Jan. 3, 1956 W. L. FRAMPTON 2,729,020

MARBLE RUNWAY DEVICE

Filed April 12, 1951 2 Sheets-Sheet 1

FIG. 1

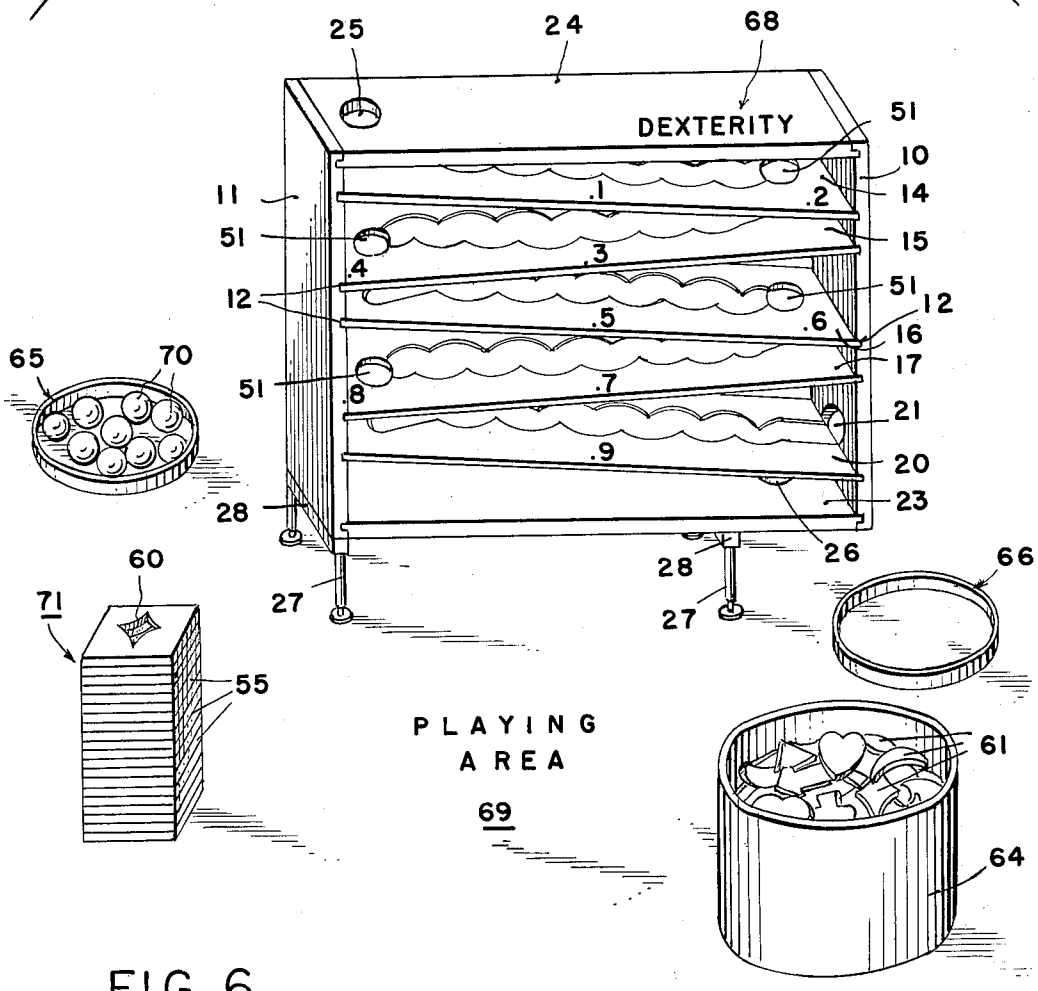

FIG. 6

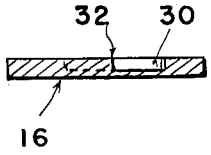

FIG. 7

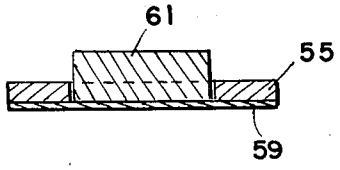

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FIG. 2

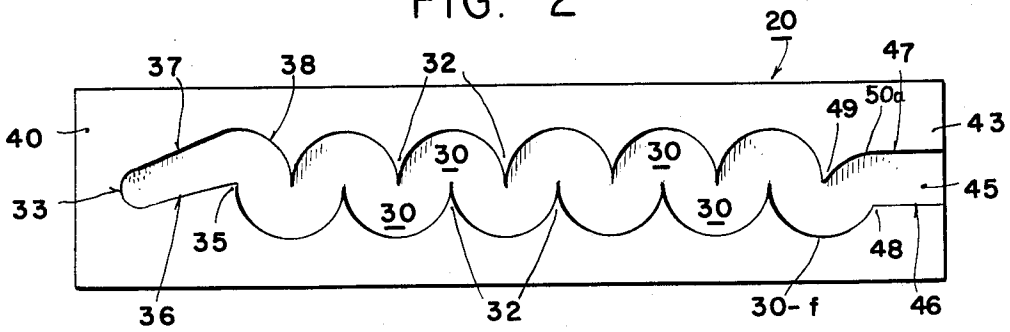


FIG. 3

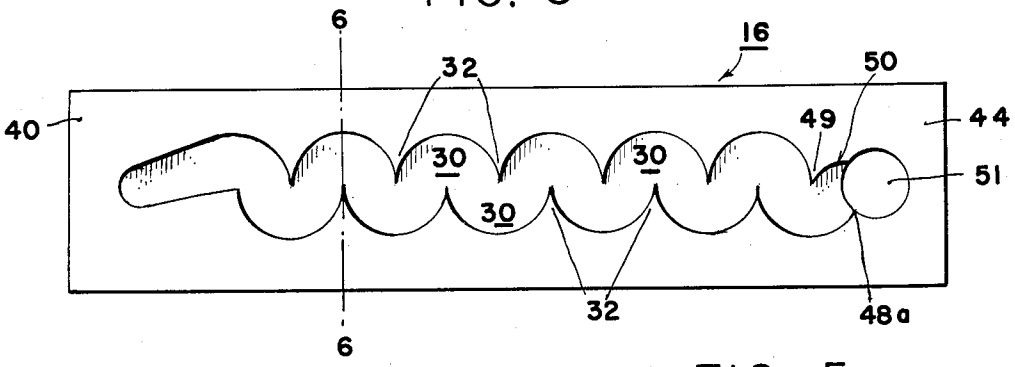


FIG. 4

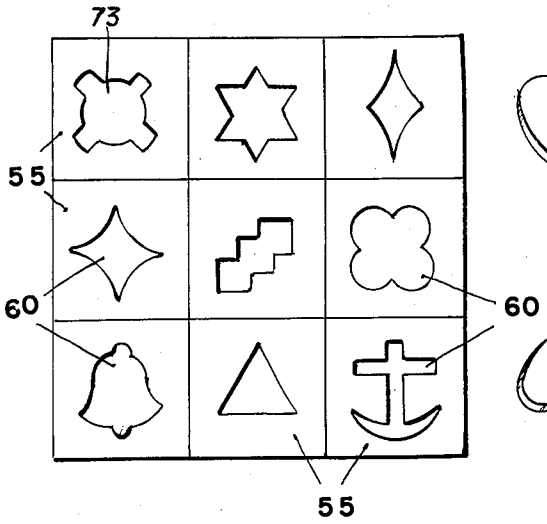
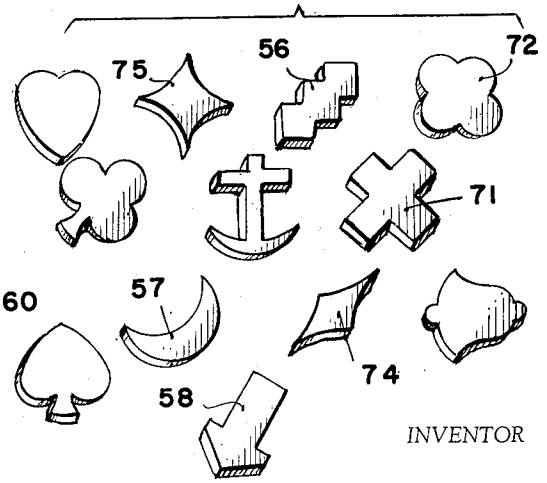


FIG. 5



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MARBLE RUNWAY DEVICE

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6 Claims. (Cl. 46—43)

This invention relates to amusement devices such as games and has for its principal object the provision of a game in which chance is almost entirely eliminated and the winner is determined by dexterity and mental alertness.

A further object of the invention is to provide a set of members which cooperate to form matched pairs with cooperating means to time the spaced periods during which the player may assemble the sets. This set affords excellent training in coordination of hands, eyes and brains in such a fashion that the discipline taught is acquired with interest and enjoyment.

A further and important object of the invention is to provide a timing device in which a marble runs thru a course, the player being required to start the marble and to catch the marble as it leaves the timer, making all of his moves during the period the marble is running and suffering a penalty should he be otherwise engaged when the marble is discharged by gravity from the timer. Incidental features are the specific runways used in the timer.

A still further object of the invention is to provide a number of pairs of matching blocks and keys in which each inner member or key fits easily into the recess in the outer member or block of that pair, characterized by the fact that such inner piece or inset will immediately and clearly be rejected by any other block of the entire group, thus aiding a player who is working against time.

Briefly the collection or kit includes a timer, a group perhaps sixteen blocks each having an opening therein, with the same number of inner or key pieces to fit within the respective blocks, a number of marbles, preferably at least twelve in order to provide ample time for anyone to complete the assembly of blocks and insert elements, two holders for the marbles and a receptacle, preferably relatively deep, to receive the inner pieces or keys. The game is won by the player who fits all of the inserts or keys in their proper blocks while collecting the least number of marbles (including penalties) in the counting holder or ring. While the independent pieces can be used in a number of other ways as hereinafter described, the particular timer illustrated cooperates with the blocks in novel manner and cannot be replaced in the game by any previous marble coaster.

In the drawings:

Figure 1 is a perspective of the set arranged for play.

Figure 2 is a plan view of the bottom runway of the timer.

Figure 3 is a plan view of an intermediate runway.

Figure 4 is a plan view of typical blocks.

Figure 5 is a perspective view of typical keys.

Figure 6 is a section on line 6—6 of Figure 3.

Figure 7 is a section thru a modified pair.

The timer consists of two uprights **10** and **11** having grooves **12** to receive runways **14**, **15**, **16** and **17** which are all alike and an ultimate or lower runway **20** which may be exactly like the others but preferably discharges

the marble in the direction of its own length thru a hole **21** in the upright **10**. While it is not essential that the timer have a full frame. I much prefer that the uprights be joined by a base **23** and a top **24**, the latter conveniently having an entrance opening or port **25** thru which a marble can be dropped to land upon the higher portion of the upper runway **14**.

In this game the timer is of considerable importance as it correlates the assembly and cooperates uniquely with the pairs. While I could readily have the path down each runway a perfectly straight groove or slot, this would permit the marble either to run entirely too fast or to require that the slope be so gentle that there would be serious danger of the marble stopping. I could also readily slow the speed of the marble by having riffles or a series of pegs to impede its travel. While this would not be objectionable except from the standpoint of cost, I believe the runways illustrated have all of the advantages and none of the disadvantages of formerly known runways. As previously stated, the purpose of the runway is to provide a period during which the player may operate the pieces and consequently the travel should require a period of at least nine seconds and preferably twice that long or more. At the same time the timer should discharge the marble so it can be caught in air by the player and its marble path should be such that there is no appreciable danger of a marble stopping of its own accord as it passes from the highest point of the top runway to the lowest point of the bottom runway. A modified exit port is produced by having an opening **26** in the base **23**, in which case the lowest runway (the one below **17**) would be exactly like all of the others. Where the opening **26** is used, it is convenient to have the timer mounted on legs such as **27** joined by cross-pieces **28** to raise the timer so that the player could hold his hand under the opening **26** and thus catch the marble. The legs **27** are convenient even with the normal opening **21** as it gives the player a better chance to catch the ball or marble as it passes out of the timer. A large book would serve the same purpose.

Referring particularly to Figure 2, the path down the runway could be a groove in a relatively thick runway but preferably each runway is of thickness not exceeding that of the outside frame **10—11—23—24**. In the form illustrated each runway is considerably thinner than this and is made out of sheets of pressed wood, fiber or any other suitable material. In view of the present emergency, no metal or plastic is used. The frame of the timer, the keys, the rings and the bowl or receptacle for the keys are all of a light wood such as pine, maple, ash, etc., the marbles of glass, and the blocks and runways are of pressed-wood sheets.

The path for the marble is bounded on each side by five full semi-circles such as **30** meeting in cusps **32** in exactly the longitudinal center line of the runway and each in the exact center of the opposite semi-circular edge **30** of the path. The balls or marbles are say an inch in diameter which is very easy to hold and the paths are each three quarters of an inch wide for a ball of that size. As the ball runs down the central portion of a path it will constantly be in contact with a cusp **32** first on one side and then on the other side, momentarily being in contact with both cusps. The semi-circles each have their centers at the opposite cusp **32** so that the ball, in running down a tilted runway, will remain in contact with a cusp **32** on the left hand side, for example, while it runs down the full semi-circle **30** on the opposite side. As it leaves the cusp **32** on the left side it will immediately pivot about the next cusp **32** on the right hand side and will remain in contact with each cusp as it rolls in contact with the opposite curved side

and whenever the ball leaves a curved side it will remain in contact with a cusp on the same side.

At the end 40 of the runway which will be the higher end, in the longitudinal center of the runway, is a circular hole five-eighths of an inch in diameter for a one inch ball. A considerable portion of this hole is cut away leaving an arcuate margin 33 having tangent to it a straight surface 36 which leads directly to the first cusp, which in this case is 35 and is almost a right angle. The opposite wall 37 of the entrance runway is tangent to the partial arc 38 struck from 35 as a center as well as tangent to the entry hole of which the arc 33 is the vestige. It will thus be seen that the initial portion of the path of the ball gradually widens from a width of five eighths of an inch to a width of three quarters of an inch. This is quite important as the widening of the path (and gravity) gives a decided acceleration to the ball since the end 40 is always higher than the discharge end 43 of the bottom runway or the discharge end 44 of the normal runway. This acceleration is repeated at the beginning of each runway and is a prime cause of the successful operation of the timer even when it is not exactly level.

In runway 20, as shown in Figure 2, a central exit guiding portion 45 is formed preferably with parallel sides 46 and 47 altho if desired these sides may taper in either direction altho this is not preferred. The exit passageway 45 is directly in the center of the runway and makes an obtuse cusp 48 with the final semi-circle 30–*f* and makes a sharp cusp 49 on the opposite side, as arc 50*a* is struck from point 48 as a center. The runway of Figure 3 is exactly like the runway of Figure 2 up to the final cusp 49 but at this point the arc 50 is struck from the cusp 48*a* as the center with a radius of three quarters of an inch and this leads to a circular opening 51 which is centered and is sufficiently larger than the marble or ball so that the latter readily falls thru the opening 51 to the next lower runway or, if the opening 26 is used, directly out of the timer. All but the bottom runway, and sometimes all of them are as illustrated in this figure.

The specific form of runway including its cusps and accelerating entrance portion is the result of considerable study and it gives the highly desirable slowing up of the marble for its path even though the runway is very slightly tilted. I find that an incline of a half an inch to a foot of travel is ample to keep the marble going without chance of blocking and yet provides sufficient friction to cause the marble to run quite slowly and this is consistent with a slight imperfection in the leveling of the timer. The incline could vary from 1:10 to 1:40. While normally it would be best if the timer were exactly level, the configuration and the slopes chosen are such that any normal unevenness of the table on which the game is played will not interfere with the correct rolling of the marble or ball.

It is best to have five runways, as illustrated in Figure 1, and I find it convenient to divide the total path into fractions, preferably tenths, in order to keep the record more easily. For this reason I have placed numerals such as .1 and .3 on the runways. The midpoint of the bottom runway would be .9 while the even numbers, .2, .4, .6 and .8 are at the lower ends of the successively lower runways.

In Figure 4 I have shown nine of the blocks but may use sixteen or more. Each block 55 has a recess 60 preferably extending completely thru the block and representing an easily recognized shape. The openings are numbered generally 60 without regard to the particular shape. Where sixteen blocks are used, the shape of the additional openings 60 would match the keys or insets 61 of the other shapes shown in Figure 5. The blocks 55 could be of the same thickness as the key which they are to receive but it is better to make the blocks about half the thickness of the keys for convenient removal of the inset or key from the recess or cavity. I prefer that the blocks be made of the same material as the runways, that is, pressed wood or fiber, but of a thickness appreciably greater than the thickness of the runways material. The various recesses 60 extend completely thru the block 55 but the latter may or may not have a backing piece 59 on the bottom, as in Fig. 7, or the backing and the block may be integral. An interesting and important feature of the pairs is that while the key 61 of any block 55 easily fits that block it will unquestionably be rejected by any other block of the group. As an example the recesses for the bell, the spade, and the club are all of about the same size but the spade key is not only too wide for the club hole but it would also be rejected by the cusps of the upper lobe of the club. It will similarly be rejected by the bell opening, the clapper notch not receiving the stem of the spade and the sides of the bell opening being too close together to accommodate the wide spade key. The club key is narrower in its wider dimension than either the bell opening or the spade opening but when trying to assemble these the club key stem will ride high above either block if the upper lobe is placed in the opening whereas if the stem is inserted first, the upper lobe will ride high on either block as its upper lobe is much too wide for the point of the spade or the hanger ring of the bell. The three small keys will also be clearly rejected by the largest openings as the stem of the arrow key 58 is too wide to go in the stem of the openings of the spade or club (or anchor) and the triad insert 56 will ride high at one end in any opening but its own as will the crescent 57 and the arrow 58. Further while the St. Andrew's cross key 71 and the quatrefoil key 72 have the same lengths on their diagonals they are clearly not interchangeable. The filleted cross key 73 is smaller over-all than either but its arms are wider so it obviously will not fit in the St. Andrew's recess or in the quatrefoil recess, nor their respective keys in its opening. Similarly the longest dimension of the concaved diamond key 74 is greater than the diagonal of the astroid 75.

The other pieces of the kit include a receptacle 64 to receive the inner pieces or keys 61, two holders or rings 65 and 66 preferably of bent wood such as used in embroidery hoops. These each hold marbles denoted generally by the numeral 70.

The game will be best understood by a description of the method of playing. The timer is placed directly in front of the player but at a distance away such that he can conveniently drop a marble into the opening 25. Such a placing of the timer gives ample room 69 on the table for spreading the blocks out for more convenient placing of the keys 61 in their respective openings 60. The ring 65 filled with all of the marbles is placed as close to the timer as may be desired. This positioning makes it very easy for the player to use his left hand and pick a marble from out the holder 65 and drop it in the opening 25 which is at the same side of the timer, that is to the left. A simple way of insuring that the timer is correctly positioned is to have on the top of the timer a word or symbol 68, for example "Front" but preferably a word that would have some significance, as for example, the word "Dexterity." By the directions given with the game the players are advised to place the timer so that this word is read in normal fashion.

The ring 66, which is empty at the beginning of the play, should be placed at the right hand side of the timer but always spaced a sufficient distance from it that a

marble rolling out thru the opening **21** will not land in the ring **66**. If the lower runway is exactly like the rest of the runway, the marble would be discharged thru the opening **26** in the base **23** and in that case sufficient space should be left under the timer so that the player can hold his hand under the opening **26** and catch the ball and then have plenty of room to deposit it in the counting ring **66**. When the legs are used, it is advantageous to move the right hand leg support **28** inward as illustrated to allow easier access to the player's hand.

The blocks **55** are stacked in a tall pile **71** preferably a bit nearer the player than the marble supply ring **65**. The receptacle **64** which holds the inner pieces or keys **61** may be placed close to the counting ring **66** that is at the right of the player. Obviously a left hand player would be permitted to reverse the arrangement.

To begin the game a marble **70** is taken from the storage ring **65** and is dropped in the entrance port **25** of the timer or time-keeper, starting the time during which the player may fit the blocks and keys together. The objective of the player is to do this fitting in the least possible time without penalty and finally to have all of the blocks spread out in the playing area **69** of the table directly in front of the player, each key **61** being in its proper space in the block **55** of its own pair. The player is permitted to work at fitting the keys and blocks only while a marble is traveling down the timer and he is required to catch the marble as it leaves the exit port **21** or **26** under penalty equal to the loss of the time required for the ball to make the complete travel which is from seven to twenty seconds. The penalty is made by placing an additional marble in the counting ring **66**.

Each player is forbidden to handle a block or a key except during the time that a marble is in progress down the timer. The penalty for a violation is the same as before, an extra marble put in the counting ring **66**. In order to prevent a player from studying the lay of the blocks to locate one or more particular shapes while no marble is in the timer, this is counted a foul and another marble is added to the counting ring. A player can use either hand or both hands if he is able. He may take a block with one hand and a key with the other or he may take a block in each hand or a key in each hand but must never have more than one block or one key in either hand. The penalty again is a fine paid by adding a marble to the counting ring. Frequently a player finishes fitting the blocks and keys together while a marble is still in progress. He then reaches into the timer and stops the marble. The path being marked in tenths should he stop the ball in the second half of the middle runway **16**, that would be between .5 and .6 and his score for that run would be the number of marbles **70** in the counting ring **66** plus the decimal which would be .6, making his score 8.6 assuming there were eight marbles in the counting ring and the last marble had been stopped as noted.

The game will be useful for teaching the young grade-school child coordination. To avoid confusing him, he will begin playing the game with perhaps four or five pairs of blocks and keys; and more pairs of blocks and keys will be added to his play as his interest calls for them. The game will then be enjoyable instruction.

For the child of kindergarten age, the game will be good entertainment. He and his playmates may spread the blocks and keys out on the floor, and together enjoy the business of fitting them together in their own good time. Or he may take the dozen bright marbles, and be nicely amused as he watches them parade through the timer. Here is sound and color and action for him, and he will have the fun of keeping the show going.

While the timer and the groups of pairs can be used alone, the particular timer forms a perfect combination with the group and the marble holders as it provides a unique didactic coordination, totally different from the use of a clock as a timer, for example, there being but one period of play in that case, whereas in the combination called for the periods of play are separated by periods of time otherwise used, as to drop the marble in and to catch it as it comes out. Since the attention of the player cannot be directed to assembly alone but must simultaneously be kept on the location of the moving marble, the elements of the kit are not aggregated but form a true combination. The game is ideal for checking the coordination of embryo pilots and such persons.

As will be noted, the essence of the full combination is to have a timer of any type which is started by the player who has no control over the ending of it, plus any sort of arrangement requiring skill in assembling which must be operated, under penalty of increased time charged, while the timer is in operation. Obviously instead of the preferred blocks and keys the thing to be fitted together could be a Chinese puzzle, for example, or a jig-saw picture and the timer could be a clock which ran for a very short period of time which was erratic in length and gave a warning and then a penalty stroke. The player would cease work on the warning sound and before the penalty sound.

What I claim is:

1. A marble guiding device of the type having a plurality of runways sloping in successively opposite directions and having a marble directing path; in which the sides of the path are formed of semi-circles meeting in cusps.

2. An intermittently operated timer to be started by a player but having an ending beyond control of the player for measuring accurately a period of time during which he may complete a portion of an assigned task, comprising a ball-directing device having a plurality of runways sloping in successively opposite directions and discharging the ball so that it may be caught by the player, each runway having a sinuous path of a type to slow up the speed of the ball to an extent that without an initial acceleration the ball would not run the full length of the path, each path including a receiving portion with tapering sides widening to the width of the sinuous path to give such initial acceleration to the ball.

3. A runway having a sinuous path for a ball designed to retard the movement of the ball when the runway is tilted toward its discharge end including a receiving portion with tapering sides widening to the width of the sinuous path to give an initial acceleration to the ball approximately equal to that required to enable the ball to pass thru the sinuous path in which the sides of the path are formed of semicircles meeting in cusps.

4. The runway of claim 3 in which the cusps of opposite sides are in the centers of the opposite semicircles whereby the sinuous path is of uniform width equal to the distance apart of proximate cusps.

5. A marble guiding runway adapted to be placed in a sloping position so the marble may run by gravity, in which the marble directing path is bounded by opposite sides, one of the sides having a cusp and the opposite side having a curved side all points on which are spaced from the cusp by a distance less than the diameter of the marble whereby the marble in running down the path may remain in contact with the cusp as it rolls in contact with the curved side.

6. The runway of claim 5 in which the two sides have alternate cusps, the total number of cusps on each side being greater than three, the cusps being so located that as the ball leaves a curved side it will remain in contact with a cusp on the same side.

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