UNITED STATES PATENT OFFICE

IRVING J. GANNON, OF WILLOUGHBY, AND GUY E. LNN, OF RITTMAN, OHIO, ASSIGNEES TO THE OHIO BOXBOARD COMPANY, OF RITTMAN, OHIO, A CORPORATION OF OHIO

CUTTING DIE FOR SLOTTING MACHINES

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This invention relates to machines for slotting partition members for the so-called honeycomb partitions used in packing and shipping containers such as bottle cases, egg boxes, boxes for incandescent electric lamps and the like; and it relates particularly to an improvement in the cutters for slotting machines of the type known as the Staude automatic partition slotting machine disclosed in the patent of George A. Fisher and John A. Morrison, No. 1,012,583, dated December 19, 1911.

As is well known, the formation of V-shaped leading ends or entrance openings in the partition slots at the edges of the partition members greatly facilitates the assembling of the members in honeycomb form, and one object of this invention is to provide the cutters of the slotting machine with means whereby these V-shaped leading ends may be formed simultaneously with the formation of the slots.

Another object of the invention is to so form the cutters that in addition to forming the V-shaped leading ends they may be adjusted to cut slots of any desired depth, and still have the V-shaped leading ends properly arranged at the edges of the partition members, as desired.

The invention consists in the combination with a partition slotting machine, of cutting dies for forming the slots in the stock for forming the partition members, these cutting dies including slotting knives and V-shaped cutter members for forming similarly shaped notches or leading ends in the slots formed by the slotting knives, and the knives being adjustable relatively to the V-shaped cutter members so that the depth of the slots may be varied, as will hereinafter be explained more particularly and finally claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a sectional side view of a partition slotting machine of the type hereinabove referred to provided with the cutting dies of the invention. Fig. 2 shows a plurality of partition members of various dimensions slotted in accordance with the invention. Fig. 3 is a plan view of a conventional assembly of partition members forming a honeycomb partition. Fig. 4 is an enlarged side view of the male cutting die of a pair of cutting dies constructed in accordance with the invention, the opposite side to that shown in Fig. 1 being illustrated. Fig. 5 is an edge view of the cutting die of Fig. 4. Fig. 6 is a section taken on line 6-6 of Fig. 4. Fig. 7 is a further enlarged detail perspective view of the two cutter members for forming the V-shaped notches. Fig. 8 is a side elevation of the female cutting die complemen tal to the male die of Fig. 4. Fig. 9 is an edge view of same. Fig. 10 is a section taken on line 10-10 of Fig. 8.

The slotting machine illustrated conventionally in Fig. 1, includes a bed 1, an adjustable hopper 2 in which are evenly stacked the blanks 3 from which the partition members are formed, two power driven cutter shafts 4 and 5 driven in opposite directions, as indicated, and upon which the cutters are mounted, and an intermittent feed mechanism including the slide 6 reciprocated by a cam and roller mechanism 7—8 driven by suitable gearing 9 in proper timed relation to the rotation of the shafts 4 and 5. The machine includes also a plurality of stripper fingers 10 and cleaner fingers 11, a delivery chute 12, a waste receiving box 13, a guard 14 and other adjuncts which enhance its perfection of operation.

As hereinbefore indicated, partitions having V-shaped notches at their slot entrances are well known, and various machines have been devised for their manufacture, but all of these machines, so far as the prior art discloses, are of the reciprocating punch and die type.

Rotary slotting machines of the type illustrated have manufacturing advantages over reciprocating punch and die machines and, as previously pointed out, it is to the adaptation of these rotary slotting machines for slotting partitions with V-shaped entrance notches that this invention is primarily directed.

This adaptation is made by substituting for the cutting dies customarily employed...
other modified cutting dies having the characteristics now to be described.

These cutting dies are provided in pairs in the forms illustrated in Figs. 4 and 8, each pair comprising a male cutting die (Fig. 4) and a female cutting die (Fig. 8) so arranged on the shafts 4 and 5 respectively that they will cooperate in slotting relation.

As many of the pairs of cutting dies are arranged upon the shafts 4 and 5 as there are to be slots in the partition members operated upon, and they are appropriately spaced as desired.

As will be seen, the shafts 4 and 5 are provided with splines 15 and 16, respectively, whose relative angular relation has a definite purpose, as will later appear.

Inasmuch as all of the male cutting dies and all of the female cutting dies, respectively, are characteristically and structurally similar, a detailed description of one of each will suffice for all.

Referring to Fig. 4 to 7 inclusive, it will be seen that, in the form illustrated, the male cutting die comprises a disk 17 having a central shaft-engaging opening 18 and a hub 19. The inner face of the disk 17 is recessed, as indicated at 20, and is provided with an annular groove or slideway 21. An annular disk 22 recessed at 23 complementally to the disk 17 and provided with an annular groove or slideway 24 complemental to the slideway 21 of disk 17, is slipped over the hub 19 with a sliding fit, and between the disks 17 and 22 are clamped one or more cutting knives 25 by means of clamping screws 26. The knife or knives 25 extend radially beyond the peripheries of the disks, and are provided with inner flanges 27 which engage in the annular grooves 21 and 24 whereby the knives are held against radial movement but may be adjusted circumferentially of the disks 17 and 22 when the clamping screws 26 are loosened.

If desired, the knives 25 may have their cutting edges serrated in a well-known manner (not shown) to enhance their cutting qualities.

Recessed into the peripheries of the disks 17 and 22 and secured thereon as by screws 28 are plates 29—29, each of which carries a wedge or half V-shaped cutting member or lug 31 offsetting radially therefrom a distance equal to the radial projection of the knife or knives 25, and they are so relatively spaced that the knife or knives 25 may slide between them for purposes of adjustment. These cutting members or lugs 31, in combination, cut the V-shaped entrance notch of the slot and the knife or knives 25 cut the slot itself. Inasmuch as the V-shaped notch is at the edge of the partition member, it will be apparent that the circumferential extension of the knife or knives 25 beyond the points of the lugs 31 will determine the depth of slot cut, and that that portion of the knife which extends as indicated at 32 behind the butt ends of the lugs 31 will have no effect upon the cutting of the slot because it is beyond the edge of the partition member. Thus the knife or knives 25 may be adjusted to cut any depth of slot relatively to the V-cutting lugs 31.

The hub 19 is provided with a key-way 33 for cooperation with the spline 15 of the shaft 4, and this key-way is arranged in a predetermined position relatively to the lugs 31. In all of the male cutting dies the relationship between these parts, key-way 33 and cutting lugs 31 is the same, and thus when a group of cutters is arranged upon the shaft 4 the angular arrangement of all of the lugs 31 will be the same and all will register or index simultaneously with the edge of the partition member to simultaneously cut similar V-shaped notches.

In order that the cutters may be held in fixed spaced relation upon the shaft, each cutter is provided with a set screw 34.

The female cutting die comprises a disk 35 recessed as at 36 upon its periphery and provided with a central opening 37 to receive the shaft 5. Within the recess 36 are mounted cutting plates 38 held in place by screws 39, and these plates are bevelled at one end as shown at 40 to form complements for the wedge-shaped edges of the V-notch cutting lugs 31. These plates, when the female cutters are properly arranged upon the shaft 5 and held thereon in adjusted position by cooperation of key-ways 41 with the spline 16 and by set screws 42, will cooperate with the knives 25 and lugs 31 to cut the slots in the partition members and form the desired V-shaped entrance notches.

The manner of adjusting the knife or knives 25 relatively to the lugs 31 to determine the depth of slot to be cut has already been described. In addition to this adjustment for depth of slot, the width of slot to be cut, dependent upon the thickness of the stock used for the partition members, may be provided for by substituting knives 25 and plates 38 of cooperating different thicknesses for those illustrated and by providing for cooperation therewith differently formed lugs 31. Obviously, the bevels of the plates 38 will correspond with the shape of the lugs 31 used.

It will thus be seen that the cutters of the invention may be adjusted or furnished to cut any depth or width of slots desired and that always these slots will be provided with the V-shaped entrance notches.

It will be understood, of course, that the female cutting dies will be so arranged axially and angularly of the shaft 5 that they will register in proper cutting relation with the male cutters on the shaft 4 as the two shafts rotate.
In operation, with the cutters thus properly relatively adjusted, as the partition blanks are fed one by one in relation to the rotation of the cutters, the edge of the blank will be V-notched by the lugs 31, and the slots cut by the knives 25, and the finished partition members ejected upon the discharge chute 12. The stripper fingers 10 will prevent the partitions from curling upward around the male cutting dies and the cleaner fingers 11 will clear the cuttings from the recesses 36 cf the female cutting dies and cause such cuttings to fall into the waste box 13.

Although the invention has been explained with particular reference to a slotting machine of a particular type, it is not intended that it be thus limited in scope. The salient features being the provision of cutting dies for slotting machines having such characteristics that they will form slots of any desired depth, such slots having V-shaped entrance notches.

Moreover, in referring to V-shaped notches it is to be understood that this is a type of notch only and that other shapes may be used so long as ease of assembly of the partition members is thereby gained. Various changes in addition to those particularly referred to are considered to be within the spirit of the invention and the scope of the following claims.

What we claim is:
1. A cutting die for partition slotting machines, having cutting means for forming a notch at the edge of the partition, and cutting means for forming a slot in continuation of such notch, said cutting means being relatively adjustable to vary the depth of said slot.
2. A cutting die for partition slotting machines, having cutting means for forming a V-shaped notch at the edge of the partition, and cutting means for forming a slot in continuation of such notch, said cutting means being relatively adjustable to vary the depth of said slot.
3. A cutting die for partition slotting machines, having cutting means for forming a V-shaped notch at the edge of the partition, and cutting means for forming a slot in continuation of such notch, said last-named cutting means being adjustable relatively to the first-named cutting means, whereby the depth of said slot may be determined.
4. A rotary cutting die for partition slotting machines, having cutting means for forming a notch at the edge of the partition, and cutting means associated with said first-named cutting means for cutting a slot in continuation of said notch, said cutting means being relatively adjustable for the purpose of varying the depth of said slot as desired.
5. A cutter for partition slotting machines, including a male die having a cutting member adapted to cut a V-shaped notch in the edge of the partition, and a knife adjustable relatively to said member for cutting a slot of desired depth in continuation of said notch, and a female die complementary to said male die and cooperating therewith during the cutting operation.
6. A rotary cutting die for partition slotting machines, including a disk, a pair of similar cutting members arranged upon the periphery of said disk and adapted to cut a notch in the edge of the partition, and an arcuate knife carried by said disk between said cutter members and circumferentially adjustable relatively thereto for cutting a slot of desired depth in continuation of said notch.
7. A rotary cutting die for partition slotting machines, including a pair of complementary disks, a pair of cutter members carried by said disks in fixed axial relation and adapted to cut a notch in the edge of the partition, and an arcuate knife arranged between said disks and extending between said members for cutting a slot in continuation of said notch, said knife being adjustable relatively to said members to vary the depth of said slot with relation to said notch, and means for clamping said disks together to thereby maintain the adjustment of said knife.
8. A rotary cutter for partition slotting machines, comprising a male cutting die and a female cutting die, said male die including a pair of disks carrying on their peripheries a pair of similar axially aligned cutting members adapted to cut a notch in the edge of the partition, and a slotting knife clamped between said disks and adjustable relatively to said members for cutting a slot of desired depth relatively to said notch, said female die including a disk having a peripheral recess provided with cutter plates complementary to the cutter members and knife of the male die and cooperating therewith to perform the partition notching and slotting operations.

In testimony whereof we have hereunto set our hands this 18th day of October, A. D. 1930.

IRVING J. GANNON.
GUY E. LINN.