

(21) Application No 8727734
 (22) Date of filing 26 Nov 1987
 (30) Priority data
 (31) 8628224 (32) 26 Nov 1986 (33) GB

(71) Applicants
Dennis George Wyman
 Courtil Brock, Doyle Road, St Peterport, Guernsey,
 Channel Islands

Wynne Marie Wyman
 Courtil Brock, Doyle Road, St Peterport, Guernsey,
 Channel Islands

(72) Inventor
Richard Joseph Maddocks

(74) Agent and/or Address for Service
Urquhart-Dykes and Lord
 Trinity Court, Trinity Street, Priestgate, Peterborough,
 PE1 1DA, Cambs

(51) INT CL⁴
 A63H 3/00

(52) Domestic classification (Edition J):
 A6S 19B2 19B4D 19B4X 19D3B 19D5 1B 1F3
 1F4 1F5

(56) Documents cited
 GB A 2041771 GB 1341522 US 3992807

(58) Field of search
 A6S
 Selected US specifications from IPC sub-class
 A63H

(54) Growing toys, eg dolls

(57) First and second parts of a toy are synchronously extensible from a third part or synchronously retractable back into the third part. The toy may be a doll, with neck, arms, legs and lower torso extensible/retractable relative to the upper torso, and with hair and teeth extensible/retractable relative to the head. Growth and retraction is achieved by a central screw-threaded shaft 30 driven by an electric motor 34 and having a variety of different pitch threads whereby synchronised but differential rates of growth are achieved for the various parts. Growth of the arms is achieved by means of a worm and pinion drive provided by the central shaft.

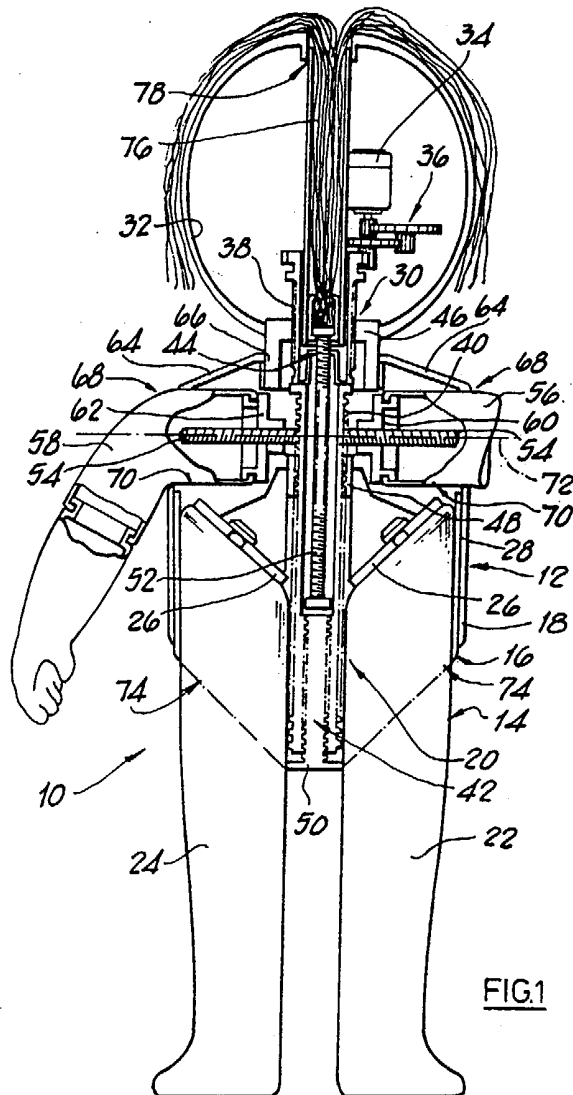


FIG.1

GB 2 199 761 A

2199761

TOYS

This invention relates to toys . A preferred embodiment described below is a toy figure in the form of a doll.

Dolls and other toy figures have been proposed with varying degrees of realism . However , the provisions of prior proposals in this respect have fallen short with regard to one important aspect of a realistic figure , namely the growth of such a figure , and it is an object of the present invention to provide improvements in relation to toy figures and toys generally in this regard.

According to the invention there is provided a toy as defined in the accompanying claims . The invention also provides a toy and a toy figure not limited by all features of any one particular claim hereof but comprising any novel feature or novel combination of features disclosed herein.

In embodiments described below a toy figure in the form of a doll is constructed so as to be capable of growing . Moreover , the proportions of the doll remain visually acceptable , and approximately in proper relationship, ^{before, during and} after such growth. The growth and subsequent retraction of the parts of the doll is achieved by a telescoping action . An internal drive mechanism for the telescoping parts of the doll has been provided without interfering with the internal swept volumes inherent in such a structure.

It will be noted that the legs of the doll described below are shaped and proportioned so as to include a lower portion having shape and profile corresponding to a proper leg structure while an upper portion thereof is generally linear, whereby the overall profile of the legs remains acceptable. In the embodiment, the size of the doll's head is chosen so as to be more in proportion to the fully grown doll than to the fully retracted doll. The legs and the trunk and the neck of the doll in the embodiment are arranged to effect synchronised growth and subsequent retraction at differential rates. In the embodiment, the doll is arranged to grow in length by approximately 33%. For effecting such growth, screw threads are provided on a driven lengthwise member. Opposite directions of growth and the differential rates are provided by opposite hands on the thread and differences in thread pitch. In the embodiment, twenty turns of the driven threaded member is sufficient to effect the full range of growth. Teeth in the head of the doll are fixed with respect to an upper portion of the body of the doll whereby growth of the neck portion causes head movement whereby the teeth progressively project and are seen to grow.

In the embodiment, synchronised differential rate growth of the lower portion of the torso and the adjacent legs is effected by means of internal and external threads in the rotatable lengthwise drive member. Lateral growth of the arms of the doll is effected by constructing the relevant screw thread on the drive member so as to have a thread

profile which can function as a worm to engage a pinion to rotate a threaded shaft or drive member extending generally at right angles to the main drive member , whereby extension of the arms can be effected in a manner analogous to that of the legs and body . The entire mechanism is arranged to be reversible. The doll is provided with a hair growth mechanism likewise operated by rotation of the main drive member and co-operation of a screw thread thereon with a threaded member connected to a rope of extendable hair. Flexibility in the plastic material of the screw threaded members provides for overload avoidance in the event of jamming occurring.

Embodiments of the invention will now be described with reference to the accompanying drawings in which :

Fig. 1 shows a vertical section through a toy figure in the form of a doll ; and

Fig. 2 shows a further vertical section through the doll of Fig. 1 , the section being taken in a plane such that the face of the doll is seen in profile.

As shown in the drawings , a toy figure in the form of a doll 10 has a structure 12 including first and second structural parts 14,16 which can be extended or retracted relative to a third part 18 to enlarge or make smaller the figure , or a portion thereof. Means 20 is provided to effect such extension or retraction and means 20 is arranged to effect synchronised extension and retraction of the first

and second parts.

In this embodiment , said first structural part 14 is constituted by the legs 22,24 of the doll which are joined by a leg yoke 26 .

The second structural part 16 in this embodiment is constituted by the lower portion of the torso of the doll. The upper portion 28 thereof is fixed . Thus , the legs 22,24 and the lower torso 16 are caused by means 20 to progressively extend at synchronised rates of extension.

Means 20 for effecting the extension and retraction of the legs and lower torso comprises a tubular shaft 30 extending from the head 32 of the doll to the lower end of torso portion 16 . Shaft 30 is arranged to be rotated about its longitudinal axis by an electric motor 34 powered by batteries (not shown) located in the front portion of the lower torso. Motor 34 drives shaft 30 through a torque-increasing reduction drive 36 .

Shaft 30 has first and second screw^{''}threaded portions 38 and 40 formed on its external periphery and first and second screw threaded portions 42 and 44 formed in its internal periphery. These threaded portions are engaged by complementary screw-threaded members 46 (for thread 38) , 48 (for screw thread 40) , 50 (for screw thread 42) , and 52 (for thread 44). The " hand " or sense of these complementary screw-threaded portions are such that rotation of shaft 30 in a single direction by motor 34 causes simultaneous downward movement of screw-threaded

members 48 and 50 and simultaneous upward movement of screw-threaded member 52 . In addition , the external screw-threaded portion 40 has a thread profile such that , as shown in Fig. 2 , it can drivingly engage a threaded shaft 54 which acts as a pinion and is drivingly coupled to the arms 56,58 of the doll through internally threaded arm coupling members 60,62 .

As seen most readily in Fig. 1 , doll 10 has a relatively fixed body portion including upper torso 18 and a shoulder portion 64 , but all other main portions of the doll are arranged to grow relative thereto , and indeed to be able to retract after such growth. Thus , head 32 is coupled through threaded member 46 to thread 38 on shaft 30 and the neck portion 66 attached to the head is thus arranged to progressively extend through shoulder 64 as shaft 30 rotates . Likewise , arms 56 and 58 extend through the openings 68 between shoulders 64 and upper torso 28. Each arm has a generally linear inner portion 70 having a lengthwise axis generally parallel to the axis 72 of pinion shaft 54 whereby progressive extension and retraction of the arms can be effected. Likewise , legs 22,24 have generally linear upper portions 74 with lengthwise axes generally parallel to the upright axis of shaft 30 . Neck portion 66 likewise has a lengthwise axis parallel to , and indeed coaxial with , shaft 30 .

Attached to the upper end of inner shaft 52 is a rope of hair 76 for the doll which projects through a central aperture 78 in the top of the head

32 of the doll , whereby the mechanism 20 causes the hair to progressively grow. It will be appreciated that mechanism 20 is reversible by reversing the drive of motor 34 , whereby the various parts of the doll's body retracts , as indeed does the hair 76 .

Fig. 2 shows some further details of the drive between shafts 30 and transverse pinion shaft 54. In addition , Fig. 2 shows an arrangement whereby teeth 80 of the doll are arranged to progressively grow. The teeth are mounted on the upper end 81 of shaft 30 , being freely journalled thereon so as not to rotate with the shaft , but to be axially fixed with respect thereto . The teeth are held against rotation by a detent 82 projecting upwards from collar 46 .

Teeth 80 are arranged to extend through an opening 84 in the upper mouth portion of head 32 , whereby , as head 32 is progressively raised as the the doll grows , the teeth 80 progressively extend through opening 84 and thus themselves are seen to grow.

In the above embodiment it will be seen that there are considerable variations in the pitches of the various screw threads. That for the legs is the coarsest and in fact is a three-start thread to assist the stability of threaded collar 48 . By suitably adjusting the pitches of the various threads , the relative rates of the synchronised extension and retraction of the body portions can be varied according to requirements. In this embodiment ,

the neck grows the most slowly , followed by the lower torso , and then the arms , and the legs grow most rapidly of all.

Fig. 3 shows additional constructional detail of the embodiment of Figs. 1 and 2. There are some slight structural differences between the embodiment of Fig. 3 and that of Figs. 1 and 2 , but generally speaking , the structure is the same and corresponding parts have been given the same reference numerals as in Figs. 1 and 2 . Thus , in Fig. 3 there can clearly be seen the form of the lower and upper torso parts 16 and 28 . These are constructed two-part form and the slidingly interengageable portions which permit extension and retraction are clearly seen . In addition, there can be seen an access hatch 86 giving access to the battery compartment in the torso . Likewise , Fig. 3 shows details of the structure of the yoke 26 linking the legs , 22,24.

In the upper torso , there can be seen the structure of the assembly 88 in which the central shaft 30 is journalled , and in which the lateral pinjon shaft 54 for actuation of the arms is likewise "journalled."

Amongst other modifications which could be made in the above embodiments while remaining within the scope of the invention , are the following :

1. Instead of a motor-driven extension and retraction mechanism , there could be provided a manual version. For example , a key or knob could be provided for manually turning the lengthwise shaft , either directly , or through a simple inclined drive arrangement .

2. An even simpler manual version can be envisaged in which extension of the toy could be effected by manual pulling , and likewise retraction by pushing , the synchronisation of the movement of the various parts being provided , for example , by means of a rack member coupled to various pinions.

3. It is envisaged that the mechanisms of the invention could be applied not only to main structural features or body portions of a toy or figure , but also to sub-portions. For example, by means of a suitable drive take-off it could be arranged that as a toy figure grows , muscles in the figure could progressively be extended by suitable actuators . Likewise , the concepts can be applied to unconventional figures including multi-appendaged animal figures and monsters.

4. Alternative actuation mechanisms envisaged include , for example , a driven winch device coupled by tension members to outwardly-loaded

limbs of a figure , the tension members serving to effect retraction against the spring or other loading, and growth being effected by unwinding of the winch. A single winch might well be sufficient for a plurality of extendible limbs and body portions.

5. A further modification of the manual drive arrangements mentioned above for extending , for example , toy figures such as dolls , includes the provision of means whereby the doll progressively grows , at a very slow rate , in response to playing action by the child. Thus , for example , the insertion of a bottle into the baby's mouth could be arranged either to effect drive of a rotary member adjacent the mouth and coupled to the extension mechanism , or else , the insertion of the bottle could be arranged to release the extension mechanism for a further increment of drive provided by a prewound spring for example. The same mechanism could be arranged to be released , as an alternative , by means of an escapement device actuated by a pendulum responding to the attitude of the doll as it is played-with by the child. A further related possibility would be that the escapement mechanism is released by squeezing action on the doll by the child. Various other possibilities include provision of a photosensitive actuation circuit for the motor drive whereby , for example , a monster figure is caused to grow merely by exposing it to light.

6. In the case of dolls and other figures electronic circuits incorporating microchips can be provided for causing the figure to speak. The above-described

drive mechanism is readily adaptable to switching such a circuit in accordance with the growth of the doll or other figure . A movable contact could be arranged to be actuated by the extension mechanism so as to progressively energise circuits having microchips whereby the sound produced by the doll progresses from baby talk to actual speech. In the above embodiment , this development would synchronise with the progressive growth of the doll's teeth .

7. Growth of the limbs etc. and hair of the above-described figure may be arranged to cause visual changes by appropriate colouring of the body portions. For example, initially blonde hair may be arranged to become " punk " by appropriate colouring of the initially inner portions of the hair itself.

8. A further mechanism which could be used for achieving synchronised extension and retraction of toy figures is a lazy tongs mechanism. This would interconnect the extensible/retractable portions of the figure or toy. It would also permit synchronised extension and retraction without involving the intervention of an operating mechanism. The child playing with the toy could simply pull or push the relevant portions of the figure.

9 As an alternative to the squeeze-responsive doll mentioned above, it is envisaged that a figure such as a monster could be provided with a similar mechanism which would be responsive to "tickling" to cause the figure to grow or retract. It will be appreciated of course that all embodiments of the invention are envisaged at a variety of sizes, including figures as small as 3 inches or 7.5 centimetres.

CLAIMS :

1. A toy (10) having a structure (12) including first and second structural parts (14, 16) which can be extended or retracted relative to a third part (18) to enlarge or make smaller the toy or a portion thereof , and means (20) being provided to effect such extension or retraction , characterised in that said means (20) for extension or retraction effects synchronised extension or retraction of said first and second parts.

2. A toy according to claim 1 characterised in that said means for extension or retraction effects synchronised extension or retraction of said first and second structural parts at different rates .

3. A toy according to claim 1 or claim 2 characterised in that said means for extension or retraction is capable of effecting both extension and retraction.

4. A toy according to any one of the preceding claims characterised in that said extension or retraction is effected in parallel directions.

5. A toy according to any one of claims 1 to 3 characterised in that said extension or retraction is effected in at least two mutually inclined directions.

6. A toy according to claim 5 characterised

in that said mutually inclined directions are disposed generally at right angles.

7. A toy according to any one of the preceding claims characterised in that said toy is a toy figure and said third part is a body portion of the figure.

8. A toy according to claim 7 characterised in that said structural parts of said figure which can be extended or retracted comprise at least two legs of said figure .

9. A toy according to claim 7 or claim 8 characterised in that said structural parts of said figure which can be extended or retracted further comprise a body and/or head and/or neck portion arranged to be extended and/or retracted at a slower rate than said legs .

10. A toy according to any one of claims 7 to 9 characterised in that said figure comprises teeth , said teeth being mounted so as to be fixed relative to said third part of said toy and extension of the neck portion of the figure being arranged to cause said teeth to be effectively extended relative to another portion of the head of the figure so as to appear to grow.

11. A toy according to any one of the preceding claims characterised in that said means for extension or retraction comprises a drivable member extending lengthwise of the toy and having drive formations thereon and being drivably coupled

to said first and second parts at spaced positions thereon .

12. A toy according to claim 11 characterised in that said drivable member comprises a rotatable member and said drive formations comprise a screw thread thereon engageable with threaded members coupled to said first and second parts .

13. A toy according to claim 12 characterised in that said drive formations comprise screw threads of differing pitch to provide differential rates of movement of said first and second parts relative to said third part.

14. A toy according to claim 12 or claim 13 characterised by said drivable member comprising at least two screw threaded portions , at least one of said screw threaded portions comprising an internal screw thread formed in a tubular portion of said drivable member .

15. A toy according to any one of claims 12 to 14 characterised in that said screw thread is engaged by a pinion disposed with its axis inclined with respect to the lengthwise axis of said rotatable member and connected to a part of the toy to be extended or retracted , the arrangement being such that the thread of the rotatable member acts as a worm to turn said pinion whereby a part of the toy can be extended or retracted at a substantial inclination with respect to the lengthwise axis of said rotatable member.

16. A toy according to any one of claims 12 to 15 characterised in that said rotatable member is arranged to be rotated by an internal motor in said toy .

17. A toy according to any one of claims 12 to 14 characterised in that said rotatable member is arranged to be rotated by external means applied to the toy by a user.

18. A toy substantially as described herein with reference to the accompanying drawings.

1/2

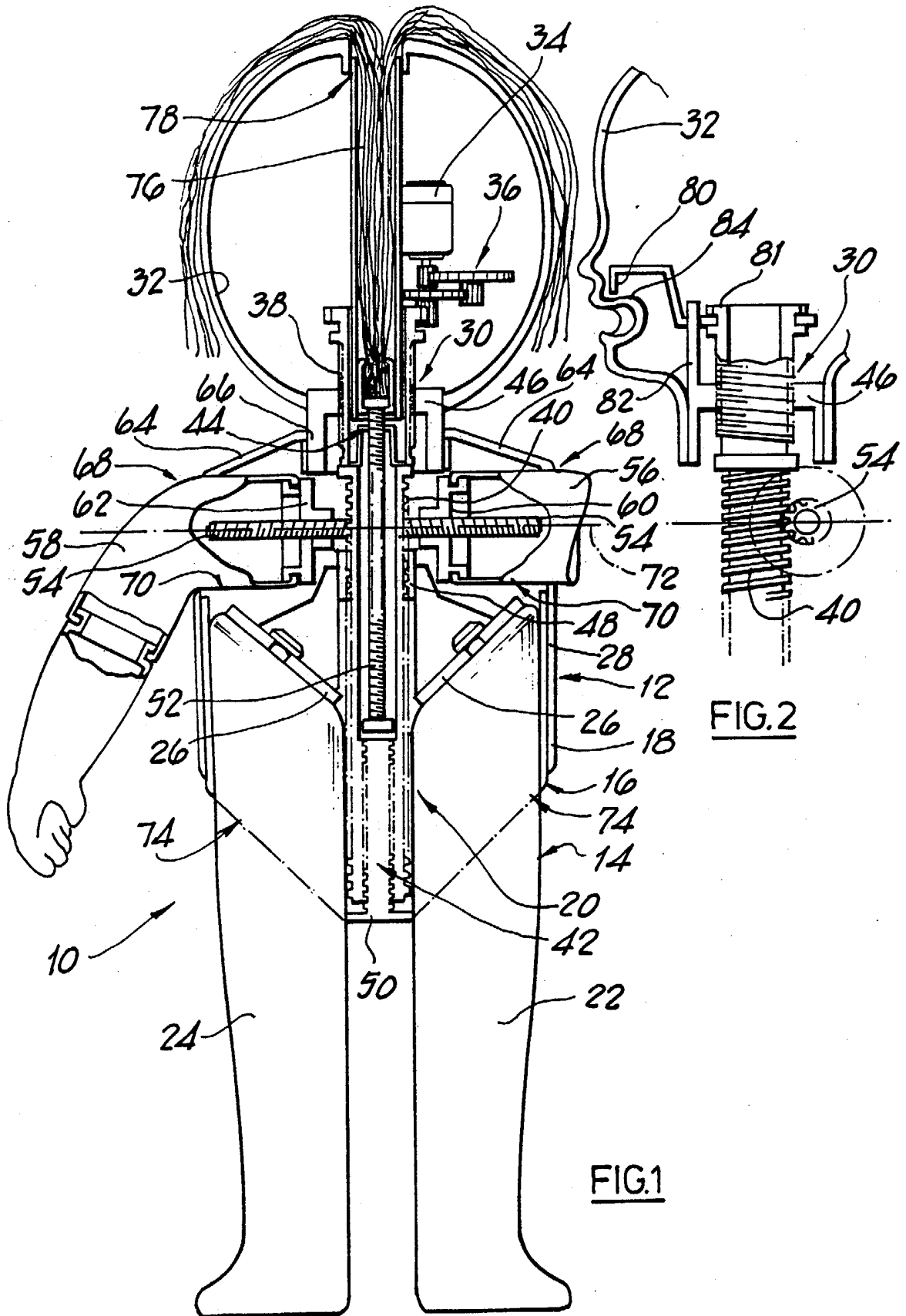


FIG. 2

FIG. 1

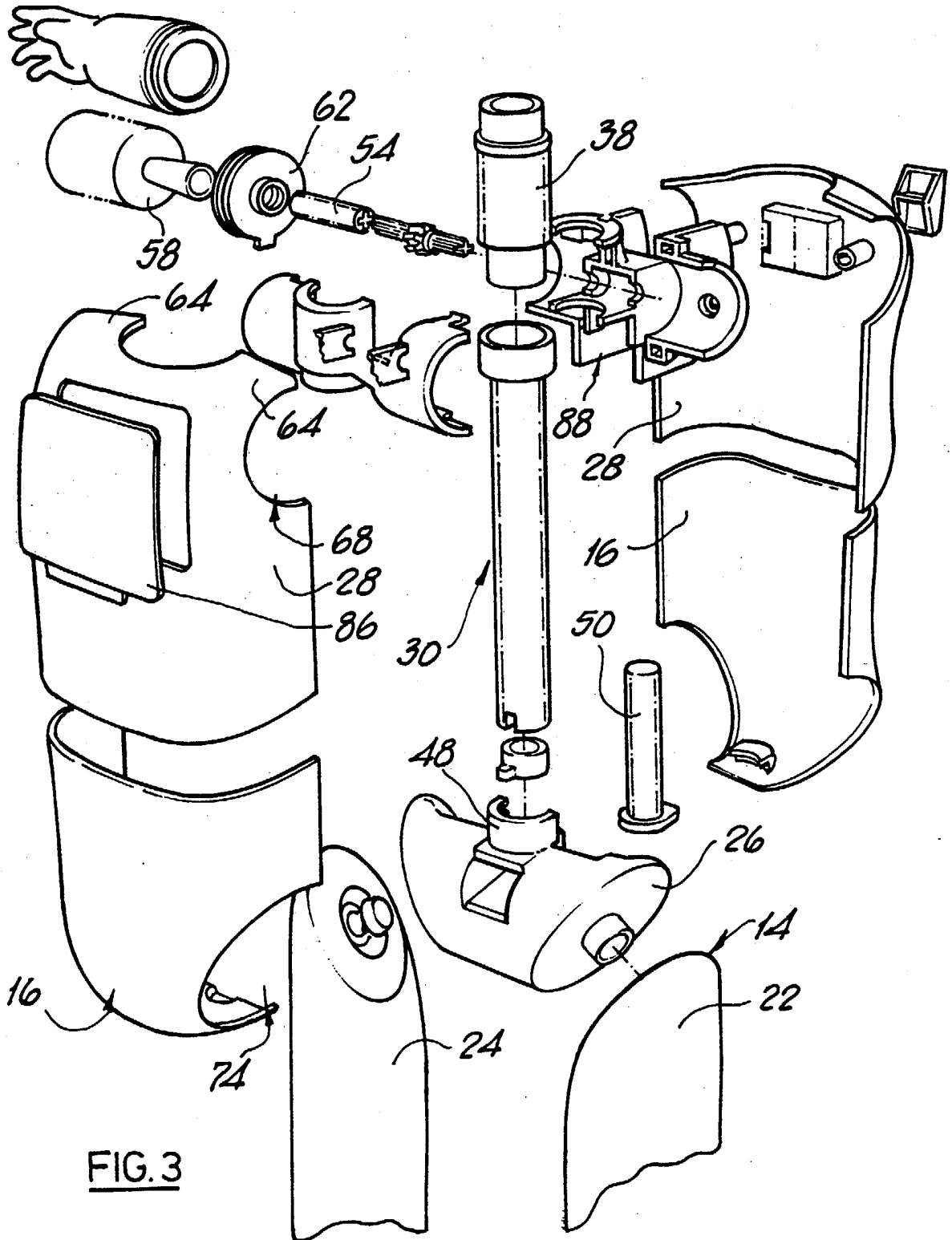


FIG. 3