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Tseng

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(54) **SHUFFLE AND DEAL DEVICE FOR MAHJONG TILES**

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A63F 9/00 (2006.01)
A63F 11/00 (2006.01)
A63F 9/20 (2006.01)

(52) **U.S. Cl.**
CPC ***A63F 11/0002*** (2013.01); ***A63F 9/20*** (2013.01); *A63F 2009/205* (2013.01)

(58) **Field of Classification Search**
CPC ... A63F 11/0002; A63F 9/20; A63F 2009/205
See application file for complete search history.

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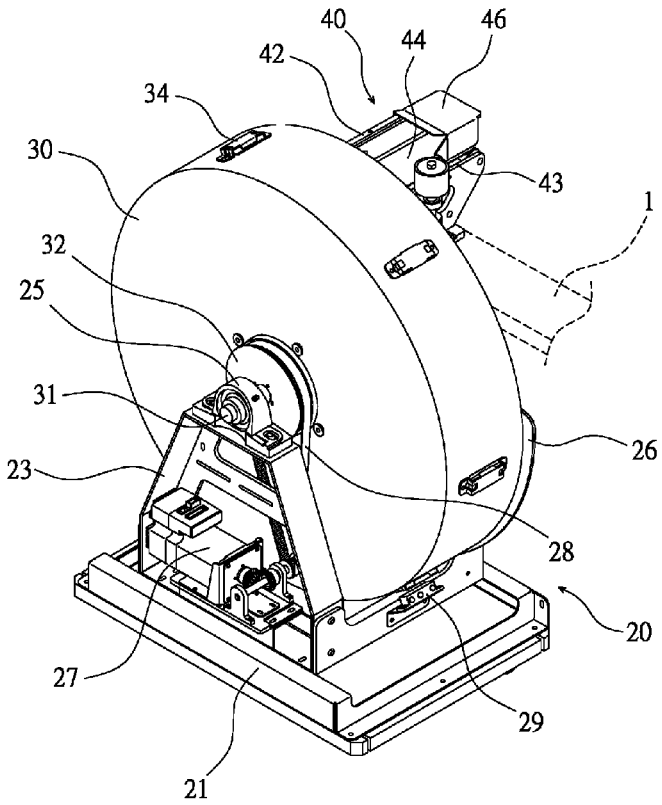
(57) **ABSTRACT**

A shuffle and deal device for mahjong tiles includes mahjong tiles, a shuffle mechanism, and a deal mechanism. Each mahjong tile includes an inner magnet therein. The shuffle mechanism includes a cylinder formed with through holes each provided with a magnet assembly for attracting the inner magnet. The cylinder brings the mahjong tiles to be turned. The deal mechanism includes a tall side board and a short side board. A conveying belt is provided between the tall side board and the short side board. An outer side of the short side board is provided with a guide wheel. A front end of the deal mechanism is inserted in the cylinder. The mahjong tiles are brought by the cylinder to pass the short side board and be blocked by the tall side board to disengage from the magnet assembly and drop on the conveying belt to be delivered out.

7 Claims, 6 Drawing Sheets



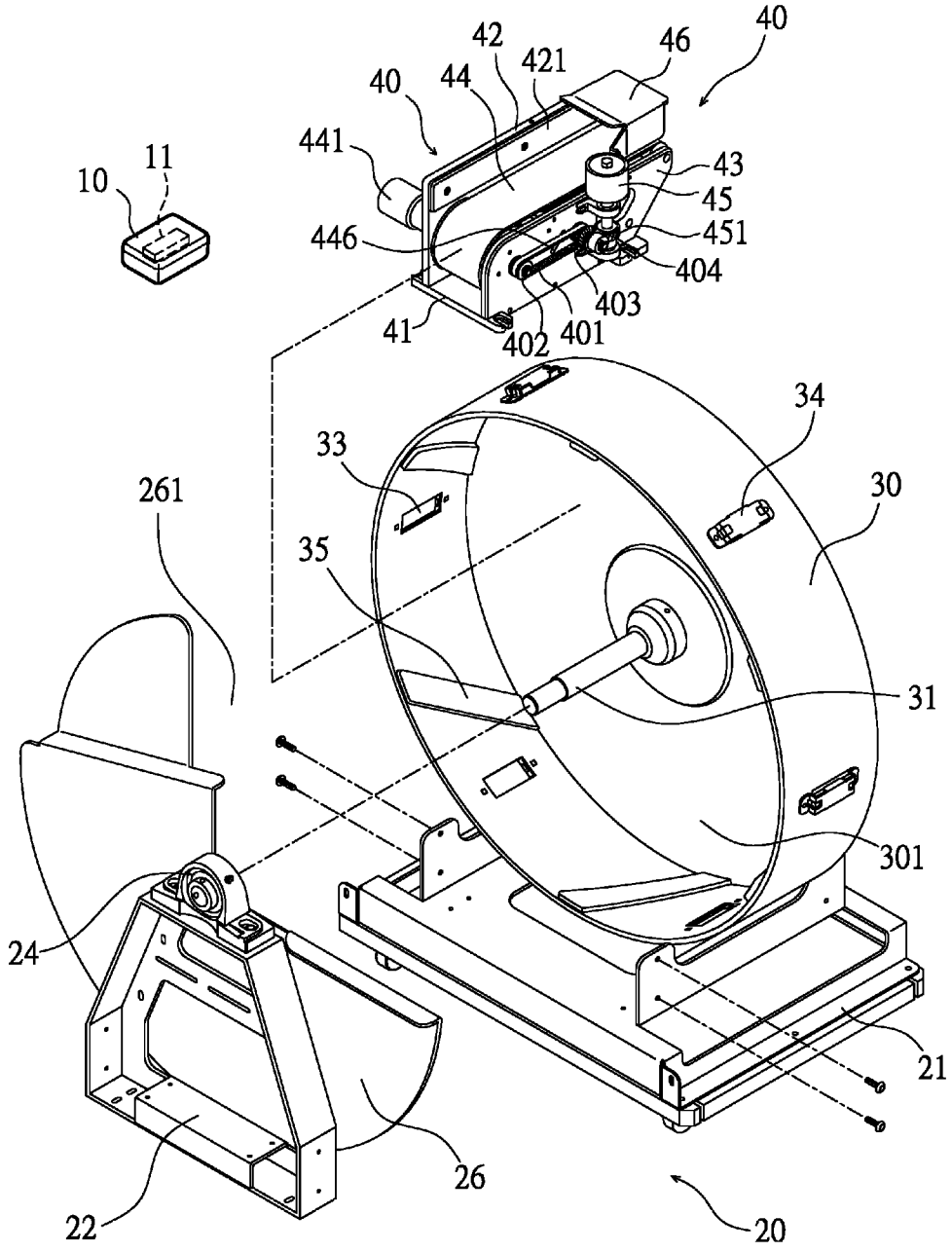

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FIG. 1

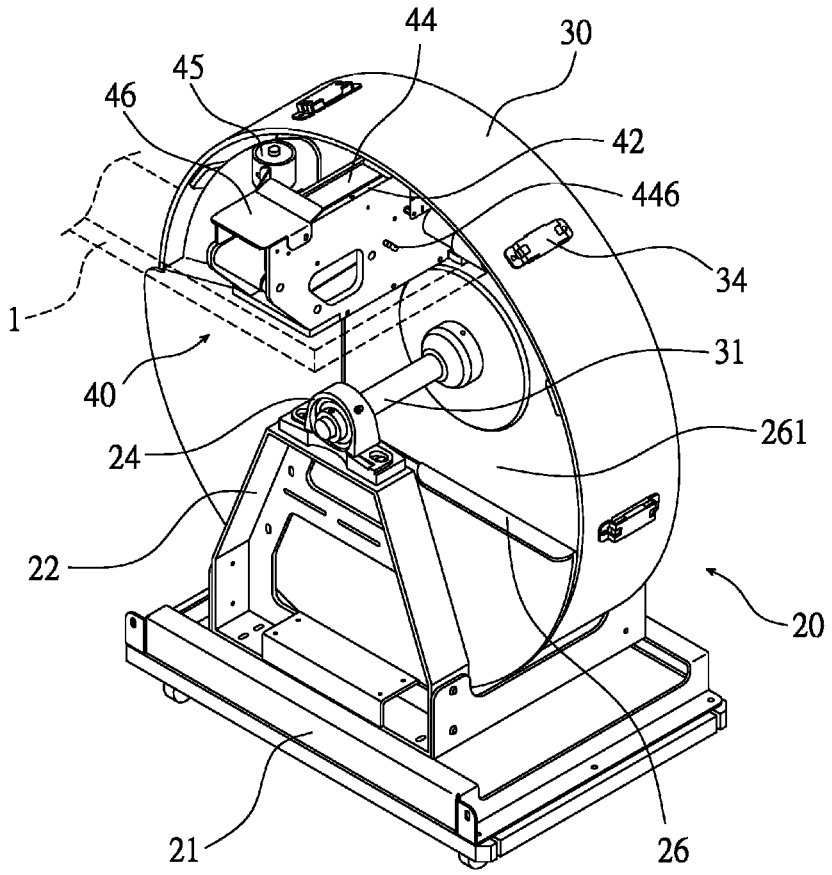

FIG. 2

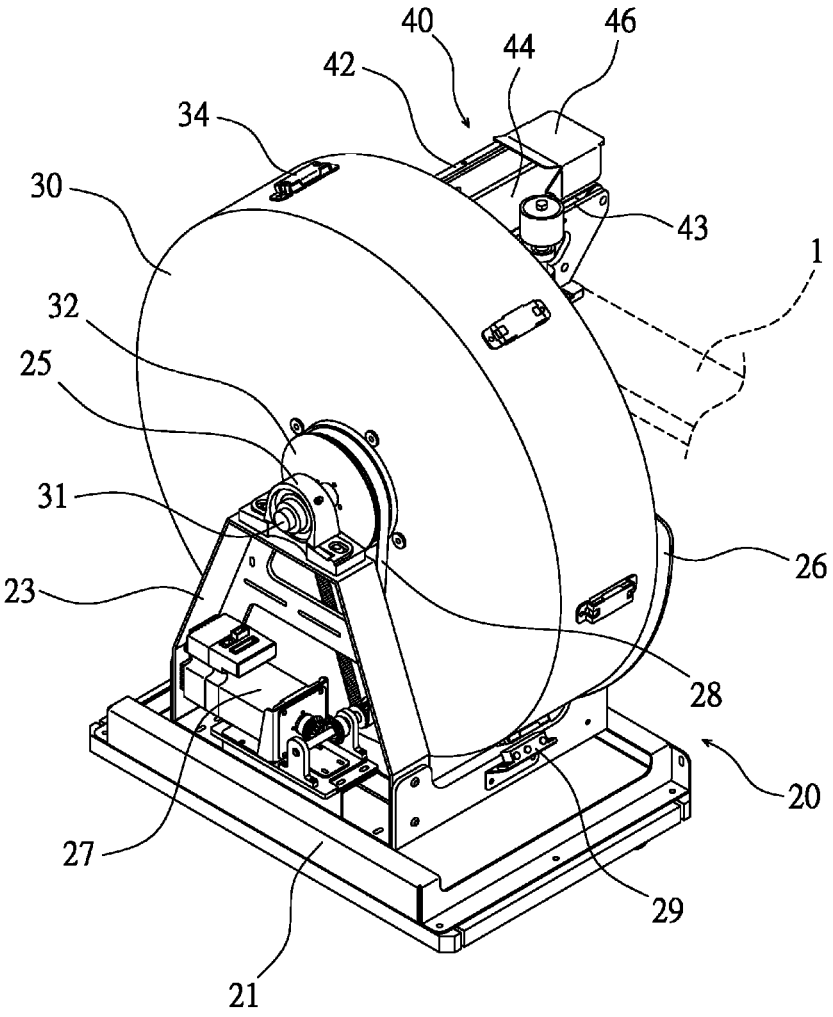

FIG. 3

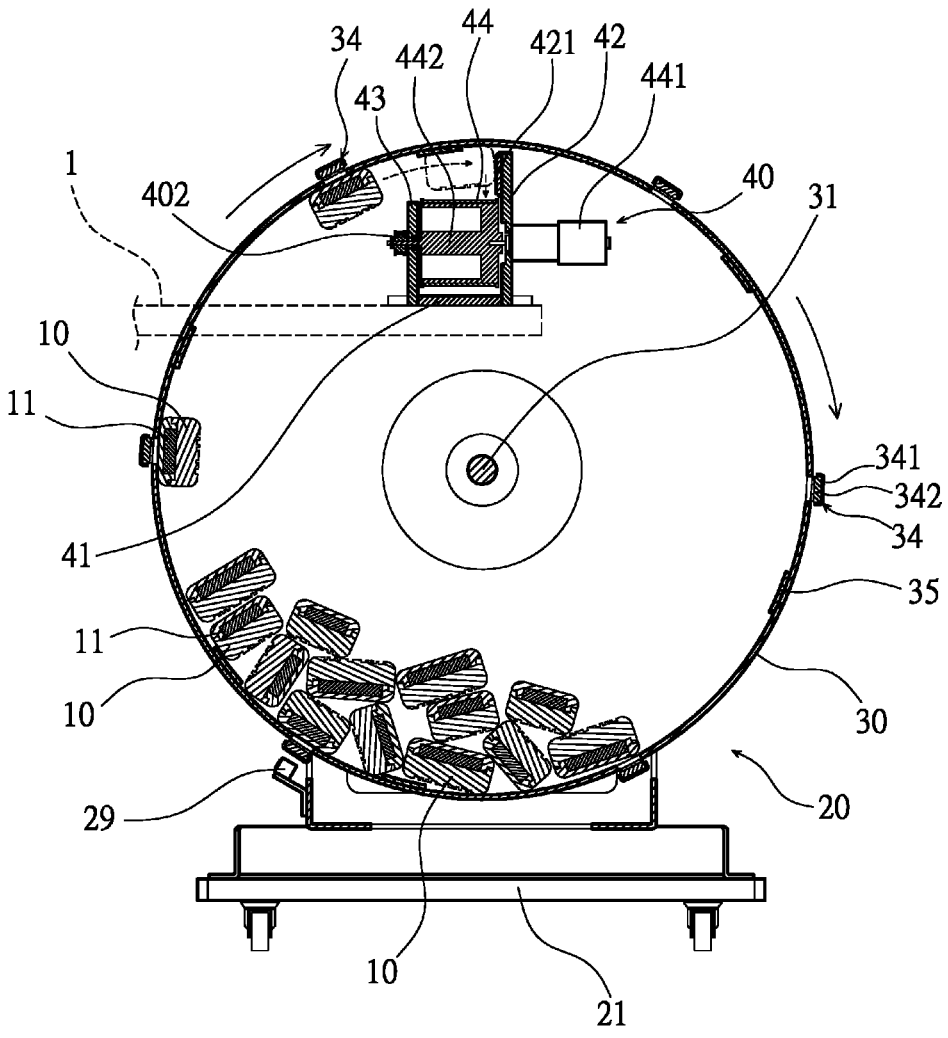
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FIG. 4

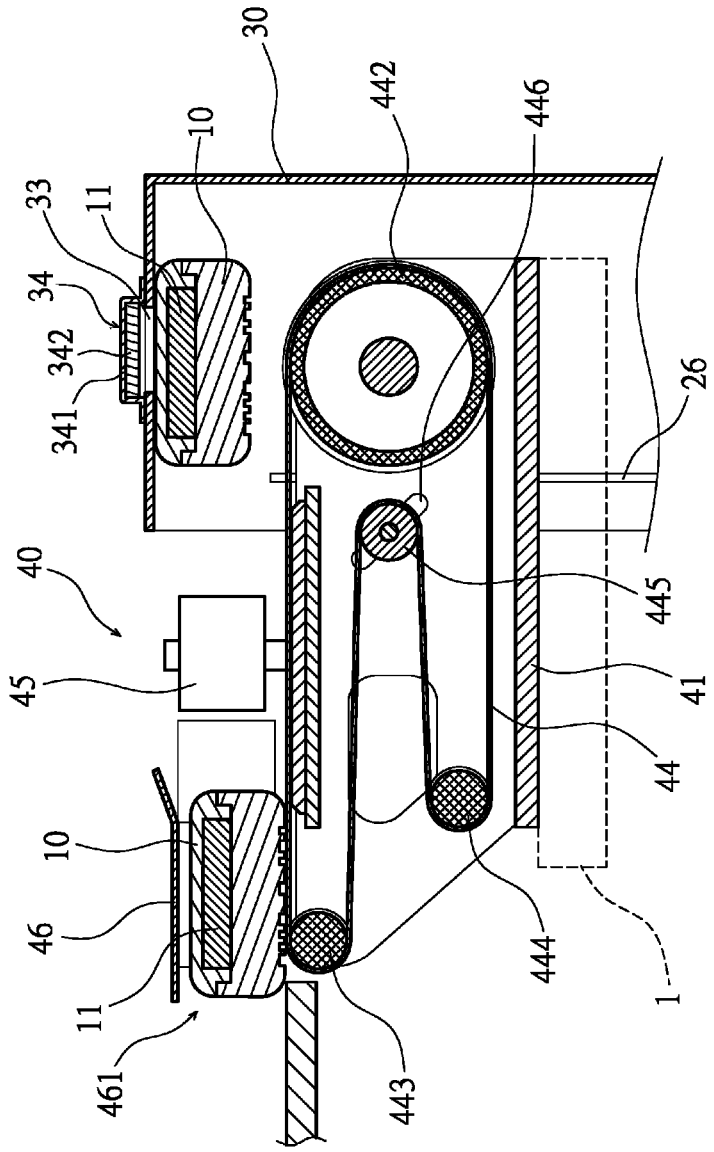
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FIG. 5

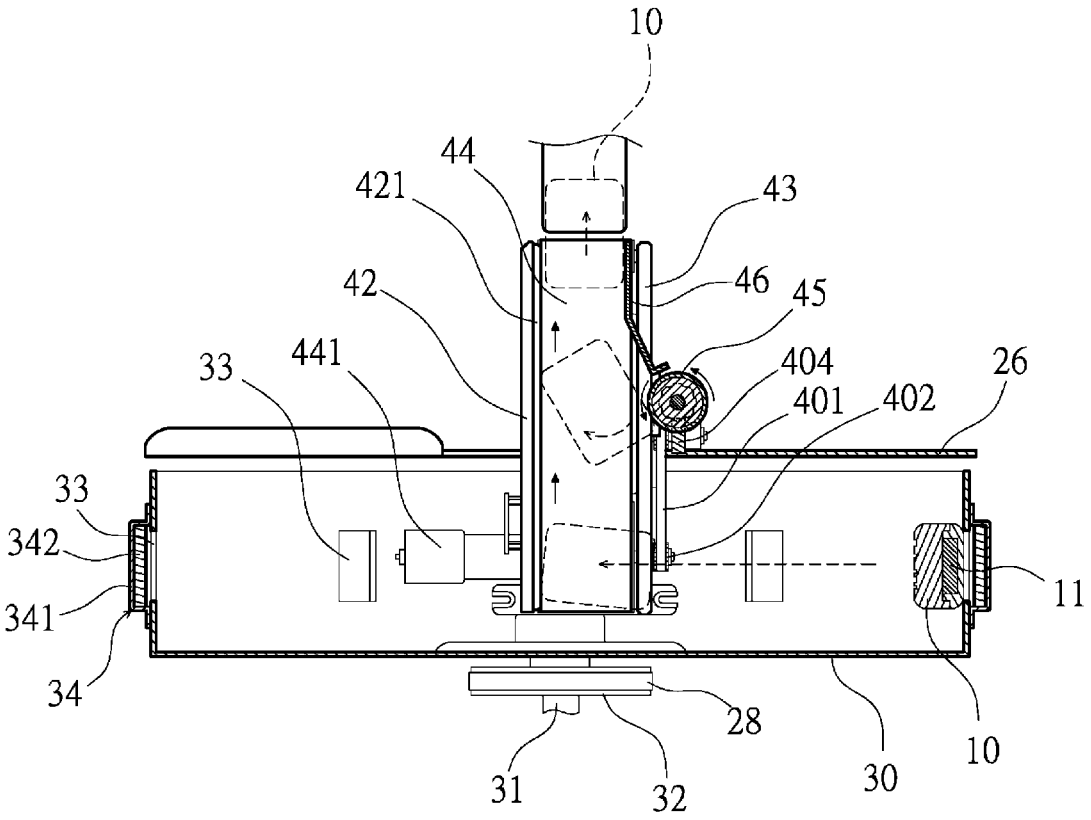
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FIG.6

SHUFFLE AND DEAL DEVICE FOR MAHJONG TILES

NOTICE OF COPYRIGHT

BACKGROUND OF THE PRESENT INVENTION

Field of Invention

The present invention relates to a shuffle and deal device for mahjong tiles, and more particularly to a device able to shuffle mahjong tiles evenly and output mahjong tiles one by one by means of magnetism.

Description of Related Arts

Mahjong is a puzzle entertainment for all ages, which contains various changes. It is well known that Mahjong is one of the quintessence of Chinese culture. With the developments of technology and network, there are different mahjong games. During a variety of mahjong games, it is necessary to shuffle tiles, stack tiles, and deal tiles. In order to increase the fairness of the mahjong game and to prevent fraud, the players should reduce the chance of touching tiles. Therefore, a mahjong table able to shuffle, stack and retrieve tiles automatically is developed on the market. But, this mahjong table is only suitable to play a traditional mahjong game for four players to sit around the table. If the players want to play different mahjong games, there is no auxiliary product able to shuffle and deal tiles automatically, let alone to cooperate with electronic and computer games. Accordingly, the inventor of the present invention has devoted himself based on his many years of practical experiences to solve this problem.

SUMMARY OF THE PRESENT INVENTION

The primary object of the present invention is to solve the foregoing problems and to provide a shuffle and deal device for mahjong tiles. Each mahjong tile is provided with an inner magnet therein. A circumferential surface of a cylinder of a shuffle mechanism is formed with through holes. An outer side of each through hole is provided with a magnet assembly for attracting the inner magnet of the mahjong tile. The cylinder brings the mahjong tiles to be turned. The mahjong tiles will be blocked by a deal mechanism to drop on a conveying belt to be output one by one for playing a game. The present invention provides an automation function for shuffling and dealing tiles and reduces human intervention.

Another object of the present invention is to provide a shuffle and deal device for mahjong tiles, wherein an outer side of the conveying belt of the deal mechanism is provided with a guide wheel. If the mahjong tile is transversely delivered, one end of the mahjong tile will be blocked by the guide wheel to change its direction. The mahjong tile is brought by the guide wheel which is turned reversely relative to the forward direction of the conveying belt, such that the direction of the mahjong tile can be corrected easily on the conveying belt to be output longitudinally. The present invention provides an automatic correction function for the direction of the mahjong tiles.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of the present invention;

FIG. **2** is a perspective view of the present invention;

FIG. **3** is a rear perspective view of the present invention;

FIG. **4** is a front sectional view of the present invention;

FIG. **5** is a side sectional view of the deal mechanism of the present invention; and

FIG. **6** is a top sectional view of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings.

As shown in FIG. **1** to FIG. **6**, a shuffle and deal device for mahjong tiles of the present invention comprises a plurality of mahjong tiles **10**, a shuffle mechanism **20**, and a deal mechanism **40**. The deal mechanism **40** is coupled on a machine platen **1**. Each of the mahjong tiles **10** has a rectangular shape and a face at a bottom thereof and is provided with an inner magnet **11** therein disposed close to a top central portion thereof and extending in a long axis direction thereof. The mahjong tiles **10** are shuffled evenly by the shuffle mechanism **20** and conveyed out one by one through the deal mechanism **40**. The shuffle mechanism **20** comprises a base **21**, a front side frame **22** and a rear side frame **23** corresponding to each other and disposed on the base **21**, and a cylinder **30** having an opening **301** at a front side thereof. A top end of the front side frame **22** is provided with a front bearing seat **24**. A top end of the rear side frame **23** is provided with a rear bearing seat **25**. The center of the cylinder **30** is provided with a rotatable shaft **31**. The rotatable shaft **31** passes through a fluted disk **32** disposed at a rear side of the cylinder **30**. The rotatable shaft **31** is connected between the front bearing seat **24** and the rear bearing seat **25**. The front side frame **22** is provided with a front cover **26** having a notch **261** to cover the opening **301** of the cylinder **30**. The front cover **26** is not in contact with the cylinder **30**. The rear side frame **23** is provided with a first motor **27** to drive a first transmission belt **28** fitted on the fluted disk **32** to bring the cylinder **30** to turn. A circumferential surface of the cylinder **30** is formed with a plurality of spaced rectangular through holes **33**. An inner side wall of the cylinder **30** is provided with oblique guide boards **35** each disposed between every two of the through holes **33**. A long axis direction of the through holes **33** is same as an axial direction of the cylinder **30**. An outer side of each through hole **33** is provided with a magnet assembly **34**. The magnet assembly **34** includes a fixing member **341** and a magnet **342** wrapped by the fixing member **341** and corresponding to the long axis direction of the through hole **33**. The fixing member **341** is coupled to the outer circumferential surface of the cylinder **30**. The magnet **342** corresponds to a respective one of the through holes **33** to attract the inner magnet **11** of one of the mahjong tiles **10** in the cylinder **30**, enabling the cylinder **30** to bring the attracted mahjong tile **10** to be turned. The base **21** is provided with a reed switch **29**. The reed switch **29** is located close to the cylinder **30** to sense the passing of the magnet assembly **34** and detect rotation of the cylinder **30**. The deal mechanism **40** includes an elongate bottom board **41**. One side of the bottom board **41** in a long axis direction thereof is provided

with a tall side board **42**, and another side of the bottom board **41** is provided with a short side board **43**. An inner side of the tall side board **42** is provided with a smooth plate **421**. The bottom board **41** is coupled on the machine platen **1**. A second motor **441** is coupled to an outer side of the tall side board **42** to drive a conveying belt **44** provided between the tall side board **42** and the short side board **43**. The conveying belt **44** is to surround a drive wheel **442**, an upper idle wheel **443**, and a lower idle wheel **444**. The drive wheel **442** is directly driven by the second motor **441**. The tall side board **42** and the short side board **43** are formed with corresponding oblique grooves **446**. A tension pulley **445** is connected between the oblique grooves **446** and can be adjusted within the oblique grooves **46**. An outer side of the conveying belt **44** passes around the tension pulley **445**. An outer side of the short side board **43** is provided with a first outer gear **402**. The first outer gear **402** and the drive wheel **442** are turned coaxially. Through a second transmission belt **401**, the first outer gear **402** drives a second outer gear **403** and a first helical gear **404** coaxial with the second outer gear **403**. The first helical gear **404** meshes with a second helical gear **451**. An upper end of the second helical gear **451** is provided with a guide wheel **45**. The guide wheel **45** is coaxial with the second helical gear **451** and driven synchronously. A tangential direction of rotation of the guide wheel **5** is opposite to a forwarding direction of the conveying belt **44**. The guide wheel **45** protrudes out of a top end of the short side board **43**. A leading board **46** is provided over a rear end of the conveying belt **44**. The leading board **46** has a flared opening at a front end thereof. An exit **461** is formed between the leading board **46** and the conveying belt **44** for mahjong tiles **10**. A front end of the deal mechanism **40** passes through the notch **261** of the cover **26** and is inserted in the cylinder **30**, such that the deal mechanism **40** is located at an inner top end of the cylinder **30**. The tall side board **42** is not in contact with the cylinder **30**. The mahjong tile **10** attracted by the magnet assembly **34** of the cylinder **30** is brought to pass the short side board **43** and be blocked by the tall side board **42** to disengage from the magnet assembly **34** and drop on the conveying belt **44** to be delivered out. Thereby, the mahjong tiles **40** can be output one by one from the cylinder **30**, providing an automation function for shuffling and dealing tiles and reducing human intervention.

The details of the assembly of the present invention are described as below. As shown in FIG. **1** to FIG. **6**, the components of the present invention, in contact with the mahjong tiles **10**, are made of a non-magnetic material, so that the inner magnet **11** of each mahjong tiles **10** won't attract an external object to influence the shuffle and deal of the mahjong tiles **10**. The inner magnet **11** is disposed close to the top of the mahjong tile **10**, enabling the top of the mahjong tile **10** to possess magnetic attraction and the bottom of the mahjong tile **10** not to possess magnetic attraction. The inner magnets **11** of the mahjong tiles **10** are disposed to have the same magnetic pole at respective upper and lower ends thereof according to the principle that the opposite magnetic poles attract each other and the same magnetic poles are repulsive each other. When the tops of two mahjong tiles **10** approach, they will be repelled apart. This is beneficial to shuffle tiles evenly. The magnetic pole of the magnet **342** of the magnet assembly **34**, facing the inside of the cylinder **30**, is different from the magnetic pole of the top of the inner magnet **11**, so that the magnet assembly **34** can attract and bring the mahjong tile **10** to the top of the cylinder **30**. The attracted mahjong tile **10** faces downward and is blocked by the tall side board **42** to drop on the conveying belt **44**. Because the mahjong tile **10** faces downward, the player cannot take a peep at the mahjong tile **10**. The mahjong tile **10** is attracted by the magnet assembly **34** in the long axis direction, so it will drop on the conveying belt **44** longitudinally. Furthermore, the smooth plate **421** is made of Teflon, so its friction coefficient is low to provide a slippery function. One side of each mahjong tile **10** leans against the smooth plate **421** to decrease friction during conveyance.

Referring to FIG. **1** to FIG. **6**, when the present invention is in use, the mahjong tiles **10** are placed into the cylinder **30**. The first motor **27** drives the first transmission belt **28** to bring the cylinder **30** to turn. After the cylinder **30** is turned, the oblique boards **35** enables the mahjong tiles **10** to be displaced obliquely and stirred so as to shuffle the mahjong tiles **10** evenly. The magnet assembly **34** of the cylinder **30** attracts the inner magnet **11** of one of the mahjong tiles **10** from the bottom of the cylinder **30**. The reed switch **29** detects rotation of the cylinder **30**. If the rotation is abnormal (the reed switch **29** detects that the frequency of the magnet assembly **34** passing the reed switch **29** is in the range of errors), it will be determined there is an obstacle to rotation. The motor **27** will be reversely turned a set distance and then continue turning to obviate the obstacle. The mahjong tile **10** attracted by the shuffle mechanism **20** is blocked by the tall side board **42** to drop on the conveying belt **44**. The conveying belt **44** is driven by the second motor **441** to deliver the mahjong tiles **10** stably. The tension of the conveying belt **44** can be adjusted by adjusting the position of the tension pulley **445** in the oblique grooves **446**.

Referring to FIG. **5** and FIG. **6**, a distance between an edge of the guide wheel **45** and the tall side board **42** and a width of the exit **461** of the leading board **46** are greater than a length in a short axis direction of the mahjong tile **10**, but less than a length in the long axis direction of the mahjong tile **10**. If the mahjong tile **10** is transversely delivered (as shown in FIG. **6**), one end of the mahjong tile **10** will be blocked by the guide wheel **45** to change its direction. The mahjong tile **10** is brought by the guide wheel **45** which is turned reversely relative to the forward direction of the conveying belt **44**, such that the direction of the mahjong tile **10** can be corrected easily on the conveying belt **44** to longitudinally pass through the leading board **46** to be output. The present invention provides an automatic correction function for the direction of the mahjong tiles.

Although particular embodiments of the present invention have been described in detail for purposes of illustration, various modifications and enhancements may be to made without departing from the spirit and scope of the present invention. Accordingly, the present invention is not to be limited except as by the appended claims.

What is claimed is:

1. A shuffle and deal device for mahjong tiles, comprising a plurality of mahjong tiles, a shuffle mechanism, and a deal mechanism, the deal mechanism being coupled on a machine platen, each of the mahjong tiles having a rectangular shape and a face at a bottom thereof and being provided with an inner magnet therein extending in a long axis direction thereof, the inner magnet being disposed close to a top central portion of each mahjong tile, the mahjong tiles being shuffled evenly by the shuffle mechanism and conveyed out one by one through the deal mechanism; the shuffle mechanism comprising a front side frame, a rear side frame, and a cylinder having an opening at a front side thereof, a top end of the front side frame being provided with a front bearing seat, a top end of the rear side frame being provided with a rear bearing seat, a center of the cylinder

being provided with a rotatable shaft, the rotatable shaft passing through a fluted disk disposed at a rear side of the cylinder, the rotatable shaft being connected between the front bearing seat and the rear bearing seat, the front side frame being provided with a front cover having a notch to cover the opening of the cylinder, the front cover being not in contact with the cylinder, the rear side frame being provided with a first motor to drive a first transmission belt fitted on the fluted disk to bring the cylinder to turn, a circumferential surface of the cylinder being formed with a plurality of spaced rectangular through holes, a long axis direction of the through holes being same as an axial direction of the cylinder, an outer side of each through hole being provided with a magnet assembly, the magnet assembly comprising a fixing member and a magnet wrapped by the fixing member and corresponding to the long axis direction of the through holes, the fixing member being coupled to the outer circumferential surface of the cylinder, the magnet corresponding to a respective one of the through holes to attract the inner magnet of one of the mahjong tiles in the cylinder, enabling the cylinder to bring the attracted mahjong tile to be turned, a base being provided beneath the front and rear side frames, the base being provided with a reed switch, the reed switch being located close to the cylinder to sense passing of the magnet assembly, the deal mechanism comprising an elongate bottom board, one side of the bottom board in a long axis direction thereof being provided with a tall side board, and another side of the bottom board being provided with a short side board, the bottom board being coupled on the machine platen, a second motor being coupled to an outer side of the tall side board to drive a conveying belt provided between the tall side board and the short side board, a front end of the deal mechanism passing through the notch of the cover and being inserted in the cylinder, enabling the deal mechanism to be located at an inner top end of the cylinder, the tall side board being not in contact with the cylinder, the mahjong tile attracted by the magnet assembly of the cylinder being brought to pass the short side board and be blocked by the tall side board to disengage from the magnet assembly and drop on the conveying belt.

2. The shuffle and deal device for mahjong tiles as claimed in claim **1**, wherein an inner side wall of the cylinder is provided with oblique guide boards each disposed between every two of the through holes.

3. The shuffle and deal device for mahjong tiles as claimed in claim **1**, wherein an inner side of the tall side board is provided with a smooth plate.

4. The shuffle and deal device for mahjong tiles as claimed in claim **1**, wherein the conveying belt is to surround a drive wheel, an upper idle wheel, and a lower idle wheel, and the drive wheel is directly driven by the second motor.

5. The shuffle and deal device for mahjong tiles as claimed in claim **4**, wherein the tall side board and the short side board are formed with corresponding oblique grooves, a tension pulley is connected between the oblique grooves and adjustable within the oblique grooves, and an outer side of the conveying belt passes around the tension pulley.

6. The shuffle and deal device for mahjong tiles as claimed in claim **4**, wherein an outer side of the short side board is provided with a first outer gear, the first outer gear and the drive wheel are turned coaxially, through a second transmission belt, the first outer gear drives a second outer gear and a first helical gear coaxial with the second outer gear, the first helical gear meshes with a second helical gear, an upper end of the second helical gear is provided with a guide wheel, the guide wheel is coaxial with the second helical gear and driven synchronously, a tangential direction of rotation of the guide wheel is opposite to a forwarding direction of the conveying belt, the guide wheel protrudes out of a top end of the short side board, and a distance between an edge of the guide wheel and the tall side board is greater than a length in a short axis direction of the mahjong tiles but less than a length in the long axis direction of the mahjong tiles.

7. The shuffle and deal device for mahjong tiles as claimed in claim **4**, wherein a leading board is provided over a rear end of the conveying belt, the leading board has a flared opening at a front end thereof, an exit is formed between the leading board and the conveying belt for the mahjong tiles, and a width of the exit of the leading board is greater than a length in a short axis direction of the mahjong tiles but less than a length in the long axis direction of the mahjong tiles.

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