

Detailed statement

Title of invention

CROSSCUT TEST DEVICE AND CROSSCUT METHOD

Technical field

The present invention, in order to evaluate the adhesion resistance of the coating film provided on the substrate, the cross-cut test apparatus and cross-cutting method for forming a board-shaped notch in the coating film.

Background technology

The evaluation method of adhesion of the coating provided on the substrate, there are various test methods typified such as J I S "K-5400". According to the method of J I S "K-5400", with respect to the coating film of the specimen, a notch is formed to reach the substrate (base) by penetrating a sharp blade. Then, from the large and small spread of the wound in the cut of the coating film, the quality of adhesion to the fragility and substrate of the coating film is determined. Also, if necessary, to the wound of the coating film formed as described above, the cellophane tape peeling test is performed by the method defined in J I S "Z-1552", the quality of adhesion is quantified.

The conventional cross-cutting method, for the test coating film, after forming a number of wounds determined according to the test method using a cutter knife and cross-cut guide, A method of forming a notch of the number that is determined along the guide again after the cross-cut guide 90° rotated so that the wound is in the grid. (for example, see Patent document 1). The cross-cutting method using such a cross-cut guide often had to replace the blades. The reason is that the cross-cut guide is very narrow in gap, because the edge of the cutter knife is often in contact with the metal cross-cut guide is likely to damage the edge. Also, there is a case where the notch mistake such as the notch is not formed in a part or cut in the same place twice or more times, the work while paying attention to such mistakes was very complicated and improvement was demanded.

To the problem described above, a coating cut tool that can simultaneously form a plurality of notches at a time with a plurality of cutter blade disposed at a predetermined interval in the blade thickness direction (for example, patent documents 2-4). When forming a notch at the same time using such a plurality of blades, it is very difficult to put a cut while keeping the biasing force to the film of each blade uniformly. Especially in the case of coating film thickness is less than 20 μm , by insufficient or excessive cut depth, it was difficult to perform an accurate evaluation.

As a way to solve these problems, the present inventors have, by utilizing the suction force of the magnets provided on the opposite surface side of the coating, to suction a plurality of blades in the cutting direction, by moving the contact relative to the edge of the blade in a state of being biased to the coating film, I have proposed a method of forming a plurality of notches at the same time (patent document 5). Because the suction power of the magnet works on all the blades, each blade is independently movable to the blade width direction (vertical direction), in order to ground along the shape of the coating film, even for 10 μm or less coating film, it is possible to stably form plural cuts.

Prior documents

Patent Document 1 content official bulletin No. 2-33157
Patent Document 2 Japanese unexamined patent No. -8- 843
Patent Document 3 Japanese unexamined patent No. -8- 215444
Patent Document 4 Japanese unexamined patent No. -9 -101254
Patent document 5 Japanese unexamined patent No. -2012 -18142

Summary of the invention

Problems that the invention intends to solve

Exemplified test apparatus in patent document 5, when the substrate of the test coating film is next, it was difficult to form a plurality of notches at the same time stably in the coating film.

(A) When the magnetic force from the back of the substrate such as soft magnetic material does not work.

(B) If the thickness of the substrate is more than a few millimeters or the test material is a solid object.

(C) The substrate is a material that is easily cleaved such as a resin film, when forming a notch with a weak force that does not cut the substrate.

(D) When the substrate is a curved surface such as a lens, the suction force due to the magnetic force is insufficient. Also, there was a problem shown below.

(E) The error is likely to occur in the cut interval, the error of 0.2 mm or more

(F) The replacement of the blade was complicated.

This invention has been made to solve these problems

Means to solve problems

The above problems of the present invention have been resolved by the following inventions.

(1) equipped with a plurality of blades having a engagement hole, the blade is provided with a engrafted fulcrum axis parallel to the blade thickness direction, comprising a blade holder for accommodating the blade that is axial on the fulcrum shaft, the magnet between the cutting edge and the test coating film of the Blade, Cross cut test apparatus characterized by suction the blade in the cutting direction in the magnetic force of the magnet.

(2) It is preferable to have a convex portion on the side of one side and a little of the blade.

(3) It is preferable to provide a magnet roller for biasing the test coating film.

(4) The shaft to be parallel to the blade thickness direction in the blade holder a plurality of blades having a engagement hole, by the suction force of the magnets installed between the cutting edge and the test coating film of the blade, the edge each of the blade is drawn outside the blade holder, The edge of the blade is pressed to the test coating film, cross-cut method characterized by forming a plurality of notches in the test coating film by moving the contacts of the edge and the test coating film relative to the object.

Effect (Result) of the invention

Cross-cutting test apparatus of the present invention, in a simple operation, under stable conditions, it is possible to safely form a notch for adhesion test of the coating film at a high accuracy interval and depth, and blade exchange is easy, further, for the coating film provided on the substrate of the curved surface, It provides a cross-cut test apparatus and a cross-cutting method capable of simultaneously forming a plurality of notches for adhesion test of the coating film.

A brief description of the drawings

Figure 1 is a Decomposition Perspective view showing an example of a cross-cut test apparatus of the present invention.

Figure 2 is a perspective view of a cross-cut test apparatus shown in Figure 1.

Figure 3 is a Decomposition Perspective view showing an example of a cross cut test apparatus having a spacer plate used in the present invention.

Figure 4 is a exploded perspective view showing an example of a cross cut test apparatus having a blade and a wheel-like magnet having a convex portion on one side of the present invention.

Figure 5 is a perspective view of a cross-cut test apparatus shown in Figure 4.

Figure 6 is a bottom perspective view of a cross-cut test apparatus shown in Figure 4.

Figure 7 is a fluoroscopic side view showing an example of a blade having a convex portion on both sides of the present invention.

Figure 8 is a front view of the blade shown in Figure 7.

Figure 9 is an enlarged front view showing a state of putting a notch in the spherical object Test coating film in the cross-cut test apparatus of Fig.

Figure 10 is a perspective view showing an application example of a cross-cut test apparatus of Fig.

Figure 11 is a side view of a cross-cut test apparatus shown in Figure 10.

Figure 12 is a side view showing a state in which the cross-cut test apparatus of Fig. 10 is housed in the test table.

Figure 13 is a fluoroscopic side view showing a method for implementing a cross-cut test apparatus.

Figure 14 is a perspective view showing a method for implementing a cross-cut test apparatus.

Forms for the implementation of the invention

Hereinafter, it will be described embodiments of this invention with reference to the drawings.

Figure 1 is an example of a Decomposition Perspective view showing the basic configuration of the KROSCATST test apparatus of the present invention, fig. 2 is a fluoroscopic side view of 1. In Figure 1 and Figure 2, Blade 10 of the strip having a engagement hole 11 in the rear end of the length direction 12 is arranged in parallel so as to the bottom of the cutting edge 11, each engagement hole 11 is axial to the fulcrum Shaft 25 is housed in the blade holder.

Magnet 30 for the blade biasing is close to the cutting edge 12 in the magnet cover. Edge 13 of the blade 10, by the suction force of the magnet 30, is pulled out of the blade holder 20. Magnet

30 is preferably a strong magnet of suction force, in particular, a rectangular neodymium magnet having a hole in the center is 20 mm ~ 30mm is preferable because the error of the suction force applied to the 11 blades 60 is small. Cross-cutting method using the cross-cut test apparatus shown in Figure 1, the blade holder 20 is pressed to the test coating film as Edge 13 is pushed, The blade 10 can be formed at the same time the 11 notches in the test coating film by relatively moving the contacts of the Edge 13 and the test coating film while maintaining to be 25 to 35° for the test coating film. Then, the test coating film is rotated 90°, performs the same operation to be orthogonal to the 11 notches formed previously, to form a 100-mass square.

Cut depth of the cross-cut can also be adjusted by the distance of the magnet 30 from the fulcrum shaft 25 in addition to the magnetic force of the magnet 30. Fulcrum Axis 11, emphasis on the cutting edge 12 near the magnet 30, when the action point Edge 13, the repulsion force of the edge 13 when it is pressed against the test coating film Edge 13, by the principle of the lever, the magnet 30 becomes smaller and closer to the fulcrum shaft 25, it becomes larger and closer to the edge. The notch at the time of cross-cutting is reached to the substrate of the test coating film, and as a method of adjusting the cut depth not cutting the supporting substrate, in the case where the notch is shallow the position of the magnet 30 in the edge direction, when the notch is deep slide in the direction of the fulcrum shaft 25. Magnet Cover 29 is attached removably to the blade holder 20. The magnet 30 by attracting the blade 10 and the magnetic force, it is possible to maintain the position in the magnet cover 29, it may be fixed to the magnet cover by a fixed means such as bolts.

The 11 number of blades 10, each is movable independently. In order to reduce the variation of the notch depth, the frictional resistance of the portion in contact with the side of the blade 10 is small. Friction coefficient of the portion in contact with the side of the blade 10 is preferably 0.6 or less in a state magnetized by the magnetic field of the magnet 30, more preferably 0.3 or less. As a method of reducing the side and friction resistance of the blade 10, metal plating, sputtering, resin coating, DLC coating, and the like, may be a combination of these. Also, in order to prevent the variation occurs in the notch depth by adsorbing the side of the blade 10 of both sides of the magnetized is to the inner surface of the blade 5 holder 20, the material of the blade holder 20 of the portion in contact with the blade 10 is preferably a non-magnetic material.

The thickness of the blade 10 affects the accuracy of the pressure and the notch spacing applied to the blade side. The variation of pressure applied to the edge is small, and, the preferred thickness of the blade 10 accuracy of the cutting interval of the practical can be obtained is 85--95% of the specified notch spacing in the cross-cut test. Edge 13 of the blade 10 by utilizing the suction force of the magnet 30 which is close to the cutting edge 12, is pressed to the test coating film. Therefore, the blade 10 It is necessary to have a soft magnetic portion to the extent that the suction force of at least the magnet 30 ranges. If the suction force of the magnet is sufficiently obtained configuration, the cutting edge and edge portion is zirconia, silicon carbide, aluminum oxide, and may be composed of non-magnetic materials such as diamonds.

Figure 3 is a Decomposition Perspective view showing an example of a cross-cut test apparatus capable of forming a 25-mass board-shaped notch using the blade holder 20 shown in Figure 1. Cross-cut test apparatus shown in Figure 3, the blade stopper 50 for fixing the Edge 13 in the

blade holder, and has a pickup plate 40 for easy to pick up any blade 10. Blade 10 and the spacer plate 80 is alternately disposed, engagement hole 11 and the engaging hole 81 is axial to the fulcrum shaft 25. Furthermore, the locking holes 82, 83, 84 of the spacer plate 80, respectively pick-up plate Fulcrum Shaft 26, the locking shaft 27, the locking shaft 33 is shaft-worn.

Friction coefficient with the side of the side and the blade 10 of the spacer plate 80 is preferably small, particularly blade 10 by the magnet 30. The coefficient of friction in the magnetized state is 0. It is preferably 6 or less. If the 0.6 or less the error of the notch depth between the blades is reduced. More preferably 0. It is 3 or less. As a method of reducing the friction coefficient, metal deposition, plating treatment, and the like resin coating, particularly PTFE coating is preferred. The thickness and number of the spacer plate 80 can be selected depending on the thickness of the cut spacing and blade.

Blade stopper 50 is axially worn on the locking shaft 28 of the blade holder 20. The rear end of the blade 10 is pushed to the cam when the blade stopper 50 is rotated in the cutting direction on the shaft 28 of the locking shaft, edge 13 is lifted by the principle of I-lever the fulcrum shaft 25, the blade 10 is fixed in the blade holder 20. Cross-cutting method using a cross-cut test apparatus of Fig. 3, the blade 10 to keep the 25-35 angle to the test coating film in a state of being fixed in the blade holder 20, the tip of the blade holder 20 I pressed to the test coating film. Then, Edge 13 to release the blade 10 which is fixed by slowly rotating the blade stopper 50 is grounded in the test coating film. Next, it is possible to move the contact between the test coating film as the blade holder 20 is not it!, the six notches in the test coating film is formed at the same time. The test coating film is 900 revolutions, performs the same operation to be perpendicular to the six notches formed previously, a notch of 25 squares is formed. The depth of the cut of the cross-cut, as well as the cross-cut test apparatus of Fig. 1 is adjusted by the magnetic domain and the position of the magnet 30.

Pickup plate 40 is close to the rear end of the blade 10. The size of the gap between the rear end portion of the pickup plate 40 and the blade 10, the degree of freedom of the rotation angle of the blade 10 is limited, the amount drawn out of the blade 10 from the blade holder 20 is adjusted. Also, by wear and tear, etc., Blade 10 that cannot be sufficient notch is easily exchanged by using the corresponding pickup plate 40. Specifically, by removing the fulcrum shaft 25 and the locking shaft 27, by depressing the protrusion 44 of the pickup plate 40 corresponding to the blade 10 to be replaced, the downward direction, Pick-up plate fulcrum shaft 26 CLAW 41 of the pickup plate is picked up by lifting the rear end of the blade 10 to the fulcrum. Furthermore, by shifting the position of the protrusion 44 of the adjacent pickup plate, the blade 10 to be replaced is easily picked up.

Figure 4 is a Decomposition Perspective view showing an example of a cross-cut test apparatus with a blade 60 having a convex portion 64 of the semicircular columnar on one side side. Also, fig. 5 is a Perspective view of Fig. 6 is a bottom view of fig. 4. Furthermore, figure 12 is an enlarged front view showing a state of putting a notch in the spherical object Test coating film in the cross-cut test apparatus of Fig. Blade 60 according to the present invention by the convex portion 64 instead of the spacer, in order to keep the blade spacing constant, it is possible to

form a plurality of notches at the same time stably without the influence of the frictional resistance of the blade side. As a result, even for the test coating film provided on the resin film substrate of myum or less, it became possible to cut the stable board eye-shaped in a small biasing force. Spacer 80 shown in Figure 4 has a semi-cylindrical convex portion 64 and the same degree of thickness, is used to adjust the gap and friction resistance between the blade side and the blade holder 20 without a semi-cylindrical convex portion 64 of the blade 60. The conventional cross-cutting method is defined by (JIS "K-5400", etc.), and generally also use the 0.38 mm thickness blade (Edge angle about 2 2 0) which is commercially available. Conventional cross-cutting method, by passing the spacer between the blades, a method of defining the notch spacing was common. Method described above, for example, the substrate of the test coating film is a case of resin or the like, if the force to be added to a single blade is required to form a notch with a small biasing force of about 0.3 N, 25, the influence of the friction force between the spacer and the blade is increased relative to the force to add to the blade, There was a variation in the cut depth.

Blade having a convex portion on the side of the small side of the present invention, when it is axial on the fulcrum axis of the blade holder, it is possible to keep the blade spacing constant, if it does not interfere with the movable blade required for cross-cutting, the shape and material of the convex portion is not particularly limited. The shape of the blade convex portion, the convex portion and hemispherical convex portions of the small semicircular columnar friction resistance of the blade side, or a combination thereof, and the like are preferred examples. Figure 7 is a fluoroscopic side view showing an example of a blade 70 having a hemispherical convex portion 74 on both sides, fig. 8 is a front view of Fig. hemispherical convex portion 74 and 75 of the blade 70, so as not to inhibit the rotational direction of the movement of the fulcrum Shaft 25 is formed asymmetric on the side of the blade 70. As the material of the blade convex portion according to the present invention, without damaging the blade side, the frictional resistance of the magnetized blade side is preferably a small non-magnetic material, especially fluorine resins, non-magnetic metals such as resins and aluminum such as a polio-like resin and the like are preferred examples. The thickness of the convex portion according to the present invention, 8 0 ' --9 5% of the gap between the blades is preferred. In this range, the notch interval is 0. It is possible to control the error of less than 2mm. As the thickness of the semicircular convex portion 64 and hemispherical convex portion 74, 75, 0. 5-0.6mm is preferred. Variation of the thickness of the convex portion according to the present invention affects the accuracy of the cut interval to the test coating film, 0. It is preferably preferably or less. As a method for producing a blade having a convex portion, a method of attaching the shape of the convex portion with an adhesive to the blade side, a method of forming a resin or metal of molten state directly laminated u on the blade side subjected to easy adhesion and the like. Cross-cut test method of inserting the blade between the spacer one of the prior art, it was complicated to insert so as not to damage the edge of the blade to 1mm below a slight gap when replacing the blade. Blade 60 when the edge 63 is damaged or worn, it can be easily exchanged by pulling the fulcrum shaft 25. Furthermore Blade 70 when it is simultaneously brought to match the plurality of blades in parallel, can be prevented by the hemispherical convex portion 7 4, 7 5 of the blade side that the east of the blade 70 is shifted apart.

In Figures. 4, 5, 6, 9, blade Holder 20 is provided with a magnet roller 31 and 32 of two at the distal end. The Magnet Roller 31, 32 is disposed so as to enclose the edge 63 pulled out by the magnetic force. Magnet Rollers 31 and 32 of two, when it is grounded in the test coating film surface, the position of the angle between the test coating film surface and the blade holder 20 is $25 \sim 35$ is preferred. Cross-cutting method using the cross cut test apparatus shown in Figure 4 in a state where the blade 60 is fixed with a blade stopper 50, four wheels of the magnet roller 31, 32 is grounded in the test coating film. Next, Blade 10 which is fixed by slowly rotating the blade stopper 50 is released, Edge 13 is grounded in the test coating film. Next, the two magnet Roller 31, 32 is that it is possible to move the contact between the test coating film so as not to leave the test film surface, the blade angle in a state of being kept in one-to the test coating film 11 notches can be put at the same time. If the substrate of the test coating film is a soft magnetic material, two of the magnet roller is adsorbed to the coating surface, because the cross-cutting device is self-sustaining, more cross cut becomes easier. If the X-Test coating film is a non-magnetic material, by providing a soft magnetic material on the opposite surface of the test film the substrate is obtained the same effect as in the case of soft magnetic material. Suction force of the test material and the magnet roller is preferably a stronger force than the suction force of the plurality of blades and the play biasing magnet, for example neodymium magnets are preferred. With a stronger force than the suction force of the plurality of blades and the play biasing magnet, the magnet roller 31 and 32 of the two is to adsorb to the test substrate, two of the magnet Rollers 31, 32 can be made from the substrate, It is possible to form a notch while maintaining the angle of the blade 60 and the test film constant. On both sides of the magnet Rollers 31 and 32, it is possible to provide an arc 35, respectively if necessary. Magnetic force line of the magnet roller 31 by the Arc 35 is concentrated in the coating direction, a stronger suction force is obtained.

Figure 9 is an enlarged front view showing a state in which 11 notches 211 is formed on the test coating film 210 of the spherical test specimen in the cross-cut test apparatus of fig. 4. As a cross-cutting method to the test coating film 210, after grounding the inner arc 35 of the left and right magnet roller 31 in a state of fixing the blade 60 in the blade holder 20 to the test coating film 210, All the blades of 11 to release the fixed state by rotating the blade stopper 50 is independently grounded in the test coating film 210. The cross-cutting device along the surface of the test coating film 210, 11 notches 211 is formed by moving backwards. The test coating film 210 is rotated 90, performs the same operation to be orthogonal to the 11 notches 211 formed previously, a notch of 100 mass is formed on the test coating film 210. In a state in which the edge 63 of the 11 blades 60 is grounded in a convex spherical shape, the distance of the Edge 62 and the biasing magnet 30 is as large as the blade 60 located in the center. The suction force of the magnet is inversely proportional to the square of the distance position of the magnet 30, from the cutting edge 62 1mm or more, further, by approximating the fulcrum shaft 25, the influence of the surface of the test coating film is reduced, the accuracy of the cross-cut test is improved.

Figure 10 is an application example of a cross-cut test apparatus of the present invention, shows an example of a car-type cross-cut test apparatus and a test stand, a state of forming a notch in the test coating film on the movable sample stand 130 is a perspective view showing.

Cross-cutting device of the car type shown in Figure 10, blade holder 20 as a basic configuration, a blade 60 having a convex portion on the side, a pickup plate 40, a blade stopper 52, a magnet roller 31, 32, further, the bottom plate 97, horizontal movable stage 92, frame 90, Four Magnet Rollers 94, comprising a cover 95. Magnet 30 is fixed to any height of the horizontal movable stage 92 instead of the magnet cover 29, the distance between the blade is precisely adjusted by the micrometer 93. Fulcrum Shaft 25 is supported by the engagement portion of the frame 90 at a position of the angle between the blade 60 and the bottom plate 97 is 25 to 35, is fixed by the engaging portion 96 of the cover 95. Frame 90 is axially worn by a mechanism that can be held at any angle to the engagement shaft 91 of the rear end of the bottom plate 97. Four magnetic rollers 94 which is projected on the rear bottom surface of the bottom plate 97 can be rotated in a state of being adsorbed to the magnetic material. Therefore, when forming a notch on the test coating film on the soft magnetic material, only by pulling the cross-cut test apparatus of the vehicle type in the horizontal direction backwards, it is possible to form a notch stably in a state of maintaining a constant cutting angle. Cross-cut test apparatus of the car type from the above characteristics are suitable when testing the planar test coating film.

Test stand 100 shown in Figure 10 is mainly a rail stand 101, movable specimen 130, is composed of a housing portion 103. Rail Stand 101 includes a concave rail 102 to be engaged in the magnet roller 94. The material of the rail Stand 101, the bottom portion of the at least concave rail 102 is made of a magnetic material, the entire rail table 101 may be composed of a magnetic material. If the bottom portion of the concave rail 102 is a hard magnetic material to place a surface so as to attract contact with the magnet Roller 94.

Movable sample table 130 shown in Figure 10 comprises an ant mechanism stage 1 2 0, 1 2 1 and the turntable 131 on the heli-carp lifting stage 110. Heli-Carp Lifting Stage 110 comprises a lifting lever 111 and a fixed screw 112, is adjusted with the lifting lever 111 to be the same height as the coating surface 200 and the rail stand 101 of the test specimen. The ant mechanism Stage 1 2 0, 1 2 1 is fixed female ant stage 120 on the upper surface of the heli-carp elevating stage 110. Male ant stage 121 is stacked on the female ant stage 120, male ant stage 121 is movable in a direction perpendicular to the movable direction of the cross-cut test apparatus. Ant mechanism Stage 1 2 0, 1 2 1 is useful in forming a plurality of grid-shaped notch 201. Non-rotating portion surrounding the turntable 131 is fixed to the male ant stage 121, the turntable 131 can be rotated 90 using a turntable lever 132.

Next, I will describe a cross-cutting method using a movable sample stand 130 cut test apparatus and a car type shown in Figure 10. Test specimen having a test coating film 200 is fixed to the rotating portion 131 of the movable sample stand 130, so that the test coating film 200 and the rail stand 110 is the same height, is adjusted by the lifting lever 111. As a fixing method, it is possible to use a removable adhesive tape, a toggle clamp or the like, the operator may be pressed with a finger. If the test specimen is heavy or the same shape test specimen is a plurality of tests, it is possible to fix the height of the movable sample stand 130 in the fixed screw 112. Car type cross-cut test device to defeat the Blade stopper 52 (replaceable from the blade stopper 50 shown in Fig. 4) in the direction of the cutting edge, after moving to the cross-cut start position in a state of fixing the blade 60, the test coating film 2 is edge 63 by slowly rotating the

blade stopper 52 To be grounded at 00. In that state, while holding the bottom plate 97 downward, 11 notches are formed by pulling the cross-cut test apparatus of the vehicle type to the required length backwards.

The blade 60 is fixed using a blade stopper 52, after the test specimen was 90 rotated using a turntable lever 132, by performing the same notch operation so as to cross the notch and 90 which is formed earlier, the grid-shaped notch 201 is formed. Figure 12 is a side view showing a state in which the cross-cut test apparatus of the car type is housed in the test stand. The fixing portion 104 for fixing the magnet roller to the housing portion 103 of the test table shown in Figure 10, the fixed portion 104 has an adsorption portion comprising a recess and a magnetic material engaging with a magnet roller, to prevent jumping out of the cross-cut test apparatus of the car type, it can be safely housed.

Example of execution 1

Figure 13 is a fluoroscopic side view showing an example 1 of the cross-cut test apparatus of the present invention. 2 5, 30, 31, 32 are the same as Figure 4. Slide-type Blade stopper 52 is movable axial to the holder 90. Blade Stopper 52 to 63

By sliding in the direction away from, it is possible to lift the tip 63 to the top. Blade 60 is 0.38mm Thickness Folding blade (0.5mm thick 1mm wide) was fixed at the same position as the spacer 64 of FIG. 4 Resin-based adhesion.

Figure 14 is a perspective view of Figure 13.

Using a cross-cut test apparatus of Example 1, it was possible to form an easily stable u at the same time the 11 notches for printing of the side (curved surface) of the beverage steel cans of 50mm diameter. Also, for the printed material printed on the food packaging resin film of about 20 Myum, without cutting the Base film, it was possible to form an easily stable at the same time the 11 notches.

Sign (symbol) description

10, 60, 70	blades
11, 61, 71	engagement holes
12, 62	cutting edge
13, 63, 73	edge
20, 90	blade holders
25	Fulcrum Axis
30	Magnets
31, 32	Magnet Rollers
50, 52	blade stopper
64, 74, 75	convex parts
80	Spacer Plate
200, 210	Test Coatings
201, 211	cuts

CLAIMS:

[Claim 1]

Equipped with a plurality of blades having a engagement hole, the blade is provided with a shaft engrafted fulcrum axis parallel to the blade thickness direction, comprising a blade holder for accommodating the blade that is axial on the fulcrum shaft, and placing a magnet between the cutting edge and the test coating film of the Blade, Cross-cutting test apparatus characterized by suction the blade in the cutting direction in the magnetic force of the magnet.

[Claim 2]

On the side of at least one side of the blade, cross-cut test apparatus according to claim 1, characterized in that it has a convex portion of the thickness corresponding to the notch spacing.

[Claim 3]

Cross-cutting test apparatus according to claim 1 or 2, characterized in that it comprises a magnet roller for biasing the test coating film.

[Claim 4]

Axis to be parallel to the blade thickness direction in the blade holder a plurality of blades having a engagement hole, by the suction force of the magnets placed between the cutting edge of the blade and the test coating film, each edge of the blade is drawn outside the blade holder, the edge is pressed to the test coating film, the edge and the contact of the test coating film by moving the relative Cross-cutting method characterized in that to form a plurality of notches in the test coating film.