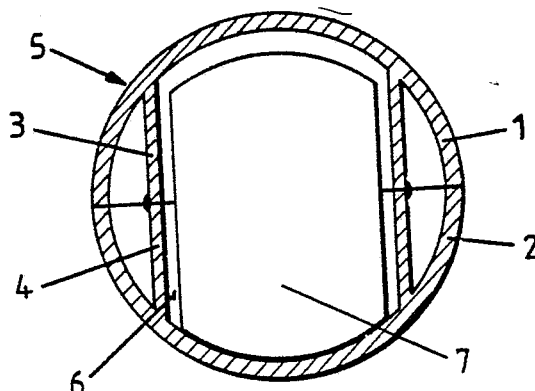




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/NL83/00025 (22) International Filing Date: 1 July 1983 (01.07.83) (31) Priority Application Number: 8202679 (32) Priority Date: 2 July 1982 (02.07.82) (33) Priority Country: NL</p> <p>(71) Applicant (for all designated States except US): SCHE- ERMEIJER, Henri, Martin [NL/NL]; Karboustraat 13, NL-1402 VA Bussum (NL).</p> <p>(71)(72) Applicant and Inventor: VOS, Guillaume, Sebastia- an [NL/NL]; Hoofdstraat 15, NL-9997 PH Zandweer (NL).</p> <p>(74) Agent: URBANUS, H., M.; Vereenigde Octrooibu- reaux, Nieuwe Parklaan 107, NL-2587 BP The Hague (NL).</p>		<p>(81) Designated States: AT, AU, BR, DK, JP, US.</p> <p>Published <i>With international search report.</i></p>

(54) Title: A PLAY AND INSTRUCTION MEANS



(57) Abstract

A play and instruction means on the basis of spherical elements, each element being an assembly of a hollow, spherical envelope made of a non-magnetizable material, in particular a synthetic plastics material, and a permanent bar-like magnet positioned within the envelope, said magnet having head faces curved analogously to the spherical envelope. The weight of the non-magnetic material processed in the spherical element is minimized relatively to the magnetic strength of the bar-like magnet.

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Title: A play and instruction means.

The invention relates to a play and instruction means on the basis of spherical elements, each element being an assembly of a hollow, spherical envelope, made of a non-magnetizable material, in particular a synthetic plastics material, and a permanent bar-like magnet positioned within
5 the envelope and having head faces curved analogously to the spherical envelope.

Such a spherical elements-containing instruction means is disclosed in German Auslegeschrift 1,239,876. These
10 known spherical elements having a magnetic field however are composed in such a way that compliance is made with the condition imposed that the magnetic flux is distributed over a maximally large portion of the sphere surface. The bar-like magnets are immovably secured within the elements.

15 German Offenlegungsschrift 30 00 567 concerns



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magnetic building blocks that can be used as play means for children or also as model building blocks for e.g. architects. No requirements are set to the building blocks in respect of shape and size, nor to the nature of the material from which 5 these are made and which may e.g. be a synthetic plastics material. One or more magnets are embedded within the building blocks and consequently likewise secured immovably.

It is an object of the invention to provide a play and instruction means of the above described type having new 10 improved spherical magnetic elements which enable a great many new applications, both as play means and as instruction means.

To this effect the invention is characterized in that the weight of the non-magnetic material processed in the 15 spherical element is minimal relative to the magnetic strength of the bar-like magnet.

By minimizing according to the invention the weight of the envelope relative to the magnetic strength, it is achieved that the forces to be exerted under influence of 20 the magnetic strength can continue to be strongly active. The envelope, apart from the fact that it serves as housing for the bar-like magnet, has substantially only a spatial orientation function within the total of coating spherical elements, ensuring the possibility of a rolling movement to 25 be performed by the spherical elements.

These two properties of the spherical elements in combination, together with the strong polarization of the magnetic effect, caused in that according to the invention



each spherical element is provided only with a single bar-like magnet, ensure that in assembling a structure by means of the spherical elements, these are optimally oriented and positioned by automatic rotation according to the magnetic force field.

5 As a result, also the stability of the resulting structure is optimal. On increasing weight of the envelope relative to the magnetic strength, the possibility for the spheres to choose the proper position by automatic rotation decreases and finally even disappears possibly. In such a case the builder

10 himself would have to choose the optimal position for each spherical element within the structure by manual rotation. The chance that he will be successful however is negligible, since on addition of each successive spherical element to a structure, the entire magnetic force field prevailing between

15 the elements already present is affected and changed. It will be clear that the possibility offered by the spherical elements according to the invention to always choose the proper position within the structure again for all elements by automatic rotation, in particular for young children, who

20 have insufficient knowledge of magnetism, is an important aid in building with the spherical elements.

Although partly depending on the diameter of the spherical element, it is of relevance to choose the ratio between the magnetic strength and the weight of the non-

25 magnetic material in such a way that per 500 Gauss magnetic strength the weight of the non-magnetic material is not more than about 1 g. In practice a ratio of about 900 Gauss magnetic strength to 1 g weight of the non-magnetic material of envelope and positioning means at a diameter of the

envelope of about 17 mm has been found quite manageable.

According to a preferred embodiment there are provided within the envelope positioning means for the bar-like magnet connected to the envelope in such a way that
5 within the envelope the bar-like magnet is movable in axial and radial direction along a distance that is subsidiary to the diameter of the spherical envelope. Due to this movability of the bar-like magnet within the spherical envelope, there is afforded an extra variability in respect
10 of the magnetic force field within a group of co-acting spherical elements. As a result, the behaviour of the spherical elements within the group becomes less predictable still, which increases the surprise as play element on application of the elements as play means.

15 According to a further embodiment, the envelope is formed of two interconnected semi-spherical portions, while within the spherical envelope, the positioning means constitute a chamber disposed in rotational symmetry about the axis right-angled to the plane of division of the semi-
20 spherical portions.

Partly with a view to an effective manufacture, it is advantageous when the magnet is a straight circular cylinder and the chamber has an annular radial cross-section and is made of the synthetic plastics material used for the
25 spherical envelope.

When assembling the spherical element, the two semi-spherical portions may be interconnected in any suitable manner, e.g. by ultrasonic welding along the

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circumference of the chamber to be formed preferably within the envelope. It is self-evident that the semi-spherical portions to be assembled may have different colours.

According to still another advantageous embodiment, 5 the play and instruction means according to the invention is an assembly of the spherical elements and of construction elements made of non-magnetizable sheet material, provided with recesses and/or holes at an interspace that is equal to or a multiple of the diameter of the spherical element, 10 said holes having a diameter that is sufficiently small in order that the spherical elements positioned on either side of the strip-like or sheet-like element in the same hole do not touch each other. By means of said strip-like or sheet-like elements, structures of various shape can be made, which 15 moreover may comprise hollow spaces, while due to the regular distribution of the recesses and holes, numbers play a role, as will be explained in the following.

Since the envelope is made of synthetic plastics material, there is obtained the practical advantage that such 20 a material has a given resilience and as a result is sound-absorbing. When handled by children, there is moreover less chance of receiving or causing injuries when e.g. the spherical elements are thrown at each other. Furthermore, also other coating materials may be employed, e.g. ceramic 25 material or wood.

The round form of the elements, in combination with the strongly polarized magnetic field, when used as a toy, offers excellent possibilities to assemble the elements to structures of varying external forms, e.g. a

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pyramid, cube, rectangle, tower, etc., and a substantially unlimited number of free forms.

In combination of 100 of the spherical elements, divided in ten groups of ten elements each, while per group the elements have the same colour, but the elements of the various groups a different colour, the instruction material is suitable for use as a so-called three-dimensional counting frame. Consequently, the instruction means in this form is an aid in teaching children arithmetic. The instruction means according to the invention is also suitable to make letters of figures and also in case of such an application is an educational appliance for children.

The elements associated with the play and instruction means according to the invention are all actively magnetic and according to the choice of the nature of the material from which the coating of the magnetic core is made, may be designed as substantially "north pole", "south pole" or "north and south pole" elements.

The diameter of the spherical elements is not critical and may be 0.5-7 cm, depending on the purpose for which the elements are used. If desired, however, smaller or larger diameters can be maintained.

On embodiment of an element according to the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a cross-section of the centre of a spherical element according to the invention which is arranged in such a way that the bar-like magnet is vertical;



Fig. 2 is an elevational view of a strip as construction element of Perspex, provided with means for interconnecting the strips through the spherical elements;

Fig. 3 shows a structure with application 1 of 5 strips of different lengths of the type shown in Fig. 2.

At 1 and 2 are shown two semi-spherical shells made of polyethylene, said two shells having the same or different colours.

The shells 1 and 2 carry internally annular 10 projections 3 and 4 being integral with the respective shells 1 and 2 and which, in assembling the shells 1 and 2 to the ready spherical element 5, guard in conjunction a chamber 6 within which the cylindrical bar-like magnet 7 is disposed. The transverse and height dimensions of chamber 6 are larger 15 than the corresponding dimensions of the magnet.

The shells 1 and 2 are fixedly connected to each other via a joint ultrasonically applied along the circumference of the contacting edges of the annular projections 3 and 4.

20 The strips 8 shown in Fig. 2 and 3 are made of Perspex. For the purpose of interconnection of the strips 8 to structures, one example of which is shown in Fig. 3, the strips 8 are provided with recesses 9 on either side and in the corresponding places. In stead of recesses also holes 25 may be applied, as indicated by way of example by 11, or the central portion of the recesses may have a continuous hole, as likewise shown by 10 by way of example.

For the purpose of coupling the strips to



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structures by means of the magnetic spherical elements, these are positioned in the recesses 9 in the manner shown in Fig. 3, while the strip is clamped by said elements under influence of the magnetic power of attraction active between the spherical elements.

As shown in Fig. 3, an identical radius of curvature has been chosen for a spherical element and a recess, thus counter-acting a lateral shift of the strips in a structure relatively to each other. This effect can be reinforced by roughening the external surface of the spherical elements and the surface of the recesses.

In order to realize corner joints in a simple manner, the strip-like or sheet-like elements can be provided with flanged edges of sufficient widths for accommodating therein the coupling recesses 9, or they may have a curved form.

Naturally, modifications may be applied in the play and instruction means as discussed in the above and as shown in the drawings without departing from the scope of the invention.

CLAIMS

1. A play and instruction means on the basis of spherical elements, each element being an assembly of a hollow, spherical envelope made of a non-magnetizable material, in particular a synthetic plastics material, and
5 a permanent bar-like magnet positioned within the envelope, said magnet having head faces curved analogously to the spherical envelope, characterized in that the weight of the non-magnetic material processed in the spherical element is minimized relatively to the magnetic strength of the
10 bar-like magnet.
2. A play and instruction means according to claim 1, in which within the spherical envelope there are provided positioning means for the bar-like magnet connected to the envelope, characterized in that the bar-like magnet within
15 the envelope is movable in axial and radial direction along a distance subsidiary to the diameter of the spherical envelope.
3. A play and instruction means according to claim 2, in which the envelope is formed of two interconnected semi-
20 spherical portions, characterized in that the positioning means within the spherical envelope constitute a chamber disposed in rotational symmetry about the axis right-angled to the plane of division of the semi-spherical portions.
4. A play and instruction means according to claim 3,



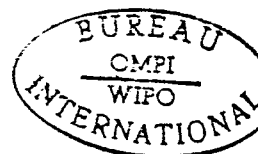
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characterized in that the magnet is a straight circular cylinder and the chamber has a annular radial cross-section and is made of synthetic plastics material used for the spherical envelope.

5 5. A play and instruction means according to claims 1-4, characterized in that the means is an assembly of the spherical element and of construction elements made of non-magnetizable sheet material, said elements being provided with recesses and/or holes at an interspace that is equal to
10 or a multiple of the diameter of the spherical element, said holes having a diameter that is sufficiently small to ensure that spherical elements positioned on either side of the strip-like or sheet-like element in the same hole do not contact each other.

15 6. A play and instruction means according to claim 5, characterized in that the construction elements made of sheet material have a curved or non-curved surface and/or are provided with a flanged edge.

7. An element comprising a spherical envelope of
20 synthetic plastics material and having a magnetic field for application in the play and instruction means to claims 1-6.



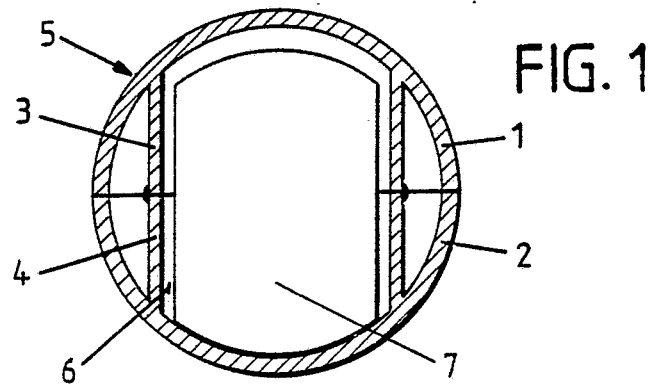


FIG. 2

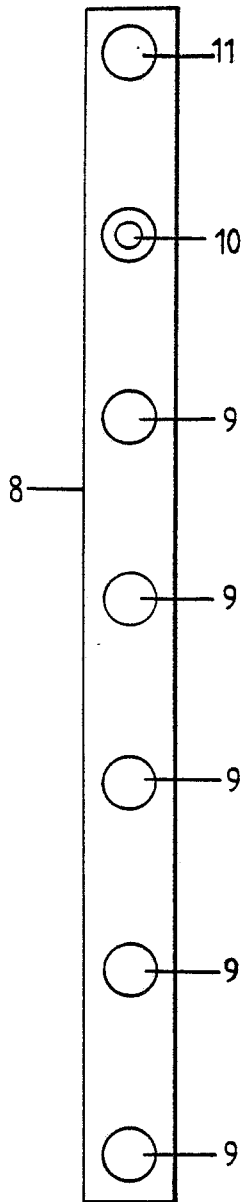
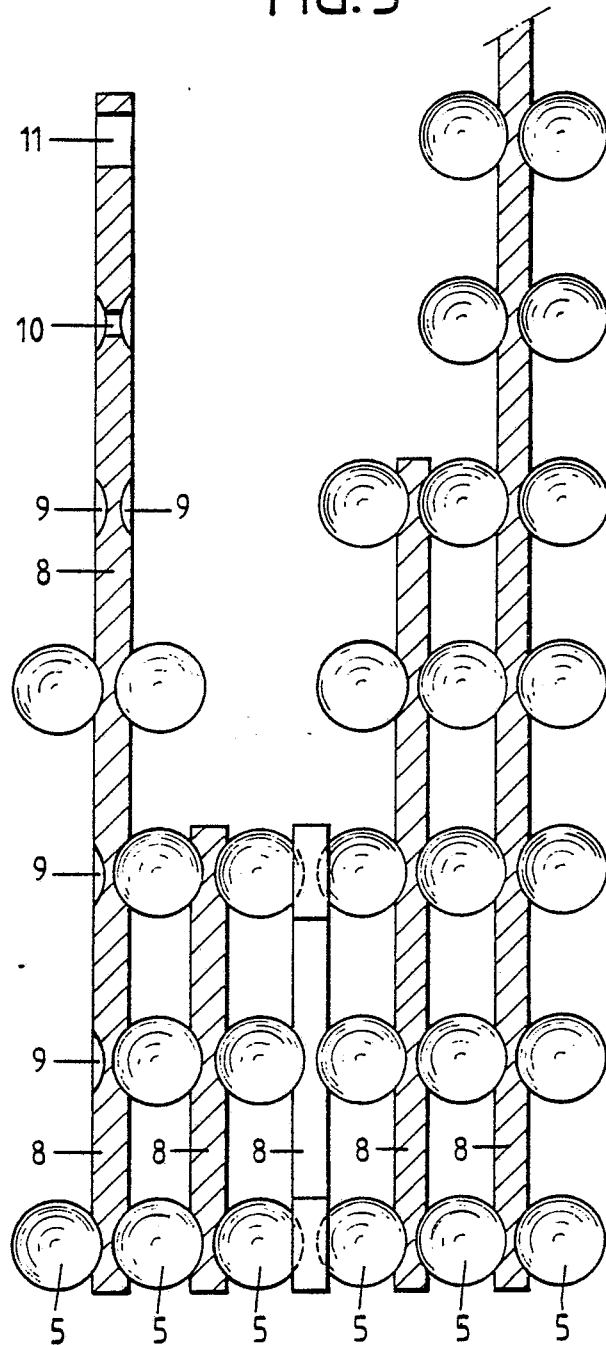


FIG. 3



INTERNATIONAL SEARCH REPORT

International Application No PCT/NL 83/00025

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC ³ : G 09 B 1/38; A 63 H 33/04		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC ³	G 09 B; A 63 H	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
A	DE, B, 1239876 (H.L. SANGSTER) 3 May 1967, see figures 1-3; column 3, lines 4-60 (cited in the application) --	1
A	DE, A, 3000567 (H.N. HEESEN) 30 July 1981, see claim (cited in the application) -----	1
<p>[*] Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ¹	Date of Mailing of this International Search Report ¹	
16th September 1983	11 OCT. 1983	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
EUROPEAN PATENT OFFICE	G.L.M. Kruidenberg	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

INTERNATIONAL APPLICATION NO. PCT/NL 83/00025 (SA 5402)

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 03/10/83

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-B- 1239876		None	
DE-A- 3000567	30/07/81	None	

For more details about this annex :
see Official Journal of the European Patent Office, No. 12/82