(No Model.)

A. JOHNSTON.

ART OF GRINDING CUTLERY OR OTHER TEMPERED STEEL ARTICLES.

No. 485,697. Patented Nov. 8, 1892.

Fig. 1.

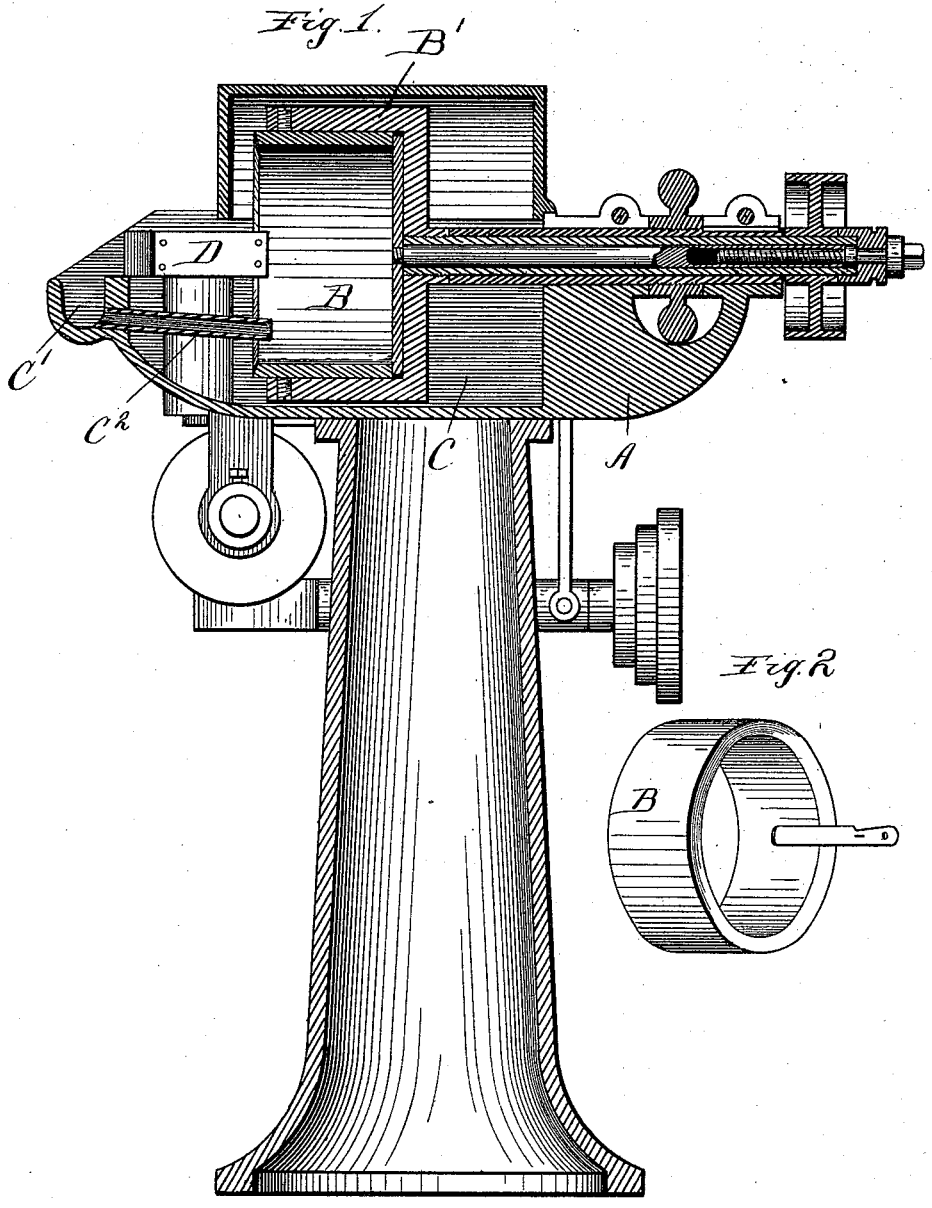

Fig. 2

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UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

ART OF GRINDING CUTLERY OR OTHER TEMPERED-STEEL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 485,697, dated November 8, 1892.

Application filed June 13, 1888. Serial No. 276,947. (No model.)

To all whom it may concern:

Be it known that I, ALLEN JOHNSTON, a citizen of the United States, residing at Ottumwa, in the State of Iowa, have invented a new and useful Improvement in the Art of Grinding Cutlery or other Tempered-Steel Articles, of which the following is a specification.

My invention has reference to the art of grinding cutlery or other articles of tempered steel, such as lathe-spindles, mandrels, &c.; and its general object is to facilitate and improve the grinding of such articles. In the specification of Letters Patent No. 465,376, granted to me December 15, 1891, I have explained the manner in which the grinding of such articles is now generally practiced, and reference may be had to said specification for a statement of the difficulties that have heretofore been encountered in the attempt to use emery grinders in place of the common grindstones. After much experiment I have been able to remove these difficulties completely by means of the present invention, which consists in holding the articles to be ground against the surface of a wheel composed of emery and a binding agent such as will soften and disintegrate at a less heat than will draw the temper of hardened steel, and at the same time applying to the grinding-surface a supply of water sufficient to conduct away the heat generated by the friction. The conjoint action of the grinder made of the described material and the abundant flow of water over the grinding-surface produces new results in the grinding of cutlery, and avoids completely all the difficulties and objections above pointed out.

The process is preferably practiced by grinding on the inner edge of a cup-shaped wheel, to the interior of which is constantly applied a copious stream of water. The centrifugal force of the rapidly-revolving wheel keeps the proper amount of water supplied to the grinding-surface.

The composition of materials which I ordinarily prefer to use to make the emery-wheel consists of nine parts, by weight, of pulverized emery and one part of shellac, which are heated to or above the melting-point of the shellac and thoroughly mixed together and then pressed into a suitable mold to form the shape of wheel desired. When cold, the emery-wheel will be ready for use, and it will melt, soften, or disintegrate before it will heat the knife or article being ground hot enough to draw its temper. The melting or disintegration which I speak of of course takes place only at the surface of the wheel directly in contact with the heated knife, and this emery-wheel will wear away smoothly, the same as any ordinary emery-wheel. Another formula which I sometimes use is, by weight, sixteen parts of pulverized emery, two parts of shellac, and one part of plaster-of-paris, all heated hot enough to heat the shellac, thoroughly mixed together, and pressed into molds. This makes a somewhat harder wheel than the former, and is better for some purposes. The shellac may also be cut with alcohol, thoroughly mixed with the emery, and then poured into molds and allowed to remain until dry; but this consumes more time. There are, of course, various materials other than shellac known to those skilled in the art which will hold the emery together when cold, and will melt or soften and permit the emery to again disintegrate before it will heat the article ground thereon sufficiently to draw its temper, and among such materials suitable to use I may mention, for sake of illustration, brimstone, and also the other various gums similar in nature to shellac.

In the accompanying drawings, which form a part of this specification, I have shown at Figure 1 a sectional view of a machine suitable for the purposes of the invention, and in Fig. 2 a perspective view of a hollow emery-wheel.

In said drawings, A represents the frame of the machine; B, the hollow emery-wheel; B′, its revolving holder, and C the water-trough, through which the emery-wheel revolves.

C′ is the elevated compartment of the water-trough, into which the water or other liquid—oil, for example—is constantly elevated or delivered by the centrifugal action of the revolving emery-wheel and its holder, and C^2 is the spout leading from this upper compartment and by which the water or other cooling liquid is constantly delivered upon the inner periphery of the revolving grinder B, so that the centrifugal action thereof will flow or spread the liquid constantly over the bevel-

edge grinding-surface of the hollow emery-wheel at the place where the grinding is being done.

D is the knife or work-holder, by which the article being ground is automatically reciprocated in and out of the hollow grinder over and parallel to its inside conical end surface and held or pressed against such grinding-surface during the grinding operation.

The construction and operation of the parts is fully shown and described in my said former Patent, No. 377,201, to which reference is hereby made, and need not, therefore, be here again described more particularly than I have done above, as my present improvement is independent of the particular construction of grinding-machine which may be employed.

The emery-wheel B is of such composition of materials as that it will melt, soften, or disintegrate before the article being ground is heated hot enough by the abrasion to draw the temper of steel, so that the article being ground may be fed across and pressed against the internal conical end face or edge of said emery-wheel automatically, or by machinery without danger of injuring the steel by overheating.

In finishing or grinding knives or other steel articles, where a fine finish is required from an article that already has a tolerably-smooth surface, the use of a very fine emery, such as that known commercially as "No. 180," or even flour-emery would be used in making the emery-wheel, and instead of water, oil would be used during the grinding operation to cool and clean the surface of the article being ground. If, on the other hand, the surface is rougher, as is the case with a knife as it comes from the forge, it would be necessary to use an emery-wheel made of coarser emery first, and water to cool and clean the articles being ground, and afterward the fine wheel and oil are used to finish or polish the surface to the required fineness.

It will be understood that in practically carrying out my invention the use of water in abundance is an essential condition, not merely to keep the grinding-surface clean and remove detached particles, but to keep the wheel in proper grinding condition. Without the use of water in the manner pointed out the wheel could not be used to grind tempered-steel articles.

By this invention cutlery and like articles, which are now ground by means of ordinary grindstones, can be ground on the soft-composition grinder with improved results, so far as the product is concerned, and with a great gain in economy.

I do not specifically claim herein a hollow or cup-shaped wheel of the described material, such claim being reserved to my application filed January 6, 1891, Serial No. 376,902, upon which Letters Patent No. 465,376, above referred to, were issued.

Having now fully described my said invention, what I claim is—

The improvement in the art of grinding articles of tempered steel, which consists in holding the article against the surface of a wheel composed of emery and a binding agent capable of softening and disintegrating at a less heat than will draw the temper of hardened steel, and at the same time applying to the grinding-surface a supply of water sufficient to conduct away the heat generated by the friction and to retard disintegration of the wheel, substantially as described.

ALLEN JOHNSTON.

Witnesses:
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