No. 877,927. PATENTED FEB. 4, 1908.

E. G. HOFFMANN.

ANNULAR KNIFE.

APPLICATION FILED MAY 14, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

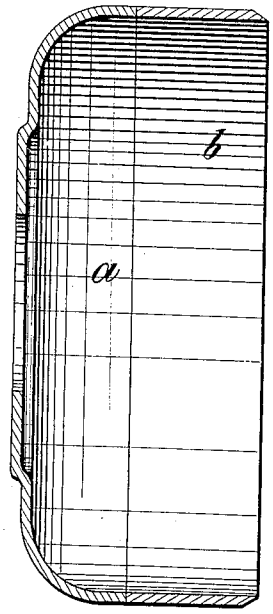


Fig. 2.

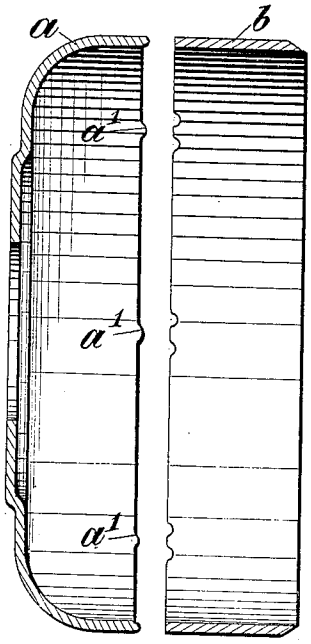
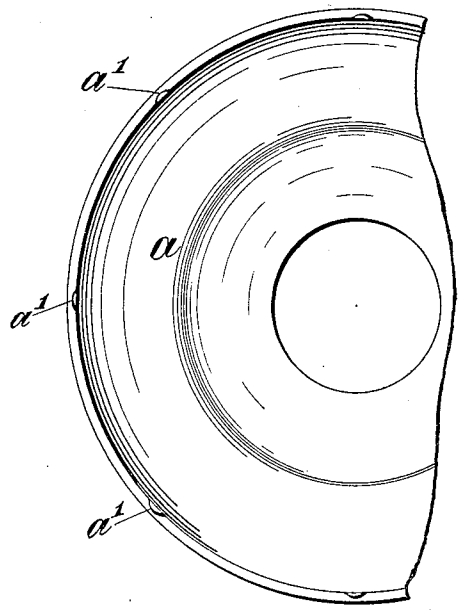


Fig. 3.



WITNESSES

Ella J. Krueger

G. McGrann.

INVENTOR

Ernst Gustav Hoffmann

BY

Redding, Riddle & Greeley

ATTORNEYS

No. 877,927. PATENTED FEB. 4, 1908.

E. G. HOFFMANN.

ANNULAR KNIFE.

APPLICATION FILED MAY 14, 1907.

2 SHEETS—SHEET 2.

Fig. 4.

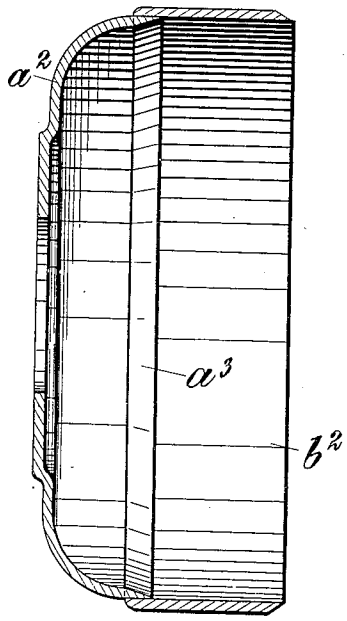


Fig. 5.

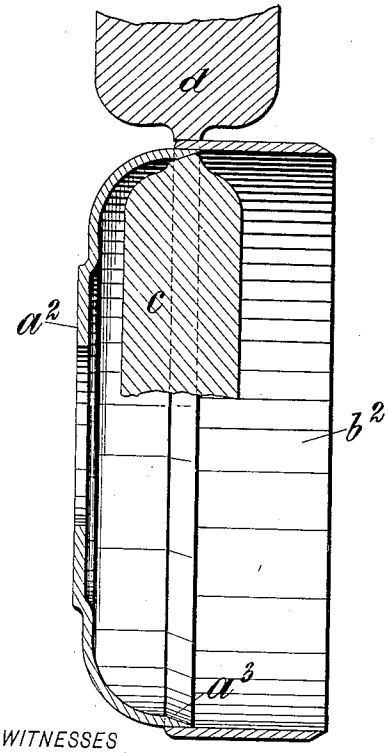
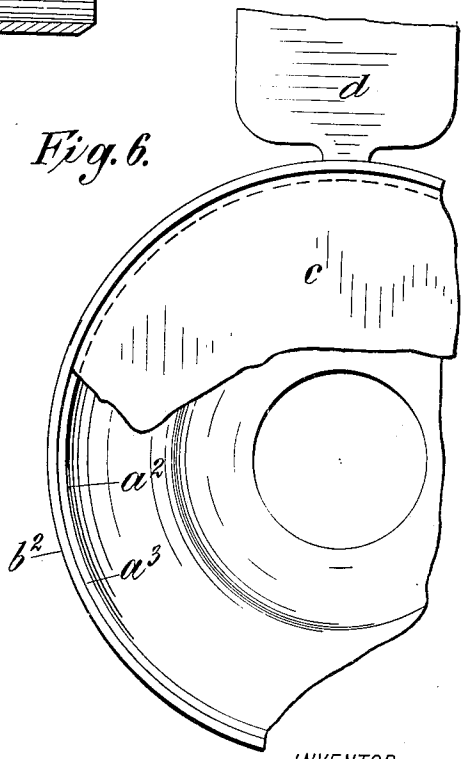


Fig. 6.



WITNESSES

Ellen J. Krueger

G. McGrann.

INVENTOR

Ernst Gustav Hoffmann

BY

Redding, Kiddle & Gurley

ATTORNEYS

UNITED STATES PATENT OFFICE.

ERNST GUSTAV HOFFMANN, OF NEW ROCHELLE, NEW YORK.

ANNULAR KNIFE.

No. 877,927. Specification of Letters Patent. Patented Feb. 4, 1908.

Application filed May 14, 1907. Serial No. 373,592.

To all whom it may concern:

Be it known that I, ERNST GUSTAV HOFFMANN, a citizen of the United States, residing in the city of New Rochelle, in the county of Westchester, in the State of New York, have invented certain new and useful Improvements in Annular Knives, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

Machines of certain kinds, such as leather skiving machines, are equipped with annular knives which are rotated at high speed. The conditions under which such machines are operated require the knives not only to be accurately balanced, because of the high speed at which they are driven, but also require the knife to have a practically smooth exterior, free from projections of any kind, and also to have a smooth interior, also free from projections and so shaped as to discharge readily that portion of the material operated upon which is projected within them. To produce such knives of suitable temper and approximating the desired degree of perfection in the other respects noted, is a matter of much expense, partly by reason of the skill and amount of time required to make the knives ready for use, and partly by reason of the weight of material required, which is itself objectionable, not only because of the amount of machining necessary, but also because of the weight of the knife when completed.

It is the object of this invention to produce knives of the character referred to which shall be better adapted for their intended use than the knives heretofore produced and can be produced at much less expense.

In accordance with this invention the cutting portion or blade of the knife is made in cylindrical form of high grade steel, preferably by butt-welding the ends of a band of high grade steel of proper width, coiled into a ring. The base or body or carrier for the blade is cup-shaped, smoothly rounded between bottom and flange, and preferably formed from stamped soft steel. The blade is then secured to the base or body by welding the two together at intervals or isolated points about the periphery, the union of the two parts being thus accomplished with ease and positiveness without danger of drawing the temper of the blade or otherwise weakening or injuriously affecting any part of the complete knife.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which—

Figure 1 is a view in axial section of the improved knife made as hereinafter described. Fig. 2 is a view similar to Fig. 1 but showing the base and blade separated and in readiness to be united. Fig. 3 is an edge view of the base portion of the knife in readiness to have the blade secured thereto. Fig. 4 is a view similar to Fig. 1 but showing the base and blade united differently. Fig. 5 is a view similar to Fig. 4 and illustrating the manner of uniting the two parts with a knife. Fig. 6 is an edge view of the knife also illustrating the manner of uniting the parts.

In the form of the improved knife shown in Figs. 1, 2 and 3, the cup-shaped base or body *a* is formed by stamping up into proper shape a sheet of soft steel and along its outer edge it is provided with a series of isolated welding points *a'*, distributed at intervals about the circumference, such welding points being formed in any suitable manner, as by laying on small bits of metal or, as shown in the drawings, by pinching the metal of the body to form such points.

The annular blade *b* is separately formed of high grade steel adapted for the purpose to which the knife is to be put, preferably by coiling into a ring a strip of metal of suitable length and width. The blade is also preferably formed about its inner edge with a series of projections or recesses, as may be convenient, distributed about the circumference in correspondence with the points *a'* of the base and coöperating therewith so as to insure the accurate placing of the blade with respect to the base. The two parts of the knife are then assembled and securely united by welding at such isolated points, distributed at intervals about the circumference. In this manner the necessary strength of union between the parts is secured without drawing the temper of the blade or otherwise affecting injuriously any portion of the knife. The welding is conveniently effected electrically.

After the parts of the knife are assembled and united, as described, the blade is ground true, inside and outside, in the usual manner, so that it forms a continuous and unbroken surface with the base or holder. There are, therefore, in the finished knife no objectionable projections, inside or outside, and the

cuttings of the material operated upon by the knife, which are projected within the knife, are permitted to work themselves freely out of the way, such action being facilitated by the well rounded internal shoulder of the stamped steel bottom.

In the form of the knife already described the two parts are practically butt-welded together, but the union of the parts may be effected by lap-welding of the parts at isolated points or intervals, as illustrated in Figs. 4, 5 and 6. In this construction no raised points of contact are required, but the base or body a^2 is slightly smaller in diameter than the blade b^2 so as to be telescoped closely within the same for a short distance and the inner edge of the body portion is beveled off, as at a^3, so as to leave no abrupt shoulder within the knife. The two parts, when thus formed and assembled, are integrally united, as by welding at isolated points or intervals, preferably by an electrical welding machine, in which one of the conducting contacts, as c, is formed to fit snugly within the edge of the base or body portion, while the other conducting contact d, of limited area at the point of contact as shown in Figs. 5 and 6, is applied externally to the lapping portions of the two parts at isolated points or intervals about the circumference. Upon the passage of the electrical current from one contact to the other, suitable pressure being exerted, the two parts of the knife are fused and welded together at such points, substantially as already described with respect to the construction shown in Figs. 1, 2 and 3.

It will be understood that the particular manner of welding together the two parts of the knife at isolated points may be varied to suit different conditions, it being simply necessary that such welding shall be effected at intervals only about the circumference of the knife. Such integral union of the blade and base at intervals only about the circumference of the knife permits the blade to have such a degree of flexibility as it has been found is necessary to enable it to withstand the variation of temperature to which it is subjected in manufacture and in use without cracking or warping.

I claim as my invention:

1. An annular knife comprising a cup-shaped base and a cylindrical blade, the two being integrally united at intervals about the circumference to secure the blade and base together while permitting expansion and contraction of the blade independently of the base.

2. An annular knife comprising a stamped cup-shaped base of soft steel and a cylindrical knife of high-grade steel, the two being integrally united at intervals about the circumference to secure the blade and base together while permitting expansion and contraction of the blade independently of the base.

3. An annular knife comprising a stamped cup-shaped base of soft steel with a well rounded internal shoulder and a cylindrical knife of high-grade steel, the two being integrally united at intervals about the circumference to secure the blade and base together while permitting expansion and contraction of the blade independently of the base.

This specification signed and witnessed this 8th day of May, A. D., 1907.

ERNST GUSTAV HOFFMANN.

Signed in the presence of—

AMBROSE L. O'SHEA,

ELLA J. KRUGER.