PATENT SPECIFICATION

323,234

Application Date: Sept. 27, 1928. No. 27,691/28.

Complete Left: Jan. 4, 1929.

Complete Accepted: Dec. 27, 1929.

PROVISIONAL SPECIFICATION.

Improvements in Constructional Toys.

I, FRANK HORNBY, of Meccano Limited, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention to be as follows:—

This invention relates to an improved clutch mechanism for use in the building up of constructional models or toys from a number of interchangeable parts. Such parts usually comprise rods journalled in the holes of equidistantly perforated strips; gear wheels, pulleys or the like being mounted on the rods. In such constructional toys or models it is desirable to provide a simple type of dog clutch which can be readily incorporated into the working models when required.

According to this invention a socket element is provided having a bore adapted to fit the rods and preferably an exterior annular channel adapted to be engaged by a lever or fork in order to slide the element to and fro on the rod. The element is formed at each end with sockets of larger diameter than the bore these sockets being adapted to be engaged over either the usual plain boss of a gear wheel or pulley and then nipped thereon by pinching screws or to engage a dog clutch member, consisting of a short sleeve adapted to be threaded on a rod and having a pinching screw for securing it thereon, the sleeve having projections or slots to form clutch members. In this way by connecting one socket of the element to the boss of an ordinary gear, sprocket wheel, or pulley and securing a clutch member in the other socket, the gear, sprocket wheel, or pulley becomes provided with a dog clutch element and any two such pulleys or gear wheels when so fitted are thus capable of being clutched together. Alternatively instead of enabling any pulley or gear wheel having a plain boss to be thus detachably provided with a dog clutch member the usual bosses of the pulleys or gear wheels instead of being made plain may themselves be formed as dog clutch members and so adapted to be coupled rotatively to a socket element when one of the sockets of the latter has been fitted with a dog clutch member in the way described.

When a dog clutch member is to be fitted in one of the end sockets of an element and to be slidable therewith on the rod its pinching screw is left loose and the clutch member secured in the socket element by means of oppositely disposed pinching screws in the latter. The wall of the socket element is slotted in order to clear the grub screw in the clutch member and so enable the latter to be inserted in the socket of the element. Positive and negative dog clutch members are provided, that is to say members having projections and other members having recesses, so as to form complementarily shaped clutch members.

By providing the socketed element with oppositely disposed pinching screws for engaging the clutch members axial centralization of the members in the element or of the element on a wheel boss is ensured and binding on the rod prevented, as would be liable to occur if but a single pinching screw at one side of the socket were provided.

By making all the pulleys, gear wheels and the like in a constructional model outfit with their bosses slotted to form clutch elements the construction of the models is considerably simplified, any pulley or gear wheel being readily adapted to be clutched to another pulley, gear wheel or to the rod as desired.

Dated this 20th day of September, 1928.

A. J. DAVIES,
Patent Agent,
24, Moorfields, Liverpool.

COMPLETE SPECIFICATION.

Improvements in Constructional Toys.

I, FRANK HORNBY, of Meccano Limited, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improved clutch mechanism for use in the building up of constructional models or toys from a number of interchangeable parts. Such parts usually comprise rods journalled in the holes of equidistantly perforated strips, gear wheels, pulleys or the like being mounted on the rods. In such constructional toys or models it is desirable to provide a simple type of dog clutch which can be readily incorporated into the working models when required.

According to this invention a socket element is provided having a bore adapted to fit the rods and preferably an exterior annular channel adapted to be engaged by a lever or fork in order to slide the element to and fro on the rod. The element is formed at each end with sockets of larger diameter than the bore, these sockets being adapted to be engaged over either the usual plain boss of a gear wheel or pulley and then nipped thereon by pinching screws or to engage a dog clutch member, consisting of a short sleeve adapted to be threaded on a rod and having a pinching screw for securing it thereon, the sleeve having projections or slots to form clutch members. In this way by connecting one socket of the element to the boss of an ordinary gear, sprocket wheel, or pulley and securing a clutch member in the other socket, the gear, sprocket wheel, or pulley becomes provided with a dog clutch element and any two such pulleys or gear wheels when so fitted are thus capable of being clutched together. Alternatively instead of enabling any pulley or gear wheel having a plain boss to be thus detachably provided with a dog clutch member and the usual bosses of the pulleys or gear wheels instead of being made plain may themselves be formed as dog clutch members and so adapted to be coupled rotatively to a socket element when one of the sockets of the latter has been fitted with a dog clutch member in the way described.

In the accompanying drawings illustrative of the invention, Fig. 1 is an elevation of a socket element, Fig. 2 being a plan and Fig. 3 an end view. Fig. 4 is a longitudinal section. Figs. 5, 6 and 7 are respectively an elevation, sectional plan and end view of a positive dog clutch member, Figs. 8, 9 and 10 are respectively an elevation, plan and end view of a negative dog clutch element, Fig. 11 is a face view and Fig. 12 an end view of a gear wheel, the boss of which is formed as a negative dog clutch member and Fig. 13 is an end view of a gear wheel the boss of which is formed as a positive dog clutch member. Fig. 14 is an end view of a wider toothed gear wheel the boss of which is also formed as a dog clutch member. Fig. 15 is a view partly in section showing a negative dog clutch member secured in a socket element. Fig. 16 shows a socket element utilised to couple a dog clutch member to a gear wheel the boss of which is plain. Fig. 17 is a view showing the application of the invention to a constructional model.

The socket element, Figs. 1 to 4, has an axial bore 1 adapted to fit the rods 2 of a constructional toy outfit, the element having end sockets 3, of larger diameter and preferably an exterior annular channel 4 adapted to be engaged by a lever 5*a*, Fig. 17, or fork adapted to slide the element to and fro on its rod. The sockets, 3, are fitted with pinching or grub screws 5 oppositely disposed in the socket wall and slots 6 are also formed in the socket walls. For use in connection with such a socket element positive and negative dog clutch members are provided, the positive dog clutch shown in Figs. 5, 6 and 7, consisting of a short sleeve 7 having a bore 8 to fit the rods of the constructional toy outfit, a pinching screw 9 and projections 10, while the negative element, Figs. 8, 9 and 10, is similar to the positive element but provided with recesses 11 with which the projections 10 may engage.

As shown in Fig. 15 when a dog clutch member 7 is to be fitted in one of the sockets of a socket element and to be slidable therewith on the rod 2, its pinching screw 9 is left loose and the dog 7 is secured in the socket by the oppositely disposed pinching screws 5. The slot 6 of the wall of the socket element clears the pinching screw 9 and so enables the member 7 to be set centrally in the socket element with the bores of both elements axially in line, thus enabling both connected elements to slide easily on the rod 2. If, therefore, another dog element 7*a*, Fig. 15, be fixed by its screw 9 on the rod 2 the slidable socket element or any member connected thereto may be brought into rotary engagement with the dog element 7*a* and driven from the rod 2 as required. By providing the socket element with oppositely disposed pinching screws any non-axial setting of the dog element in the socket is avoided, such being liable to occur if but a single pinching screw were provided. As shown in Fig. 16 by connecting one socket of a socket element to the plain boss 12 of a gear, sprocket wheel, or pulley, and securing a dog member 7 in the other socket, the gear, sprocket wheel, or pulley, becomes provided with a dog member and any two such pulleys when so fitted are thus

capable of being clutched together or to a dog member secured on the rod.

Alternatively, the bosses of gear wheels, pulleys or the like in a constructional toy outfit instead of being cylindrically plain may themselves be formed as dog clutch members as shown in Figs. 11 to 14 inclusive, the gear wheels, pulleys or the like, being then adapted to be coupled rotatively to a socket element when a dog clutch member has been fitted in one of the sockets of the latter, as previously described.

In Fig. 17 an application of the invention is shown where a sprocket wheel 20 provided with a plain boss is fitted with a socket element 21 in the outer end of which is secured a dog member 7, the elements 20, 21, and 7 being slidable on the rod 2 by manipulating the lever 5*a* pivoted at 22 in the perforated strip 23, the arm 5*b* of the lever engaging the annular groove 4 of the socket element. Similarly the plain boss of another sprocket wheel 24 may be coupled by a socket 25 to a dog member 7, and be slidable on the rod by another lever 5*c* pivoted in the strip 23. Either of the sprocket wheels 20, 24, or both may thus be engaged respectively with the clutch boss 26 of a gear wheel 27 secured on the rod 2 or with a similarly secured clutch element 16 and either or both of the sprocket wheels 20, 24, thus caused to be driven from the rod 2. The sprocket wheels 20, 24, are shown driving by chains 28 sprocket wheels on other rods 29, 30.

By making all the pulleys, gear wheels and the like in a constructional model outfit with their bosses slotted to form clutch elements the construction of the models is considerably simplified, any pulley or gear wheel being readily adapted to be clutched to another pulley, gear wheel or to the rod as desired.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. For use in clutch arrangements in constructional toys, a socket element having a bore adapted to fit the rods of the toy system and provided at each end with sockets of larger diameter than the bore and with means for securing in said sockets dog clutch members, the bosses of gear wheels or pulleys and the like of the toy system.

2. A socket element as claimed in claim 1, provided with oppositely disposed pinching screws in the socket walls.

3. A socket element as claimed in claim 1 or 2, having the walls slotted for the purpose of clearing the pinching screws of a wheel boss or dog clutch member inserted in the element.

4. For use in combination with a socket element as claimed in claim 1, 2 or 3, a dog clutch member comprising a sleeve having a bore to fit the rods of the toy system, a grub screw for securing the sleeve to the rod and projections or recesses on the sleeve.

5. For use in combination with a socket element as claimed in claim 1, 2 or 3, gear wheels, pulleys or the like, the bosses of which are formed with projections or recesses to form dog clutch members.

6. A socket element for use in building constructional models, constructed, arranged and adapted to operate, substantially as described and shown in Figures 1 to 4 inclusive of the accompanying drawings.

7. Dog clutch members for use in conjunction with socket elements as claimed in any of the preceding claims substantially as described and shown in Figures 5 to 10 inclusive.

8. Gear wheels, pulleys or the like for use in conjunction with socket elements as claimed in any of the preceding claims substantially as described and shown in Figures 11 to 14 inclusive of the accompanying drawings.

Dated this 3rd day of January, 1929.

A. J. DAVIES,
77, Chancery Lane, London, W.C. 2,
Chartered Patent Agent.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1930.

Fig.1.

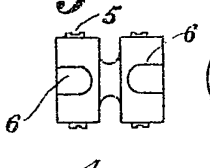


Fig.3.

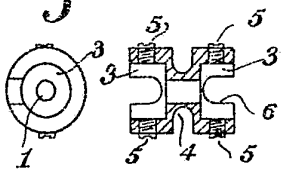


Fig.4.

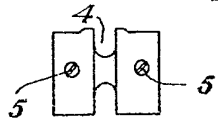


Fig.2.

Fig.5.

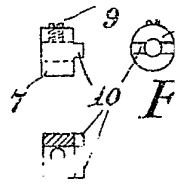


Fig.6.

Fig.12.

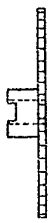


Fig.11.

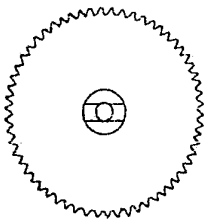
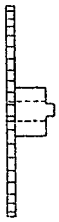


Fig.13.



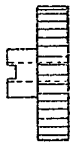
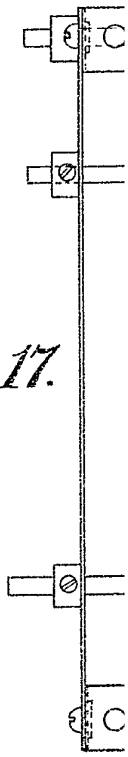


Fig.14.

Fig.17.



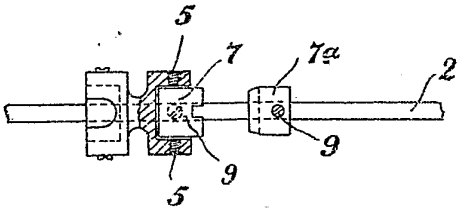


Fig.15.

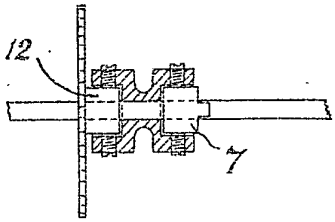


Fig.16.

Fig.5.

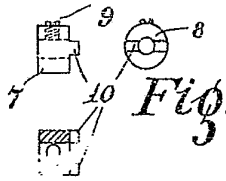


Fig.7.

Fig.6.

Fig.8.

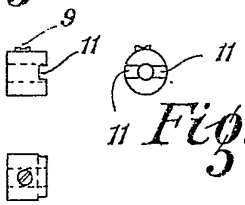
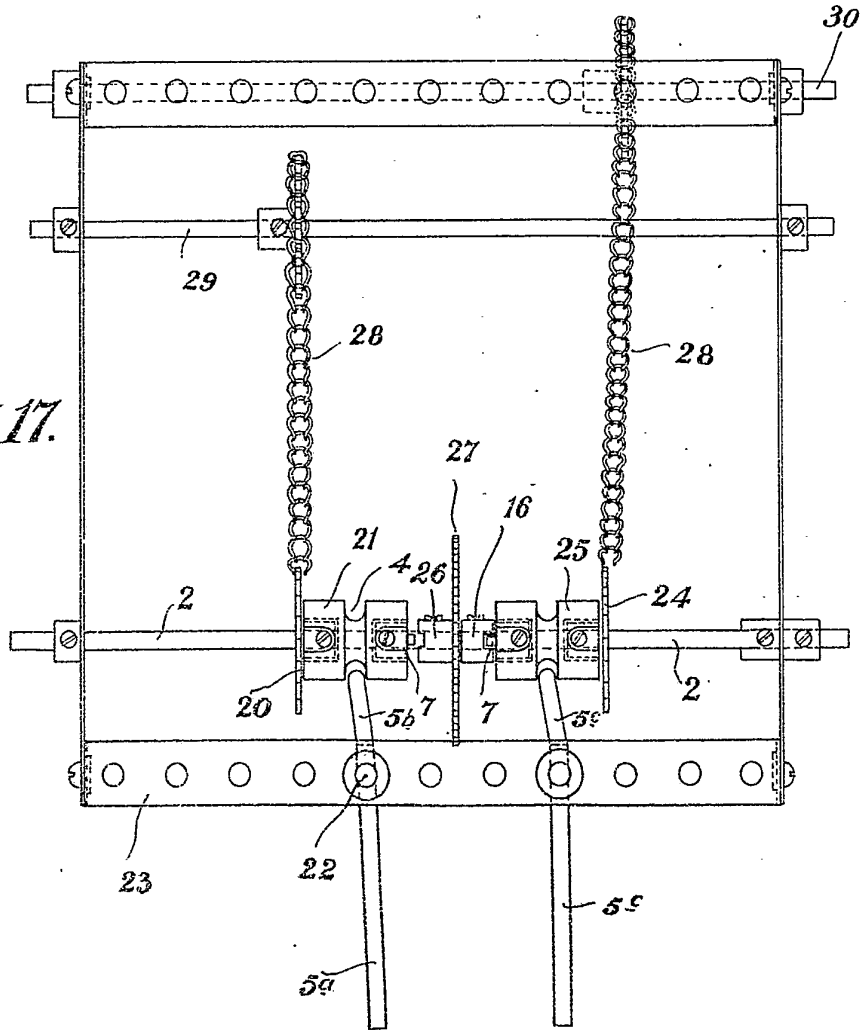


Fig.10.

Fig.9.

3.

Fig.17.



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16.

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Fig.1. Fig.3.

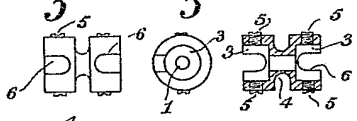

Fig.4.

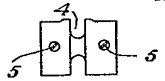

Fig.2.

Fig.5.

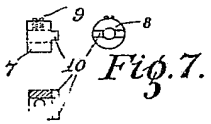

Fig.7.

Fig.6.

Fig.8.

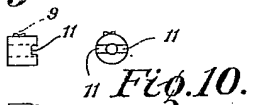

Fig.10.

Fig.9.

Fig.12. Fig.11. Fig.13.

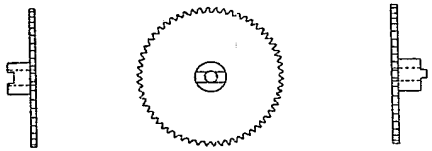

Fig.14.

Fig.17.

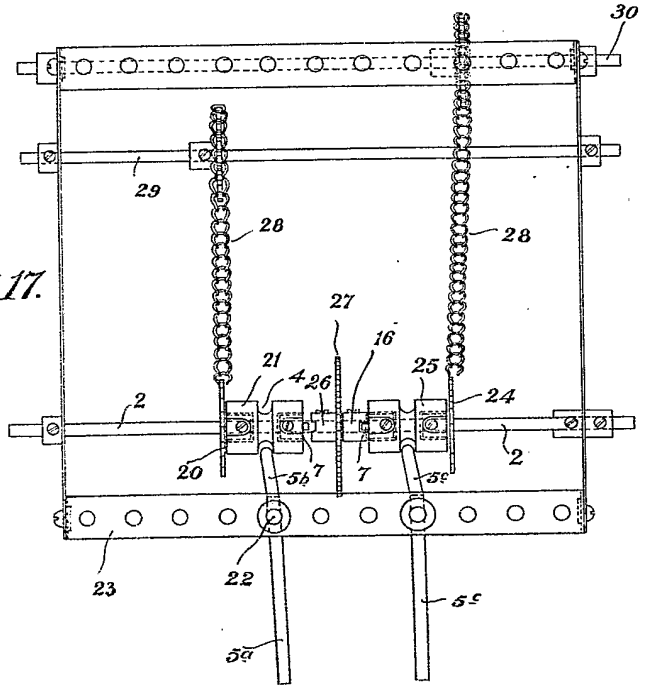

Fig.15.

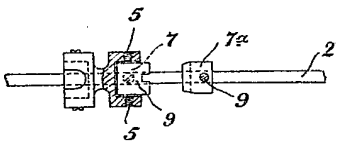

Fig.16.