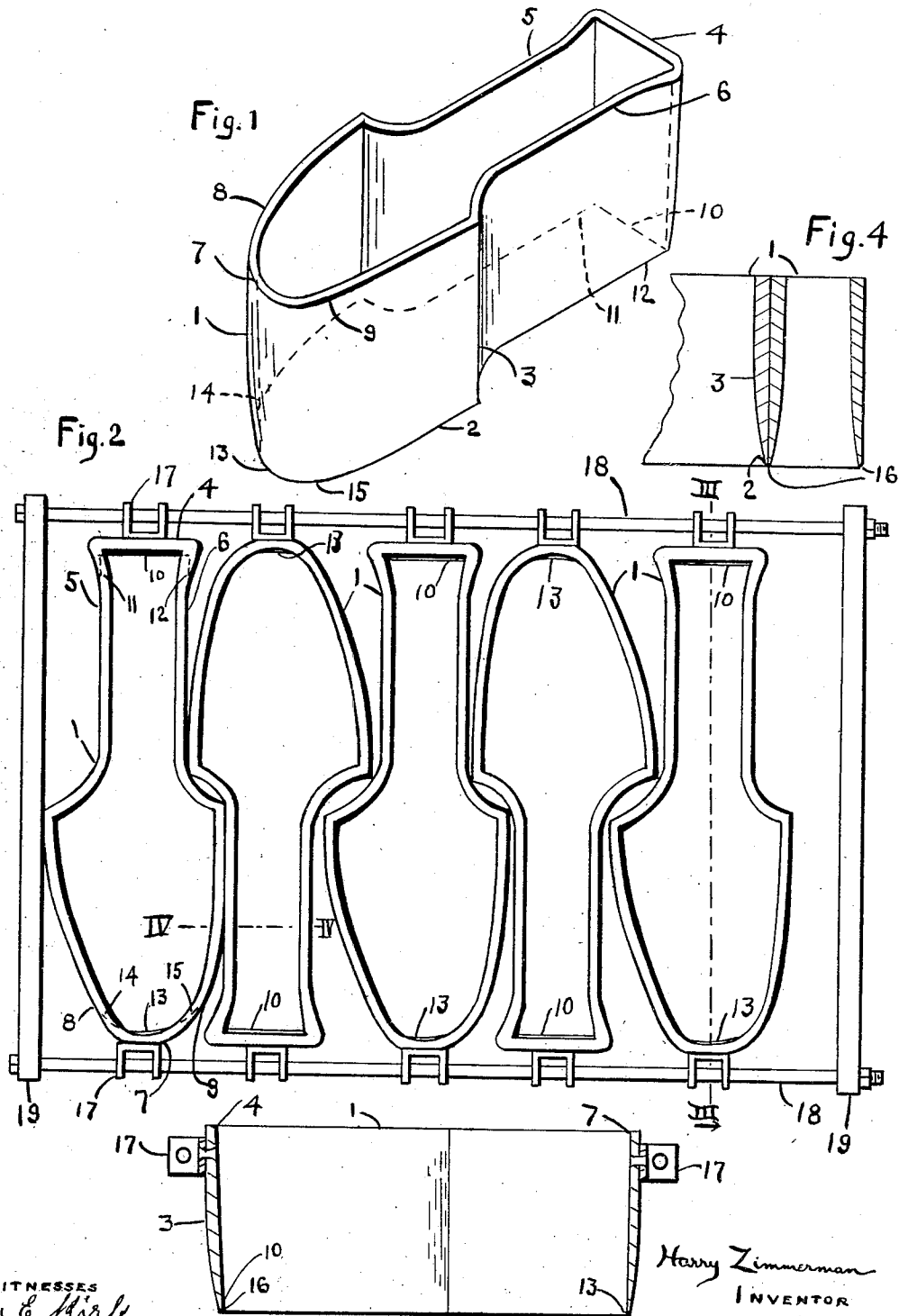


H. ZIMMERMAN.
MATERIAL CUTTER.
APPLICATION FILED SEPT. 17, 1907.

931,830.

Patented Aug. 24, 1909.

2 SHEETS—SHEET 1.



WITNESSES
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Hazel Kirk

Fig. 3

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2 SHEETS—SHEET 2.

Fig. 5

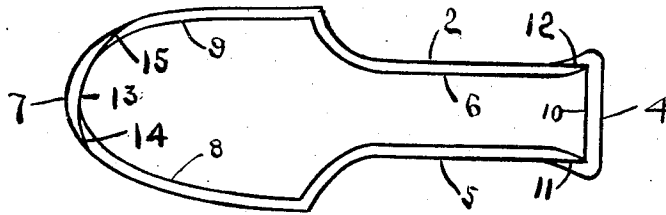


Fig. 6.

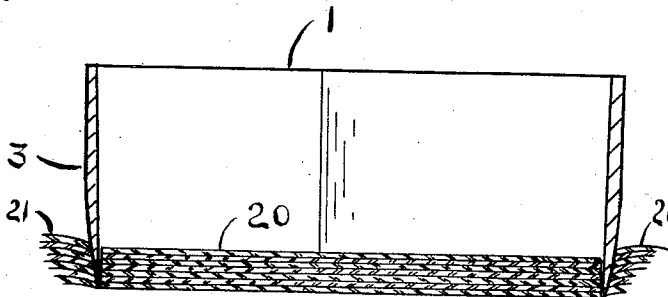
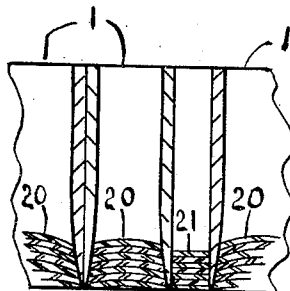


Fig. 7



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UNITED STATES PATENT OFFICE.

HARRY ZIMMERMAN, OF FREMONT, OHIO.

MATERIAL-CUTTER.

931,830.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed September 17, 1907. Serial No. 393,341.

To all whom it may concern:

Be it known that I, HARRY ZIMMERMAN, a citizen of the United States, residing at Fremont, Sandusky county, Ohio, have invented new and useful Material-Cutters, of which the following is a specification.

This invention relates to cutting material, and more particularly to prolonging the usefulness of the cutting element as well as so configuring the elements that they may be readily freed from the material while they are permitted to so act together as to bring about the most economical cutting by reducing the waste.

This invention has utility when embodied in dies for cutting fabrics, especially a plurality of thicknesses of fabric at once, as it will not only directly penetrate the goods, but is easily withdrawn, excessive congestion being avoided. Whatever binding occurs is within the die and therein is so disposed as to minimize strains on weaker portions of the die, as the angles. Furthermore this inwardly directing wedge action of the cutter takes place only where the series of cutters abut or nearly abut each other, thus preventing the cutters from working against each other. The result of this is that the cutters tend to seek each other and thus automatically bring about the most advantageous cutting by eliminating to the greatest degree possible intermediate waste. This line of action is so close that not even a thread of fabric remains between the abutting portions of the dies.

Referring to the drawings: Figure 1 is a perspective view of the embodiment of the invention in an endless die; Fig. 2 is a plan view of a group of dies; Fig. 3 is a longitudinal section of one of the dies on line III—III Fig. 2; Fig. 4 is a transverse section of the dies on line IV—IV Fig. 2; Fig. 5 is a bottom plan view of one of the dies shown in Fig. 2; Fig. 6 is a longitudinal section of die shown in Fig. 5, illustrating its action on the material to be cut; and Fig. 7 is a view in section similar to line IV—IV Fig. 2, extended to include a portion of third die, also illustrating action of the dies on the material being cut.

The die 1 has the entering or cutting edge 2 which in the embodiment shown is endless. This entering edge 2 is on the heavy wedge shaped stiffening wall 3.

For cutting material that arrangement of the dies is sought which will result in reduc-

ing the waste to a minimum. With dies of form illustrated, an arrangement longitudinally parallel as shown in Fig. 2 most nearly uses all of the goods. With this arrangement accordingly there should not be a wedge action between the dies to push them away from each other as they penetrate the goods, and the longitudinally extending walls have the incline or bevel to congest the goods in the die in the intermediate portions thereof. No ill effects follow from this binding as it does not become excessive, the terminal portions of the die having freeing walls. At one terminal the wall 4 is between the reversely extending walls 5, 6; while at the remote end, wall 7 connects walls 8, 9, which extend in reverse directions. These portions 4, 7, not adjacent the walls of the dies with which the grouping is to be had, flare or have the bevel on the outer side, the inner side being nearly perpendicular to the entering edge, or there may be a slight incline outwardly to still further free the fabric cut, thus throwing lower portion 10 of wall 4 within the length of the top of the die.

From the position of the entering edge adjacent the inner side of the stiffening wall at portion 10, the entering edge in following the form of the die crosses relatively to the stiffening wall at edges 11, 12 to the outer portion of the stiffening wall. Likewise, edge 13 under the wall portion 7 is near the inner side of die wall and connected by edges 14, 15, to the longitudinal runs of edge 2 which are adjacent the outer edge of the stiffening wall 3. The configuration of the stiffening wall is thus different from that of the cutting edge, the wall flaring outward at those points exterior to the grouping of the material cutters. The dies are of the regular form as to action line of cutting edge, but the stiffening wall is staggered relatively thereto.

Were the bevel continued directly down the stiffening wall on one side only to render sharp enough for a cutting edge, this would cause action of the material through which the cutter operated to act all against one (the beveled) side of the wall, the lower portion of which must be so thin that in heavy work turning or fracture would follow. To insure against this trouble, in dressing the entering edge, it is given a very short counter bevel 16 of such angle that the edge has strength to withstand work of cutting, but so short that abutting dies by wedge action on the

inner sides of the adjacent walls hold the dies so closely in contact that a thread may not be left therebetween. As there is no intermediate congestion, there is no forcing of the dies apart as they are forced into the material. In reality, they work toward each other.

In the group cutting, a plurality of dies are arranged in such manner as to cut to the greatest advantage, the dies being provided with brackets 17 which loosely engage rods 18. The rods 18 with end bars 19 constitute a frame for the grouping of the dies. In operation, an end die is set at the proper point near the edge of the plurality of thicknesses of superposed material, and the remaining dies are slid along to fit against each other from the end die. As power is applied, the parallel abutting walls, as shown in Fig. 4, tend to work with each other, automatically maintaining the most economical cutting relation while mutually reinforcing each other against congesting action of the material 20 being wedged into the adjacent dies. Those adjacent portions of the dies which do not quite contact, are in a measure reinforced by the material 21 coming up between the straight or parallel walls against the binding action from within the dies. Where this reinforcement is absent, and there is no advantage in having the entering edges near the outer side of the die for economical cutting, the entering edge changes position; or the stiffening wall is staggered over, transferring the wedging action outside of the die to thrust the material away from the set or grouping (see Fig. 3). In the embodiment shown, this change of wedge or flaring is about the terminals and besides freeing the material coming into the die near the ends, is a feature of increased strength for the die as the wedging is now against the outer or convex portion of the die instead of the inner or concave. The action against the convex side of the wedge, brings the reversal portions of the end walls to mutually coact in withstanding the strain, while if the outer side were straight and the inner part of the end beveled there would be no wedging or resistance on the outer side of the wall while wedging on inner side would tend to force all asunder.

The grouping of the dies without rigid confinement, imparts such flexibility to the system that unequal resistance is not liable to injure the whole set, while if one should meet with accident, it may be more cheaply replaced than if a unit, while the result is as a unit multiple form die so far as economizing material is concerned for inasmuch as where the edges abut there is no material left between, better results could not be obtained.

The invention, besides bringing about maximum economy in cutting, permits of most ready freeing from the material, as

well as produces a cutter of great strength, and therefore, of long life. The freeing from intermediate material is due to the parallel outer walls between the dies, so giving no binding action. In addition, the loose assemblage of the group enables them to easily space from each other when withdrawn, and all the outside material at once falls away. The cut pieces, having the regular form of the cutting edge for the particular form desired, are uncompressed or free in one direction, which with the die shown is the longer way, while in the opposite or transverse direction the pieces are somewhat compressed. With thin material, as cloth, which may be piled up to two or three inches of thicknesses, the several pieces as they are cut in multiple and as they move up between the wedge faces tend to bulge medially, which is readily permitted owing to the separate layers and discharge is conveniently brought about. Strength is given the cutter by avoiding such form as might tend to cause outward pressure especially toward an unreinforced portion. This is done by the outwardly wedging end portions, in this instance, which wedge action is resisted by the forcing of the walls of the die toward each other whereby they mutually strengthen. Under these circumstances the semi-congestion works no ill effect, the terminals being to some extent acting inward to hold the ends of the longitudinal walls, while the adjacent die walls are effective medial reinforcing means.

The counter lead 16 of the cutting edge brings the action part of the die under a considerable portion of the stiffening wall, making it strong in resisting compression, while the contour of the edge is such that in operation it will not tend to buckle or flex out of form.

The reversals at the terminals form interior angle having convex exterior wedge walls.

What is claimed and it is desired to secure by Letters Patent is:

1. A die having a peripheral entering edge and a stiffening wall therefor having each side staggered relatively to said entering edge.

2. A material cutter having a peripheral stiffening wall with an entering edge staggered to opposite sides of the medial line of the wall.

3. A die having a peripheral entering edge in configuration extending in reverse directions in a common plane, and a stiffening wall for the edge oppositely disposed to the edge adjacent the reversals.

4. A die having reversely extending walls, and a peripheral entering edge in a common plane for the wall oppositely disposed to the walls between the reversals.

5. A die for cutting material, having an

entering edge of interior angle form upon an internal wall, remotely from the angle congesting the material and locally to the angle freeing the material in its cutting action.

6. An endless material cutter having its cutting edge in a common plane and having a plurality of alternate exteriorly and interiorly directing wedge walls for the material.

10 7. A plurality of independent abutting dies having entering edges and stiffening walls with wedge action confining congestion of the material to one direction in the die.

15 8. The combination with a plurality of co-seeking dies of directing means for the grouping of the dies comprising a bar on which the dies are slidably mounted.

9. A rigid grouping member and a plurality of mutually reinforcing material cutters movably engaged thereby.

10. A plurality of co-seeking dies and relatively movable means for yieldably directing the grouping of the dies.

11. A material freeing combination of dies with wedge walls directing the unconfined material away from the line of the combination and oppositely directing the confined material.

In testimony whereof I affix my signature in the presence of two witnesses.

HARRY ZIMMERMAN.

Witnesses:

GEO. E. KIRK,
MARIE KLOPPER.