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Hsu et al.

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(54) **CORDLESS CURTAIN ASSEMBLY WITH MAGNETIC UNITS**

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(51) **Int. Cl.**
E06B 9/262 (2006.01)
H01F 7/02 (2006.01)

(52) **U.S. Cl.**
CPC ***E06B 9/262*** (2013.01); *E06B 2009/2622* (2013.01); *H01F 7/0252* (2013.01)

(58) **Field of Classification Search**
CPC . E06B 9/262; E06B 2009/2622; H01F 7/0252
USPC 24/303
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,196,818 A * 3/1993 Anderson ..... A45F 5/00 223/109 A
6,833,507 B2 * 12/2004 Arkin B60R 11/00 174/135
6,988,526 B2 * 1/2006 Judkins E06B 9/262 160/84.01
7,150,304 B2 12/2006 Hsu
2005/0109468 A1 * 5/2005 Hsu E06B 9/262 160/84.01

(Continued)

FOREIGN PATENT DOCUMENTS

CH 692877 A5 * 11/2002

OTHER PUBLICATIONS

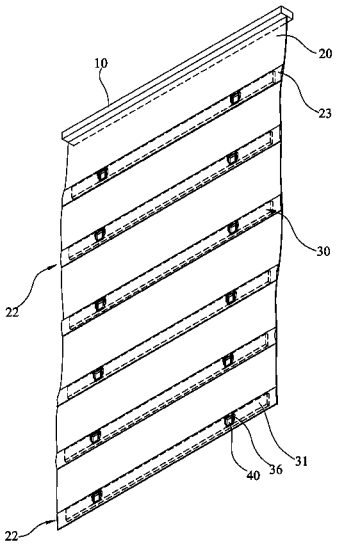
U.S. Appl. No. 15/091,590, filed Apr. 6, 2016.
U.S. Appl. No. 15/091,593, filed Apr. 6, 2016.

Primary Examiner — Blair M Johnson

(57) **ABSTRACT**

A cordless curtain assembly includes a fabric connected to a top rail. The fabric has multiple transverse folding sections and each folding section has a passage defined therein. Multiple magnetic units are respectively received in the passages of the folding sections and each have a carrier, multiple clamping members and multiple magnetic parts. The carrier of each magnetic unit has two reception areas defined in the top thereof. Each clamping member has a press bar and two legs which respectively extend from the underside of the press bar. Each leg has a resilient arm extending outward therefrom. Each clamping member has one of the magnetic parts clamped between the two legs. The combination of the clamping member and the magnetic part are securely inserted into the reception area corresponding thereto. The press bar seals the top opening of the reception area.

5 Claims, 8 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2012/0234502	A1*	9/2012	Chen	E06B 9/262 160/84.01
2015/0146371	A1*	5/2015	Liang	G06F 1/1656 361/679.56
2016/0120352	A1*	5/2016	Hsu	E06B 9/262 160/201
2016/0235237	A1*	8/2016	Chu	E06B 9/262
2016/0376837	A1*	12/2016	Hsu	E06B 9/262 160/84.01
2016/0376838	A1*	12/2016	Hsu	E06B 9/28 160/84.03

* cited by examiner

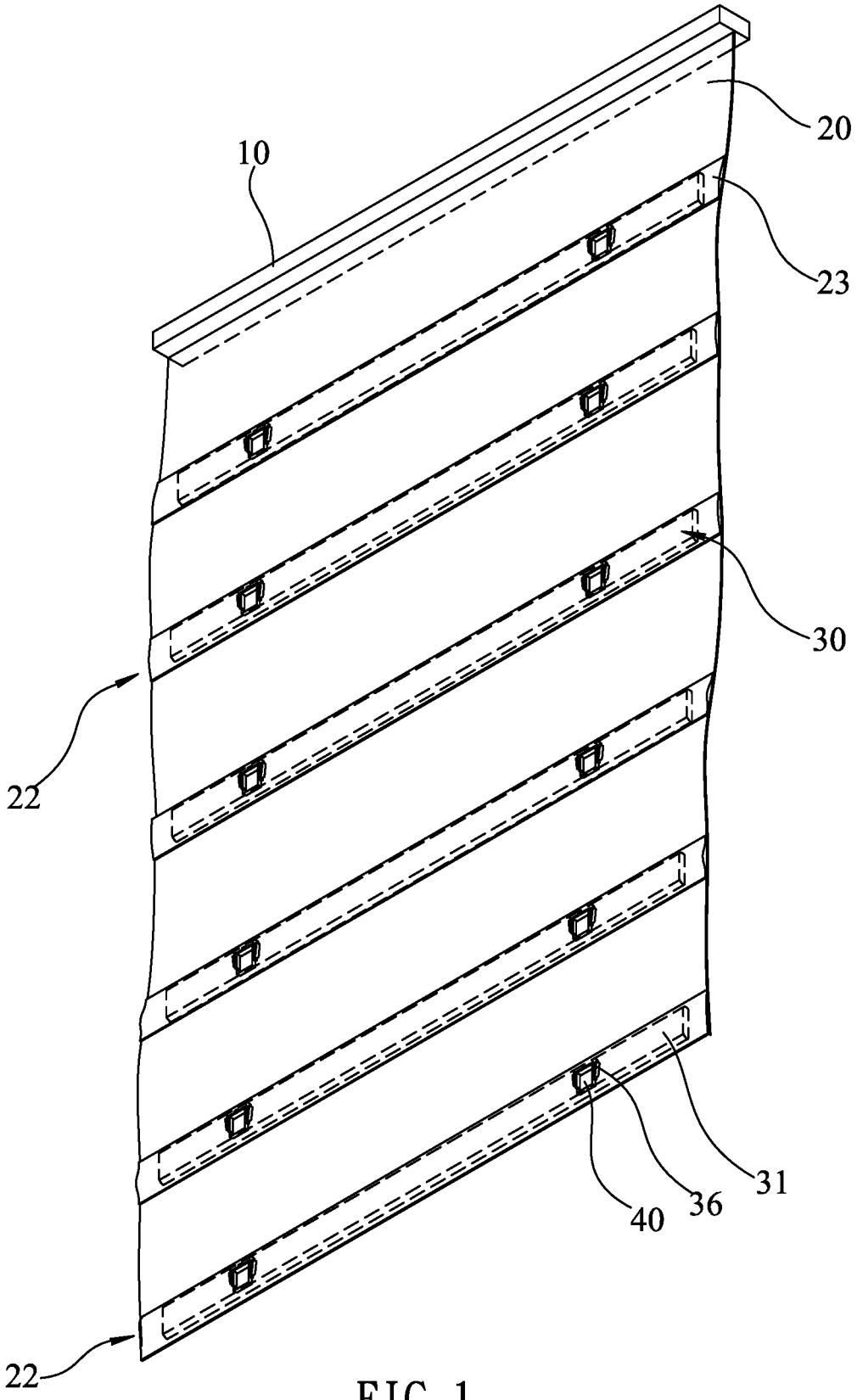


FIG. 1

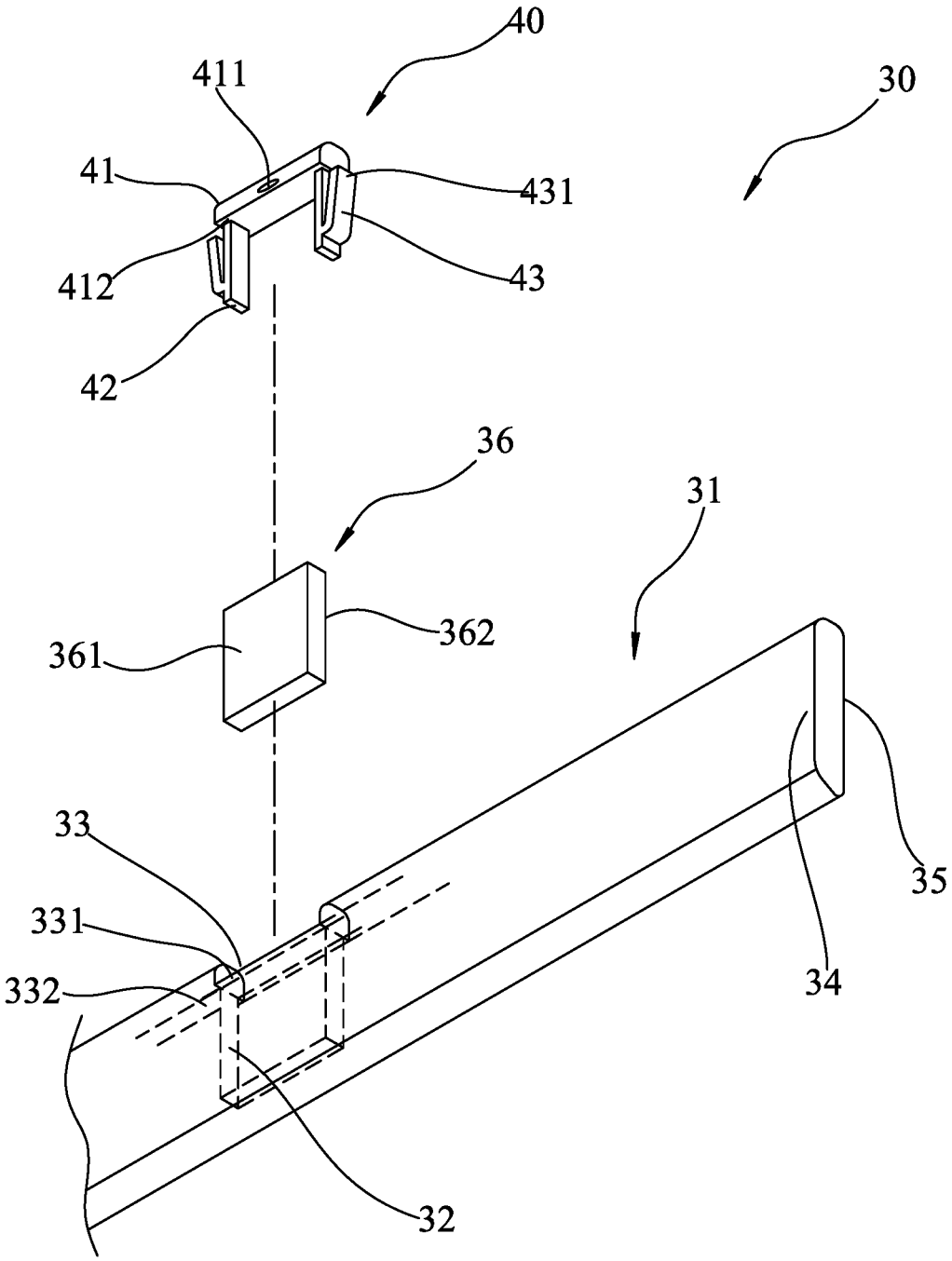


FIG. 2

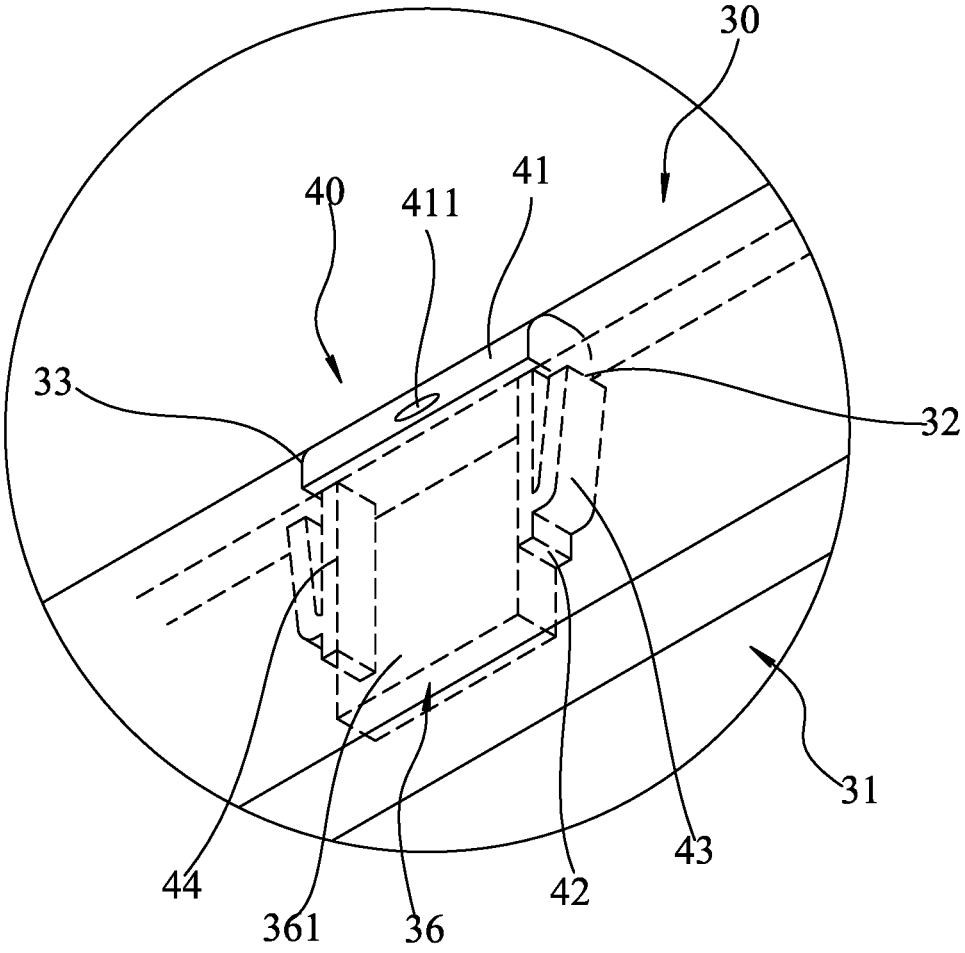


FIG. 3

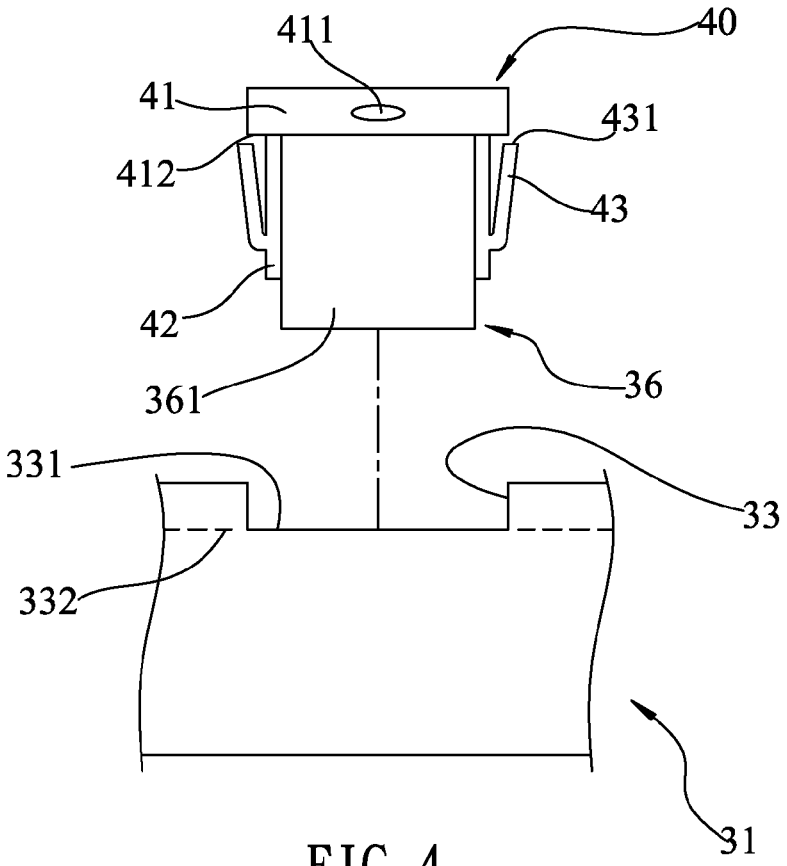

411
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FIG. 4

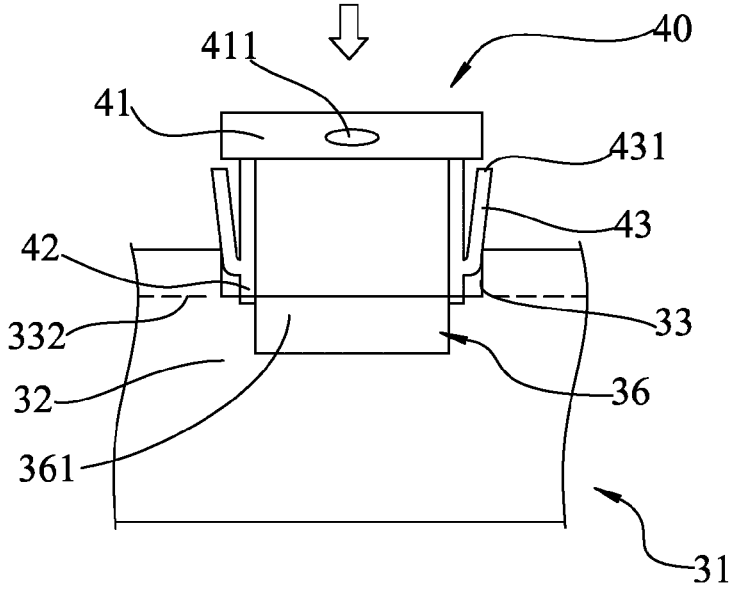
411
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FIG. 5

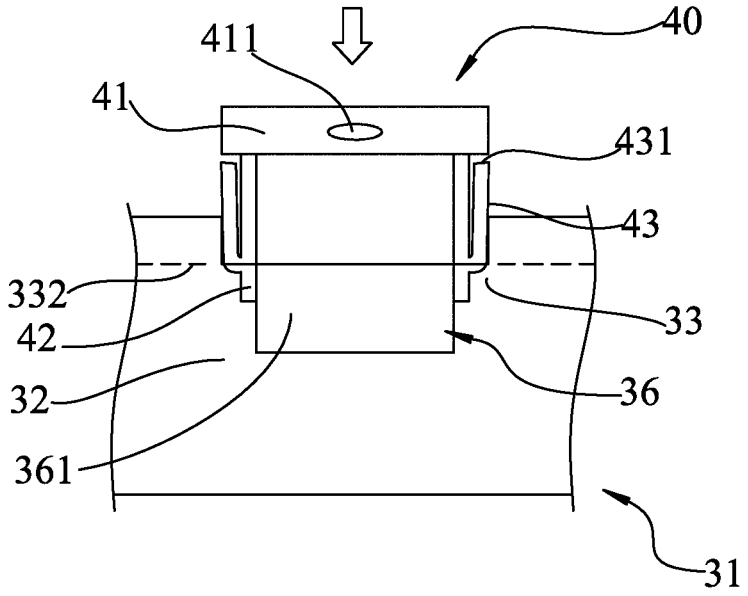
411
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FIG. 6

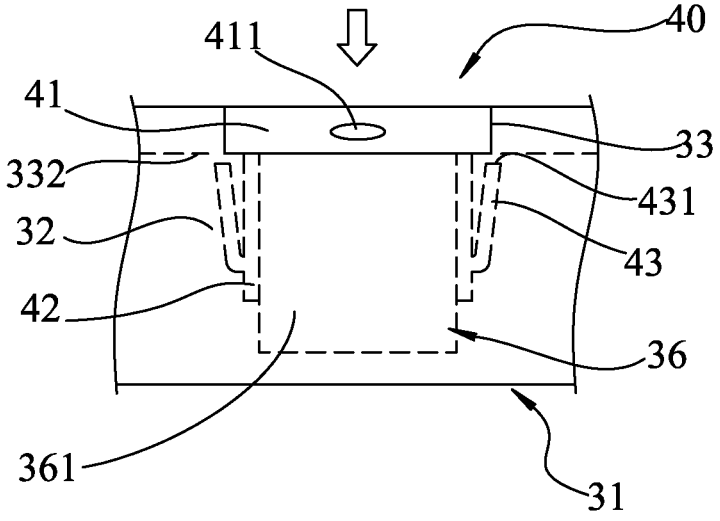
411
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FIG. 7

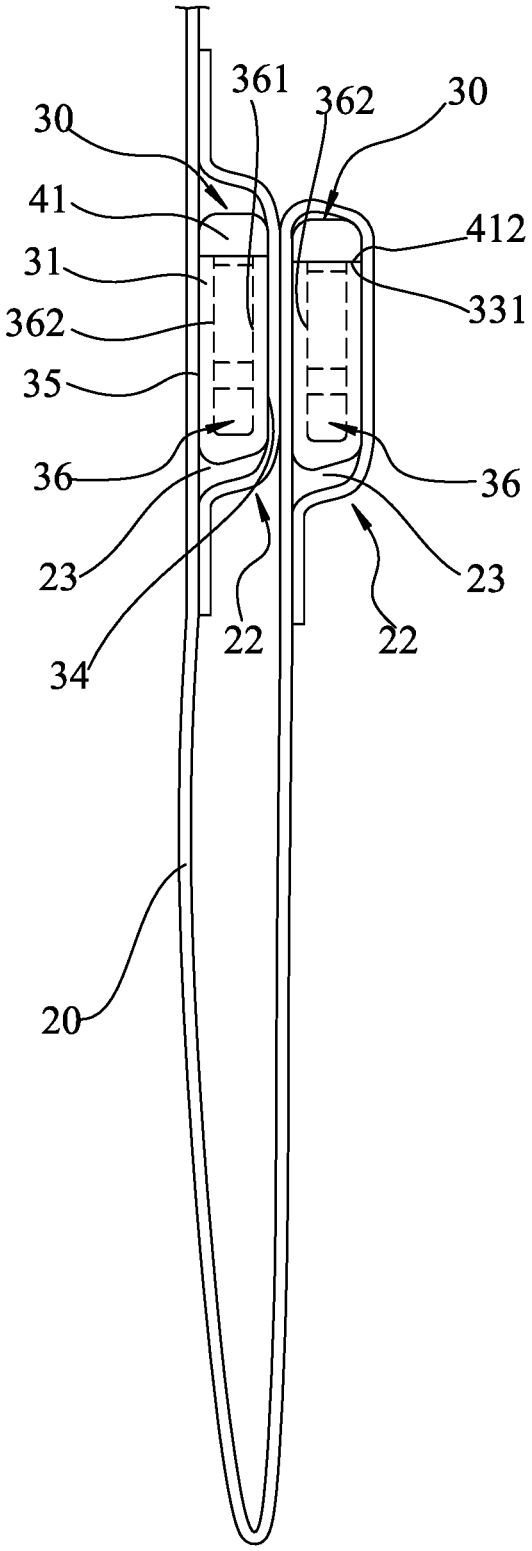

FIG. 8

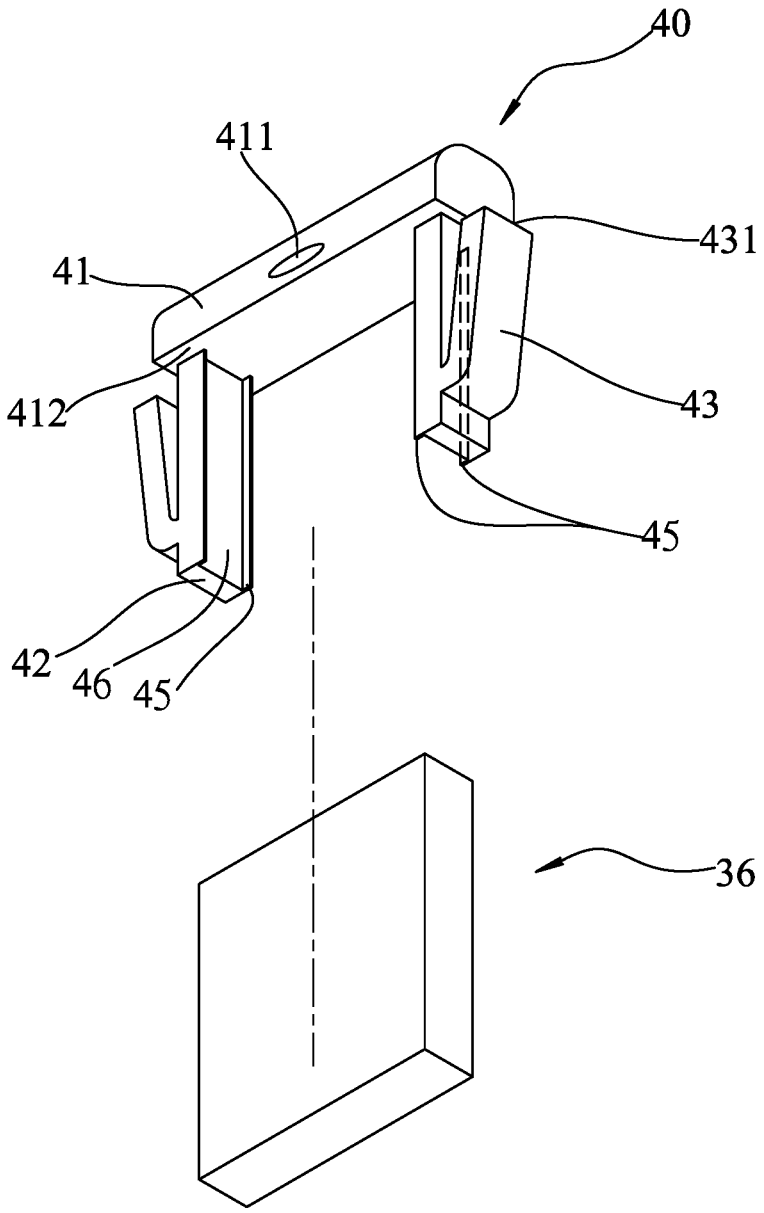

FIG. 9

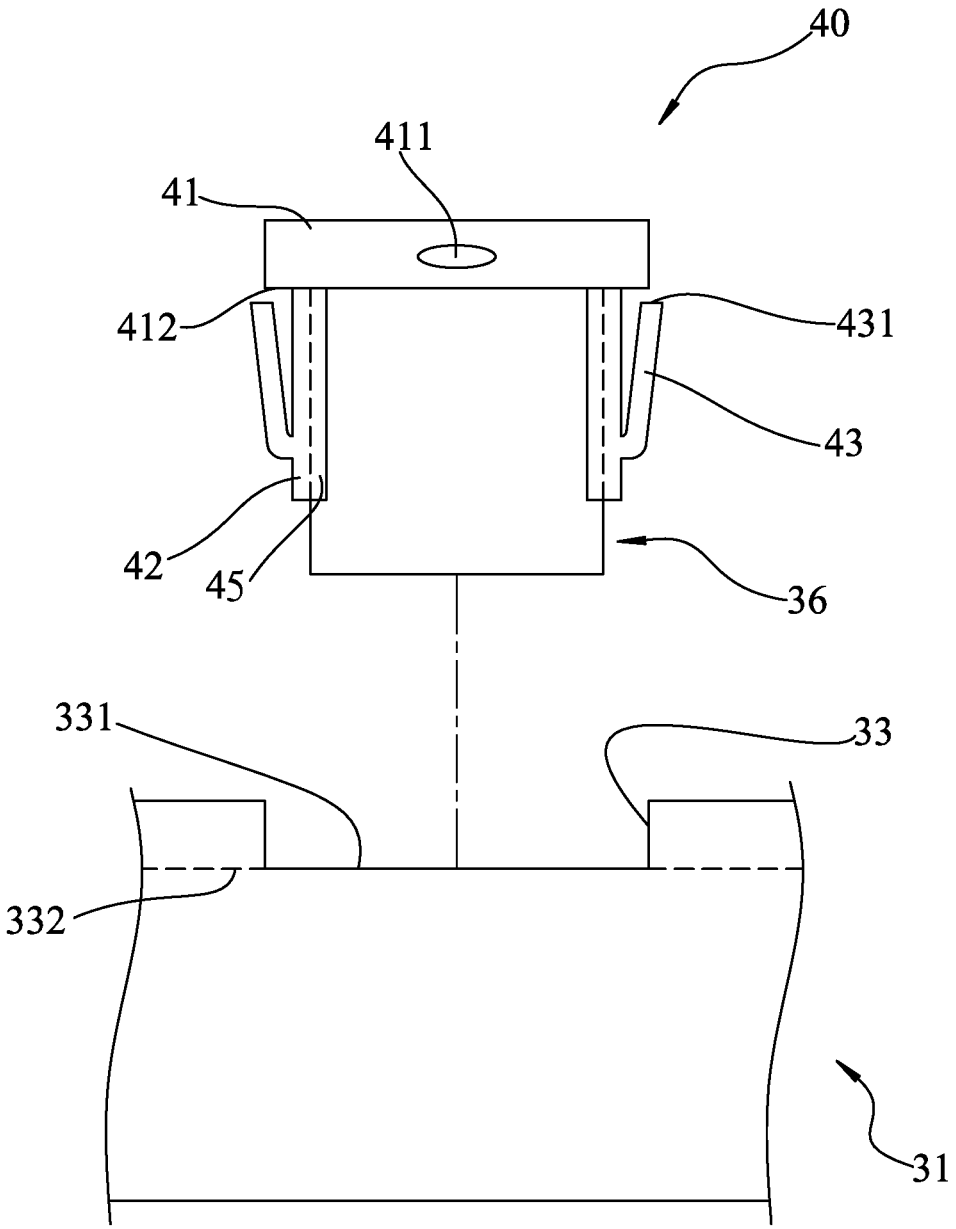

FIG. 10

CORDLESS CURTAIN ASSEMBLY WITH MAGNETIC UNITS

BACKGROUND OF THE INVENTION

1. Fields of the Invention

The present invention relates to a cordless curtain assembly, and more particularly, to a cordless curtain assembly having magnetic units connected to the fabric of the curtain so as to fold the fabric of the curtain by attracting the magnetic units.

2. Descriptions of Related Art

The conventional curtain assemblies generally have operation cords which hang downward from the top rail of the curtain assembly, and the users can pull the operation cords to collect or to expand the fabric of the curtain assembly. However, the operation cords have potential risks to children if the operation cords wrap around the children's neck.

Cordless curtain assembles are developed to improve the above mentioned problem. One of the conventional cordless curtain assemblies is disclosed in applicant's former U.S. Pat. No. 7,150,304 which discloses multiple magnets connected to the fabric so that when the curtain is folded, the user folds the bottom end of the fabric upward to attract the magnets consecutively. When expanding the fabric, the user pulls the bottom end of the fabric to detach the magnets one by one. No cord needed.

However, the magnets have to be connected to the fabric one by one by either melting art or sewing art. This takes a lot of time and the magnets may shift by impact. Besides, when installing the magnetic parts, the negative pole and the positive pole of each of the magnetic parts have to be correctly orientated so as to fold the fabric by attracting the magnetic parts correctly. This also increases assembling time and reduces the production efficiency of the cordless curtain assemblies.

The present invention intends to provide a cordless curtain with a magnetic operation system to eliminate the shortcomings mentioned above.

SUMMARY OF THE INVENTION

The present invention relates to a cordless curtain assembly and comprises top rail and a fabric is connected to the top rail. The fabric has multiple folding sections formed transversely thereto and each folding section has a passage defined therein. Multiple magnetic units are respectively received in the passages of the folding sections. Each magnetic unit has a carrier, multiple clamping members and multiple magnetic parts. The carrier of each magnetic unit is received in the passage corresponding thereto and has a first sidewall and a second sidewall which is located opposite to the first sidewall. A hollow area is defined between the first and second sidewalls. Two reception areas are defined in the top of the carrier and communicating with the hollow area. Each clamping member has a press bar and two legs which respectively extend from the underside of the press bar. The press bar has an identification portion. A receiving space is defined between the two legs and the press bar. Each leg has a resilient arm extending outward from the outside thereof and toward the press bar. Each resilient arm has a distal end. A gap is defined between each of the legs and the resilient arm corresponding thereto. Each clamping member has one of the magnetic parts clamped in the receiving space thereof. Each of the magnetic parts has a positive-pole face and a negative-pole face which is located opposite to the positive-pole face. The clamping members are respectively engaged with the reception areas. The two legs are inserted into the reception area and the press bar seals the top opening of the reception area. The resilient arms of each clamping members are squeezed when passing through the reception area. When the clamping member is engaged with the reception area, the resilient arms expand outward to restrict the clamping member from dropping out from the reception area of the carrier. The fabric is folded by attracting the magnetic units in the folding sections one by one.

Preferably, the carriers each are an elongate plastic part, and the upright height of the first sidewall is smaller than that of the second sidewall.

Preferably, each of the clamping members is a U-shaped plastic member. The width of each of the legs is smaller than the width of the underside of the press bar so as to form two elongate areas formed on two sides of the underside of the press bar relative to the two legs. Each of the reception areas has a recessed portion defined in each of the first and second sidewalls of the carrier. A first top support face is defined on the first sidewall by the recessed portion corresponding thereto, and a second top support face is defined on the second sidewall by the recessed portion corresponding thereto. The two legs and the two resilient arms are inserted into the reception area between the first and second sidewalls. The two elongate areas of the press bar are rested on the first and second top support faces when the press bar is engaged with the recessed portions of the first and second sidewalls to seal the top opening of the reception area.

Preferably, the width of the gap becomes larger toward the press bar.

Preferably, each of the two legs of each of the clamping members has two flanges extending from the inside thereof. A clamping slot is formed between the flanges of the two legs. The magnetic part is fitted into the clamping slot and restricted by the flanges.

The primary object of the present invention is to provide a cordless curtain assembly using magnetic units, wherein each magnetic unit includes a carrier which accepts multiple combinations of clamping members and magnetic parts. The clamping members are securely engaged with the reception areas of the carrier so that the assembly is easy and efficiency.

Another object of the present invention is to provide a cordless curtain assembly using magnetic units, wherein each clamping member has an identification portion which guides the assemblers to correctly install the magnetic parts to the clamping members.

The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view to show that the cordless curtain assembly of the present invention is expanded;

FIG. **2** is an exploded view of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **3** is an enlarged view to show that the combination of the clamping member and the magnetic part is engaged with the reception area of the carrier of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **4** is a front view to show that the combination of the clamping member and the magnetic part is to be engaged

with the reception area of the carrier of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **5** is a front view to show that the combination of the clamping member and the magnetic part enters into the reception area of the carrier of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **6** is a front view to show that the resilient arms of the clamping member are squeezed when entering into the reception area of the carrier of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **7** is a front view to show that the resilient arms of the clamping member expand outward after that the combination of the clamping member and the magnetic part is engaged with the reception area of the carrier of the magnetic unit of the cordless curtain assembly of the present invention;

FIG. **8** is an end view to show that the magnetic units in the folding sections of the fabric are attracted to each other when folding the fabric of the cordless curtain assembly of the present invention;

FIG. **9** shows another embodiment of the clamping member of the present invention, and

FIG. **10** shows that the magnetic part is clamped between the legs of the clamping member and restricted by the flanges on the legs of the clamping member.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. **1** to **3**, the cordless curtain assembly of the present invention comprises a top rail **1** and a fabric **20** having its top end connected to the top rail **1**. Multiple folding sections **22** are formed transversely at even distance to the fabric **20**, and each folding section **22** includes an elongate decoration piece connected to the fabric **20** so as to define a passage **23** between the decoration piece and the fabric **20**.

Multiple magnetic units **30** are respectively received in the passages **23** of the folding sections **22**. Each magnetic unit **30** has a carrier **31**, multiple clamping members **40** and multiple magnetic parts **36**. The carrier **31** of each magnetic unit **30** is received in the passage **23** corresponding thereto and has a first sidewall **34** and a second sidewall **35** which is located opposite to the first sidewall **34**. The carriers **31** each are an elongate plastic part. The upright height of the first sidewall **34** is smaller than that of the second sidewall **35**. A hollow area **32** is defined between the first and second sidewalls **34**, **35**. Two reception areas **33** are defined in the top of each of the carriers **31** and communicates with the hollow area **32**.

Each clamping member **40** has a press bar **41** and two legs **42** which respectively extend from the underside of the press bar **41**. The press bar **41** has an identification portion **411** formed to one side thereof. A receiving space **44** is defined between the two legs **42** and the press bar **41**. Each leg **42** has a resilient arm **43** extending outward from the lower portion of the outside thereof and toward the press bar **41**. Each resilient arm **43** has a distal end **431**. A gap is defined between each of the legs **42** and the resilient arm **43** corresponding thereto. The width of the gap becomes larger toward the press bar **41** so that the resilient arm **43** is allowed to be squeezed toward the leg **42**.

Each clamping member **40** has one of the magnetic parts **36** clamped in the receiving space **44** thereof. Each of the magnetic parts **36** has a positive-pole face **361** and a negative-pole face **362** which is located opposite to the positive-pole face **361**. When installing the magnetic part **36** in the receiving space **44**, the assemblers can easily install the magnetic part **36** by reference of the position of the identification portion **411** on the press bar **41**.

As shown in FIGS. **4** to **7**, the clamping members **40** are to be respectively engaged with the reception areas **33**. The two legs **42** are inserted into the reception area **33** and the press bar **41** seals the top opening of the reception area **33**. The resilient arms **43** of each clamping members **40** are squeezed when passing through the reception area **33**. When the clamping member **40** is completely engaged with the reception area **33**, the resilient arms **43** expand outward to restrict the clamping member **40** from dropping out from the reception area **33** of the carrier **31**.

Specifically, each of the clamping members **40** is a U-shaped plastic member. The width of each of the legs **42** is smaller than the width of the underside of the press bar **41** so as to form two elongate areas **412** formed on two sides of the underside of the press bar **41** relative to the two legs **42**. Each of the reception areas **33** has a recessed portion defined in each of the first and second sidewalls **34**, **35** of the carrier **31**. A first top support face **331** is defined on the first sidewall **34** by the recessed portion corresponding thereto, and a second top support face **332** is defined on the second sidewall **35** by the recessed portion corresponding thereto. The two legs **42** and the two resilient arms **43** are inserted into the reception area **33** between the first and second sidewalls **34**, **35**. The two elongate areas **412** of the press bar **41** are rested on the first and second top support faces **331**, **332** when the press bar **41** is engaged with the recessed portions of the first and second sidewalls **34**, **35** to seal the top opening of the reception area **33**. Preferably, the top surface of the press bar **41** is in flush with the top of the carrier **31**.

As shown in FIG. **8**, when folding the cordless curtain assembly, the lower end of the fabric **20** is folded upward by attracting the magnetic units **30** in the folding sections **22** one by one. The fabric **20** is able to be folded upward to a desired position. When expanding the fabric **20**, a force is applied to pull the folded sections of the fabric **20** to separate the attracted magnetic units **30**.

As shown in FIGS. **9** and **10**, each of the two legs **42** of each of the clamping members **40** has two flanges **45** extending from the inside thereof. A clamping slot **46** is formed between the flanges **45** of each of the two legs **42**. The magnetic part **36** is fitted into the two clamping slots **46** of the two legs **41** and restricted by the flanges **45**.

While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A cordless curtain assembly comprising:

a top rail;

a fabric having a top end connected to the top rail, multiple folding sections formed transversely to the fabric, each folding section having a passage defined therein;

multiple magnetic units respectively received in the passages of the folding sections, each magnetic unit having a carrier, multiple clamping members and multiple magnetic parts, the carrier of each magnetic unit being received in the passage corresponding thereto and having a first sidewall and a second sidewall which is located opposite to the first sidewall, a hollow area defined between the first and second sidewalls, at least

two reception areas defined in a top of the carrier and communicating with the hollow area;

each clamping member having a press bar and two legs which respectively extend from an underside of the press bar, the press bar having an identification portion, a receiving space defined between the two legs and the press bar, each leg having a resilient arm extending outward from an outside thereof and toward the press bar, each resilient arm having a distal end, a gap defined between each of the legs and the resilient arm corresponding thereto, and

each clamping member having one of the magnetic parts clamped in the receiving space thereof, each of the magnetic parts having a positive-pole face and a negative-pole face which is located opposite to the positive-pole face, the clamping members respectively engaged with the reception areas, the two legs inserted into the reception area and the press bar sealing a top opening of the reception area, the resilient arms of each clamping members being squeezed when passing through the reception area, when the clamping member is engaged with the reception area, the resilient arms expand outward to restrict the clamping member from dropping out from the reception area of the carrier, the fabric being folded by attracting the magnetic units in the folding sections one by one.

2. The cordless curtain assembly as claimed in claim **1**, wherein the carriers each are an elongate plastic part, an upright height of the first sidewall is smaller than that of the second sidewall.

3. The cordless curtain assembly as claimed in claim **1**, wherein each of the clamping members is a U-shaped plastic member, the width of each of the legs is smaller than the width of the underside of the press bar so as to form two elongate areas formed on two sides of the underside of the press bar relative to the two legs, each of the reception areas has a recessed portion defined in each of the first and second sidewalls of the carrier, a first top support face is defined on the first sidewall by the recessed portion corresponding thereto, and a second top support face is defined on the second sidewall by the recessed portion corresponding thereto, the two legs and the two resilient arms are inserted into the reception area between the first and second sidewalls, the two elongate areas of the press bar are rested on the first and second top support faces when the press bar is engaged with the recessed portions of the first and second sidewalls to seal the top opening of the reception area.

4. The cordless curtain assembly as claimed in claim **1**, wherein a width of the gap becomes larger toward the press bar.

5. The cordless curtain assembly as claimed in claim **1**, wherein each of the two legs of each of the clamping members has two flanges extending from an inside thereof, a clamping slot is formed between the flanges of each of the two legs, the magnetic part is fitted into the two clamping slots and restricted by the flanges.

* * * * *