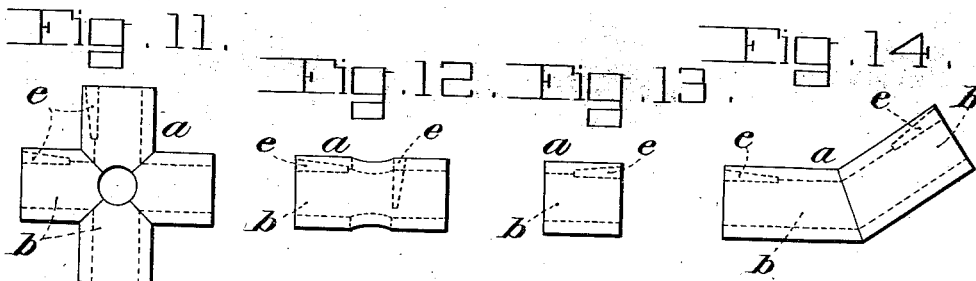
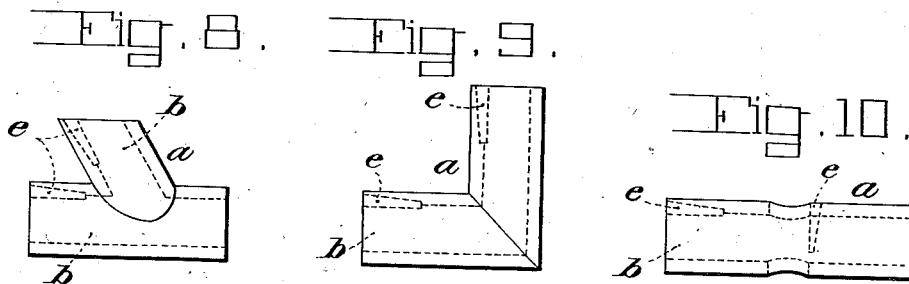
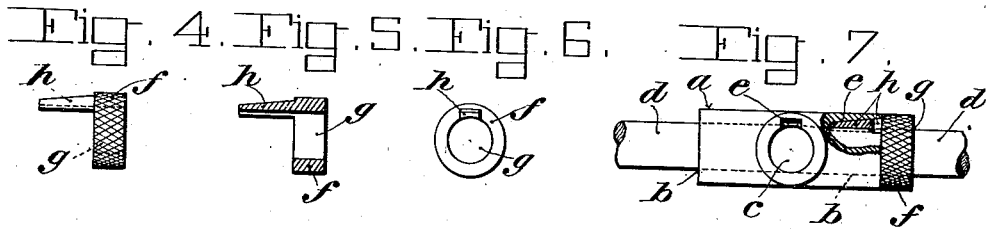
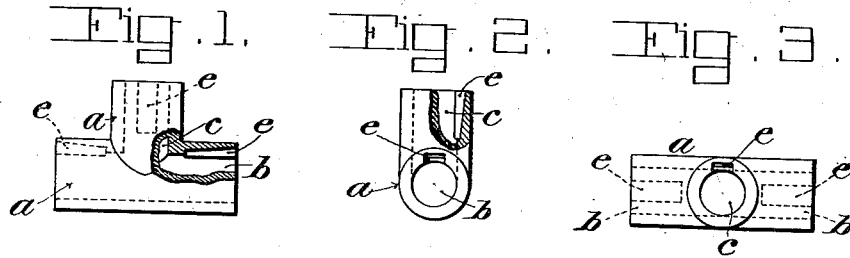


W. MICHAELIS.
 CONSTRUCTIONAL TOY.
 APPLICATION FILED MAY 22, 1913.

1,085,460.

Patented Jan. 27, 1914.

2 SHEETS—SHEET 1.



WITNESSES

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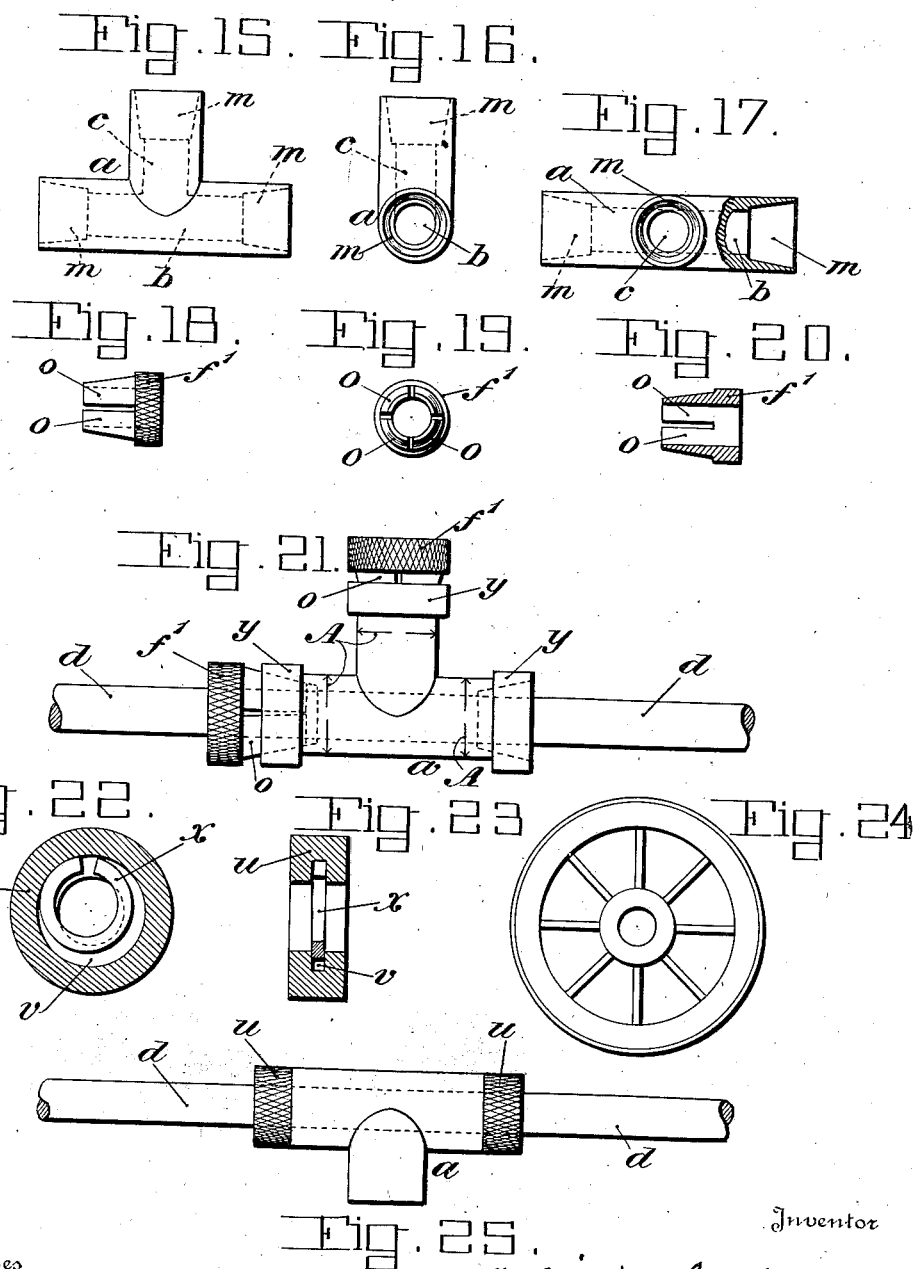
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2 SHEETS—SHEET 2.



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CONSTRUCTIONAL TOY.

1,085,460.

Specification of Letters Patent.

Patented Jan. 27, 1914.

Application filed May 22, 1913. Serial No. 769,318.

To all whom it may concern:

Be it known that I, Dr. WILLIAM MICHAELIS, a subject of the German Emperor, and a resident of London, England, have invented certain new and useful Improvements in Constructional Toys, of which the following is a specification.

The constructional toys hitherto known for making toy machines suffer from the disadvantage that the axles and shafts employed must be of larger diameter at the places where they are rigidly connected with other parts of the construction than at the places where they are to revolve in a stationary part.

As of course only bars or rods of uniform diameter throughout their length can be employed if the number of the parts to be kept in stock is not to reach an indefinite quantity, all the constructional parts have hitherto been made of soft wood, and the instructions are that the bars should be so far reduced, by rolling or pressing between two blocks, that they can easily rotate in the perforations in the blocks. In order to fasten wheels on the ends of these bars, some linen or tough paper is slipped over the end of the bar, and for the same object string is wrapped in the middle of the bar. Finally if opportunity offers the wood may be swollen by moistening it. All such means are in their nature primitive and not applicable to constructional material of greater strength, for instance to metal or hard wood, and in any case exceed the admissible demands on the intelligence of children.

It has hitherto not been possible to make the separate elements of a constructional toy in such a way that toy machines can be made therefrom which can be described as actually capable of working, as the use of wooden constructional elements excludes this idea at once. Apart from this fundamental defect, the toys made from the ordinary constructional elements have an external appearance which is unlike that of the real machines. The causes of this are to be found in the want of a suitable connecting member for the rods or bars which cannot be dispensed with as constructional elements.

This invention has for its object to form the elements of constructional toys so as to remove all the disadvantages mentioned and enable working toy engines or machines externally like the originals to be made. Ac-

ording to the invention, the connection of the bars is made by means of separate joint members or junction pieces and wedge members. The wedges are so formed that the child easily learns how to make and release the connection and does not require to employ any special ability.

In the accompanying drawings—Figure 1 is a side elevation of a T-shaped joint member; Fig. 2 is an end elevation, and Fig. 3 is a plan, of the same; Fig. 4 is a side elevation of the corresponding wedge member; Fig. 5 is an axial longitudinal section, and Fig. 6 is an end elevation, of the same; Fig. 7 is a plan of the finished connection, including the joint member, the wedge member and the rods or bars with which they are associated; Figs. 8, 9, 10, 11, 12, 13, 14, are views of different forms of joint members; Figs. 15, 16 and 17 are respectively a side elevation, end elevation, and plan, of a modified form of joint member; Figs. 18, 19 and 20 are respectively a side elevation, end elevation, and longitudinal axial section, of a wedge member of corresponding modified form; Fig. 21 is an elevation of a finished connection including a wedge member, a rod or bar, and a T joint member having an annular flange or enlargement on each one of its three ends; Fig. 22 is a section, at right angles to the axis, of a ring member which when fitted on a rod or bar is held secure from lateral displacement on said rod while free to revolve thereon; Fig. 23 is an axial section of the same; Fig. 24 is an elevation of a modified form of ring member having the shape of a wheel; Fig. 25 is an elevation of a finished connection in which ring members such as shown in Figs. 22 and 23 are employed.

A T-shaped piece is provided with bores *b* and *c* of the same diameter in both arms. The width of the bores is such that the T-shaped piece can turn loosely and be easily displaced on the cylindrical rod *d* with the least possible play. The bores are enlarged at the ends to form a wedge shaped groove *e*.

The wedge member *f* is formed with a plate or head which provides for handling. A hole *g* of the exact width of the bores or passages in the T-shaped piece is provided in the center of the plate so that the wedge member can also turn loosely and be easily displaced on a bar or rod. The member *f* has a wedge-shaped projection *h*, which ex-

tends in the axial direction of the bore *g*, is curved on its inner face corresponding to the contour of this bore, and fits into the grooves *e* in the T-shaped piece.

5 By simply fitting together the two parts hereinbefore described it is easily possible to firmly connect the joint piece *a* with the rod or bar *d*. The child only requires to turn the wedge member relatively to the joint member until the wedge projection stands opposite the groove, whereupon the wedge easily slips into the groove, when a slight pressure is applied. The wedge projection is pressed inward so far that it rests firmly on the bar, so that both parts are now prevented from turning and from being displaced longitudinally relative to the bar. This connection may be made at any suitable point on the bar.

20 The connection of the round rods or bars with other suitable joint members, like those shown in Figs. 8-14, may be made in similar manner, and by means of these connection can be made with other rods or bars. The form illustrated in Fig. 8 enables two rods or bars to be connected at an acute angle, and the joint member provided with four bores or passages at right angles to one another, as illustrated in Fig. 11, enables four rods standing at right angles to one another to be connected together. Such joint members or unions are only capable of being made of strong materials.

35 Of course wedge pieces may be provided which have wedge-shaped projections on both sides. Also, instead of a single wedge-shaped projection, a ring of a larger number, for instance, four such projections, may be provided. The manufacture of the joint members is thereby simplified because their respective wedge grooves as a whole form a conical enlargement which may be made by turning or milling. Such a joint member is illustrated in Figs. 40 15-17, and the corresponding wedge member in Figs. 18-20.

The joint member has at both ends of its longer bore, and at the outer end of its central bore, a conical enlargement *m*. A conical neck *o* which is divided into four wedge-shaped projections by means of four slots, is provided on the wedge member *f'*. In making the connection between these parts it is unnecessary to turn the wedge member into a suitable position relatively to the joint member. As, however, the pressure which must be exerted in fitting the two parts together is distributed over four wedge-shaped tongues, while in the construction first described only a single tongue had to be pressed in, it appears doubtful whether a child would be able to exert the necessary pressure merely with its fingers to enable a firm connection to be made. 65 Suitable pliers therefore are provided,

adapted to take the parts between its jaws and to press them together. Such pliers form the subject of my application for Letters Patent Ser. No. 805,969 filed December 11, 1913, constituting a division of this application.

In the modified form of joint member shown in Fig. 21, said member is provided with annularly flanged or shouldered ends *y* to facilitate the use of said pliers with joint members of different lengths, as more fully explained in my aforesaid divisional application, Ser. No. 805,969.

In addition to the rods or bars *d*, the joint members *a* and the wedge members *f* and *f'*, rings *u* may be employed which are passed on to the rods *d* and secured against lateral displacement but not against rotation, as is shown in Figs. 22-25.

A groove *v* is formed in the ring *u* for receiving a clamping spring *w* which projects beyond the inner periphery of the ring (Figs. 22, 23). When the ring is pushed on to a rod *d* against the resistance of the spring, any further displacement is prevented, but it is quite possible to easily rotate the ring on the rod. The end of the rod is entered into the somewhat contracted opening in the ring, formed by the inwardly projecting spring, and then, as the ring is forcibly pushed by hand onto the rod, the spring, of course, will be expanded by the rod sufficiently to permit of this movement.

By forming the ring as a wheel hub (Fig. 24) no further attachment of the wheel is necessary. The spring pressure is so calculated that the wheel will not be displaced sidewise of itself, but can still rotate. Such rings may also be employed for securing bodies against displacement on the rods *d*. Should a joint member, for example, have to turn but not be displaced on a rod, a ring *u* is pushed against each of its end faces (Fig. 25). The possibility of the ring rotating of itself does not in this case come into question.

The arms of the joint members may also be tapered and provided with axial slots. In this case the wedging is effected by means of clamp rings provided with an inner cone. These are drawn over the arms of the joint members after their bores have received the rods.

Any suitable kinds of working machines, transmissions and the like, and also models of working appliances, useful articles and building constructions, can be made from the constructional elements.

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. A constructional toy, more particularly for making toy machines, having three

groups of constructional elements, to wit:
cylindrical rods or bars, tubular joint mem-
bers, and locking members having an an-
nular head to fit the rod or bar to which
5 it is applied and one or more wedge-shaped
prolongations adapted to enter correspond-
ingly shaped recesses in the joint members,
and formed with a concave face to fit the
rod or bar to which the locking member is
10 applied, substantially as hereinbefore set
forth.

2. A set of toy construction members com-
prising in combination cylindrical rods or

bars, tubular joint members, locking mem-
bers for detachably connecting said rods 15
and joint members, and internally recessed
rings with annular clamping springs in said
recesses to fit upon said rods or bars—all
substantially as hereinbefore set forth.

Signed at Nuremberg, Bavaria, this third 20
day of May, 1913.

DR. WILLIAM MICHAELIS.

Witnesses:

OSCAR BOCK,
MAX PUSDENDORFF.