Dec. 22, 1970 G. CEPPI 3,548,594

POWER-TRANSMITTING DEVICE TO ACTUATE THE MOVING PART OF TOYS

Filed April 17, 1969

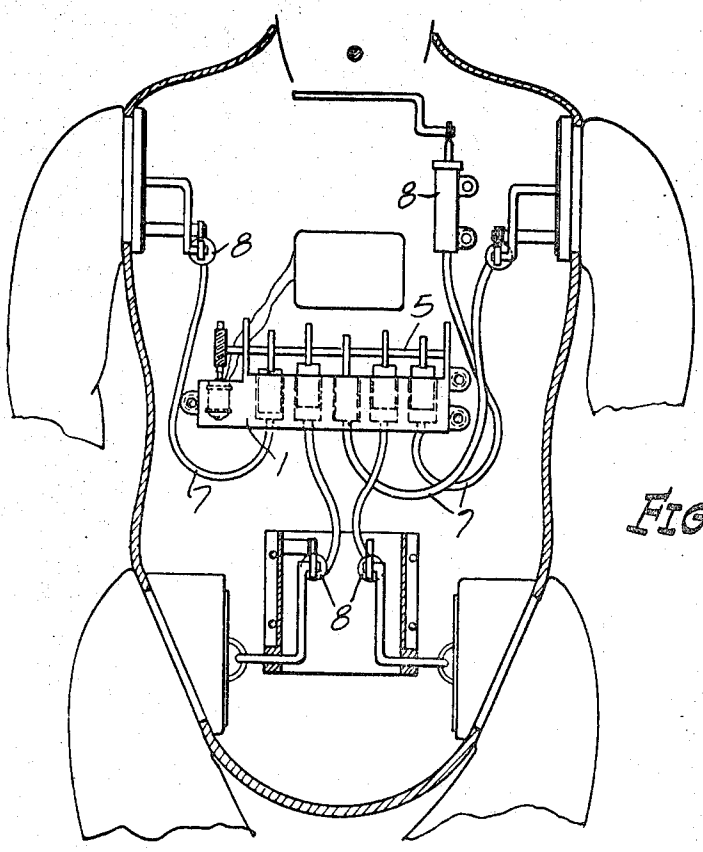
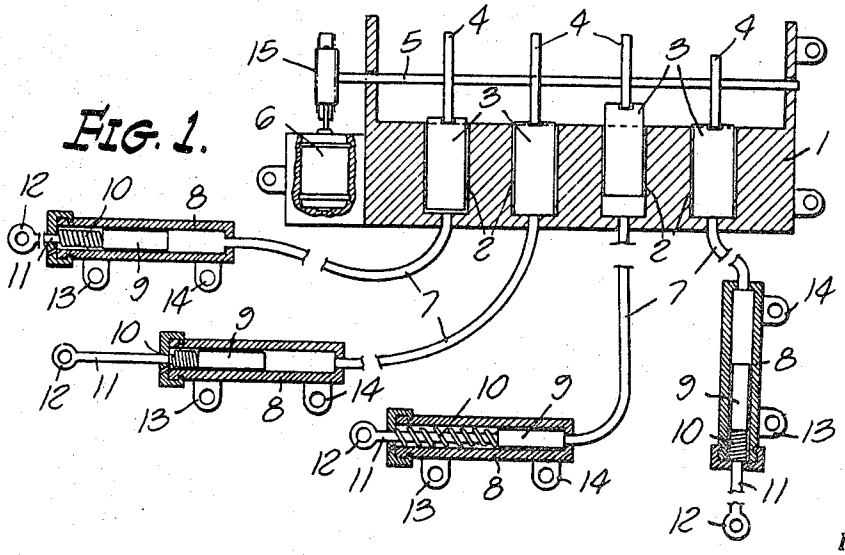


FIG. 2.

FIG. 1.



INVENTOR.

GIANNANTONIO CEPPI

BY

Max E. Shirk

ATTORNEY.

United States Patent Office 3,548,594 Patented Dec. 22, 1970

3,548,594

POWER-TRANSMITTING DEVICE TO ACTUATE THE MOVING PART OF TOYS

Giannantonio Ceppi, Milan, Italy, assignor to Mattel, Inc., Hawthorne, Calif., a corporation of Delaware

Filed Apr. 17, 1969, Ser. No. 816,980
Claims priority, application Italy, Apr. 22, 1968, 15,578/68
Int. Cl. F15b 7/00; F16h 53/00
U.S. Cl. 60—54.5 1 Claim

ABSTRACT OF THE DISCLOSURE

The present invention concerns a power transmitting device which, by means of a unique cam mechanism, actuates a plurality of mutually independent hydraulic system which produce the movements of a corresponding number of moving parts on a dolly, puppet, animal or toys in general.

BACKGROUND OF THE INVENTION

Various mechanical systems are being presently used to produce the movement of the moving parts of a toy; nevertheless, all of the systems presently being used permit the motion of a limited number of moving parts, are of relatively complex construction and tend generally to be somewhat expensive.

The purpose of the present invention is to provide a power transmitting device of the type specified above, one of simple design, which produces the simultaneous and independent movement, according to a pre-established sequence, of a plurality of moving parts on a toy.

SUMMARY OF THE INVENTION

More precisely, the device according to the invention includes a base element or block in which are recessed a plurality of cylindrical cavities or primary cylinders in each of which a corresponding primary piston slides, the upper end of which is constantly held in contact with the contour of a corresponding cam fastened interchangeably with a common shaft which is appropriately driven Each primary cylinder is connected, by means of a flexible duct in a closed hydraulic system, to at least one secondary cylinder, the piston of which is constantly urged toward the bottom by means of a spring. In this manner, the motion in opposition to the action of the primary piston as determined by the shape of the corresponding cam is transmitted through the hydraulic system to the secondary piston, and the latter transmits the action in turn to a moving part on a toy in which the device is installed.

BRIEF DESCRIPTION OF THE DRAWINGS

To permit a better understanding of the invention, reference is made to the annexed drawings, which show by way of example a device according to the invention as applied to a doll; it is understood, however, that the device itself can be applied to any toy which has moving parts that must be actuated.

FIG. 1 shows a sectional view of the power transmitting device according to the invention; and

FIG. 2 shows the device of FIG. 1 as applied to a doll.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In referring to the figures, it is seen that the power-transmitting device according to the invention includes a base element or block **1**, in which a plurality of cylindrical chambers or primary cylinders **2** are formed. In each primary cylinder **2** a corresponding primary piston **3** slides, the upper end of which is constantly in contact with the profile of a a corresponding cam **4**.

The cams **4** present different profiles which are in conformity with the motions which it is desired to obtain with respect to the moving parts of the toy, and thees are fastened interchangeably to a common shaft **5** supported by the block **1** itself. The shaft **5** is driven in rotation by means of a suitable drive, which for example can be the electric motor **6**, the axle of which is connected mechanically to the shaft **5** by means of a member **15** designed to reduce the number of revolutions of the shaft itself, as, for example, a reducer with an endless-worm wheel.

Each primary cylinder is connected, by means of a flexible tube **7**, to at least one secondary cylinder **8**, the piston **9** of which is constantly urged by a spring **10** toward the end of the cylinder **8** which is connected to the tube **7**. A suitable liquid which fills part of the cylinders **2** and **8** and the tube **7** is provided in order to transmit to the piston **9** the power imparted to the piston **3** by the cam shaft **5**. In this manner the movement by each piston **3** through the closed hydraulic system formed by two cylinders coupled in the manner specified above is transmitted to the moving part of a toy.

The coupling with the moving part of the toy is accomplished by means of the rod **11** on the piston **9**, at the end of which is formed a ring **12** to permit a non-rigid couple. Each cylinder **8**, moreover, is provided with two drilled flanges **13** and **14** to fasten the cylinder itself to the body of the toy. The attachment of each cylinder **8** can be accomplished by using both flanges **13** and **14** so that the cylinder remains rigidly affixed. On the other hand, by using only one of the flanges, for example, the cylinder **8** can be pivotally mounted to the body of the toy. The method of attachment of the cylinder **8** to the body of the toy is dependent upon the type of movement which it is desired to produce for the moving part of the toy.

FIG. 2 shows, by way of example, the application, in the case of a doll, of a power-transmitting device according to the invention.

As can be seen from FIG. 2, the device is provided with five primary cylinders according to a desired sequence, connected to as many other secondary cylinders used to move, respectively, the legs, hands and head of the doll.

What has been described or illustrated in the attached drawings should not be considered in any way to be limitative, inasmuch as the device according to the invention can be effectively applied to any toy for the purpose of producing the movement of one or more moving parts of the toy itself.

What we claim is:

1. In a toy having a body part and a plurality of parts movably mounted thereon:

a unitary base block mounted on said body part and having a plurality of primary cylinders opening through one surface thereof;

a priamry piston slidably mounted in each cylinder and projecting outwardly of said surface;

a cam shaft journalled on said base block and extending over the projecting ends of all said primary pistons;

a plurality of removable cams on said cam shaft positioned to respectively engage the projecting ends of said primary pistons and reciprocate the same when said shaft is rotated;

means mounted on said body part and defining a secondary cylinder adjacent each of said movably mounted parts;

a secondary piston in each secondary cylinder and having a piston rod thereon drivingly connected to an associated movably mounted part;

flexible tubes hydraulically connecting the interiors of each of said primary cylinders with the interiors of selected ones of said secondary cylinders;

spring means urging only said secondary pistons to move in their cylinders in a direction to force hydraulic fluid through said flexible tubes to said primary cylinders and thereby urge said primary pistons against said cams; and

means for rotating said shaft.

References Cited

UNITED STATES PATENTS

919,465	4/1909	Richards	60—54.5X
1,464,589	8/1923	Talbot	74—568
2,306,131	12/1942	Lossau	60—54.5X
2,379,545	7/1945	Silva et al.	

FOREIGN PATENTS

267,480	6/1950	Switzerland	60—54.5

MARTIN P. SCHWADRON, Primary Examiner

R. BUNEVICH, Assistant Examiner

U.S. Cl. X.R.

46—150, 247; 74—568