supporting said body on a supporting surface and moving it therealong, a leg member, second means for removably mounting said leg member on said body for rotation about an axis parallel to the axis of rotation of said wheel, said leg member extending downward in close proximity to said supporting surface, means slidably connecting said leg to said wheel eccentrically of said axle whereby rotation of said wheel produces oscillation of said leg, an arm member, third means for removably mounting said arm member on said body for rotation about an axis parallel to the axis of rotation of said wheel, and a rigid linkage connecting said arm member to said leg member to provide forward movement of said arm member upon backward movement of said leg member, whereby oscillation of said leg member produces oscillation of said arm member in the opposite direction in synchronism therewith, a head member, fourth means for removably mounting said head member on said body for rotation about an axis parallel to the axis of rotation of said wheel, drive means connected between said power mechanism and said head member to rotate said head member periodically back and forth relative to said body, said first, second, third and fourth means being manually releasable without the aid of tools, sounding means, and means associated with said drive means for connecting said sounding means to said power mechanism periodically in synchronism with the movement of said head member, whereby a sound is made during a predetermined movement of said head member.

5. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually and without the aid of tools, said mechanical man comprising a hollow body, a power mechanism supported within said body, a drive axle passing through at least one wall of said body and coupled inside said body to said power mechanism, at least one drive wheel, first means for removably mounting said drive wheel on said drive axle outside said body for supporting said body on a supporting surface and moving it therealong, a leg member, second means for removably mounting said leg member on said body for rotation about an axis parallel to the axis of rotation of said wheel, said leg member extending downward in close proximity to said supporting surface, means slidably connecting said leg to said wheel eccentrically of said axle whereby rotation of said wheel produces oscillation of said leg, an arm member, third means for removably mounting said arm member on said body for rotation about an axis parallel to the axis of rotation of said wheel, and a rigid linkage connecting said arm member to said leg member to provide forward movement of said arm member upon backward movement of said leg member, whereby oscillation of said leg member produces oscillation of said arm member in the opposite direction in synchronism therewith, a head member, fourth means for removably mounting said head member on said body for rotation about an axis parallel to the axis of rotation of said wheel, drive means connected between said power mechanism and said head member to rotate said head member periodically back and forth relative to said body, said first, second, third and fourth means being manually releasable without the aid of tools, sounding means, means associated with said drive means for connecting said sounding means to said power mechanism in synchronism with the movement of said head member, whereby a sound is made during a predetermined movement of said head member, a bell, a bell ringer, and means connecting said power mechanism to said bell ringer to cause said bell ringer to ring said bell continuously.

6. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually, said mechanical man comprising a wall defining a hollow body having an opening therein, a cover piece for covering said opening, a coil spring disposed within said body with one end of said coil spring attached to said body, a bull wheel, a ratchet means coupling said bull wheel to the free end of said coil spring, a drive axle passing through said wall, gear means coupling said drive axle to said bull wheel, said bull wheel, said ratchet means and said gear means each being separately slidable into operating position inside said body in a direction transverse to its direction of operation, means for releasably locking said cover piece over said opening and for releasably locking said bull wheel, said ratchet means, and said gear means in operating position, at least one drive wheel, first means for removably mounting said drive wheel on said drive axle for supporting said body on a supporting surface and moving it therealong, a leg member, second means for removably mounting said leg member on said body for rotation about an axis parallel to the axis of rotation of said wheel, said leg member extending downward in close proximity to said supporting surface, means slidably connecting said leg to said wheel eccentrically of said axle whereby rotation of said wheel produces oscillation of said leg, an arm member, third means for removably mounting said arm member on said body for rotation about an axis parallel to the axis of rotation of said

wheel, and a rigid linkage connecting said arm member to said leg member to provide forward movement of said arm member upon backward movement of said leg member, whereby oscillation of said leg member produces oscillation of said arm member in the opposite direction in synchronism therewith, said first, second and third means being manually releasable.

7. An automobile, perambulatory mechanical man that a child can assemble and disassemble manually and without the aid of tools, said mechanical man comprising a wall defining a hollow body having an opening therein, a cover piece for covering said opening, a coil spring disposed within said body with one end of said coil spring attached to said body, a bull wheel having a cam surface, a ratchet means coupling said bull wheel to the free end of said coil spring, a drive axle passing through said wall, gear means coupling said drive axle to said bull wheel, said bull wheel, said ratchet means and said gear means each being separately slidable into operating position inside said body in a direction transverse to its direction of operation, means for releasably locking said cover piece over said opening and for releasably locking said bull wheel, said ratchet means and said gear means in operating position, at least one drive wheel, means for removably mounting said drive wheel on said drive axle for supporting said body on a supporting surface and moving it therealong, a head member, means for removably mounting said head member on said body for pivotal movement relative thereto, and a cam follower urged against said cam surface and connected to said head member to pivot said head member relative to said body, thereby effecting a nodding movement.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 195,689 | Quackenbush | Sept. 25, 1877 |
| 597,519 | De Souchet | Jan. 18, 1898 |
| 1,373,168 | Buchanan | Mar. 29, 1921 |
| 1,801,312 | Jones | Apr. 21, 1931 |
| 2,013,709 | Boissoneau | Sept. 10, 1935 |
| 2,514,450 | Kopf | July 11, 1950 |
| 2,546,297 | Brice | Mar. 27, 1951 |
| 2,588,040 | Perez | Mar. 4, 1952 |
| 2,596,216 | Dawson | May 13, 1952 |
| 2,625,771 | Herrick | Jan. 20, 1953 |
| 2,935,816 | Michael | May 10, 1960 |
| 2,949,696 | Easterling | Aug. 23, 1960 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 615,304 | Germany | June 6, 1935 |