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MATERIALS FOR USE IN TUMBLING BARREL POLISHING AND FINISHING AND METHOD OF PRODUCING SAME

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This application is a continuation in part of our copending application, Serial No. 330,468, filed April 19, 1940.

The main objects of this invention are:

First, to provide an improved material for the burnishing and polishing of articles by tumbling barrel methods or processes.

Second, to provide a material which is highly efficient and desirable for the polishing and burnishing of metal articles such as stampings, die castings, and the like and also adapted for the polishing of non-metallic parts which is highly efficient and results in a satisfactory polish or finish.

Third, to provide a material for the purposes stated and having these advantages which is very economical in its initial cost and very durable and also economical in use from the standpoint of time required for the polishing operations.

Fourth, to provide an aggregate material for tumbling barrel finishing and polishing which is highly effective on work of varying sizes, shapes and configurations.

Fifth, to provide a method of preparing polishing material which is highly desirable for use in "dry" polishing processes.

Our present invention relates to a "dry" polishing process for metallic parts or articles, being in some respects similar to the subject matter of our application relating to "wet" polishing processes and materials used therein covered by our application, Serial No. 415,774, filed October 20, 1941, filed concurrently herewith.

The polishing aggregate of our invention has various characteristics which enables us to accomplish the various stated objects and other objects which will hereinafter appear.

The method of our application comprises two steps although it should be understood that both steps may be used independently or in connection with other polishing steps or supplementary to other polishing steps.

The preferred steps of our method used successively comprise (*a*) a preliminary or a "roughing" step, and (*b*) a finishing or "fine" polishing step.

The material used in both steps or operations includes as an aggregate irregular fragments of limestone or crushed or broken limestone preferably ranging in size from approximately ½ to 1½ inches in longer dimensions. These are of a great variety of irregular shapes and sizes within the general limits stated. As received from the quarry or stone cutter or as results from crushing limestone, these fragments have sharp points and edges and in that condition are undesirable for the practice of our method and we therefore subject the same to a process for eliminating these sharp points and edges without, however, destroying the irregular outlines of the fragments.

The processing procedure preferably comprises the loading of a many-sided tumbling barrel with the limestone fragments with enough water to submerge the fragments, and adding thereto a severe abrasive compound. For a standard size barrel, the following is a satisfactory compound:

Pumice	10 lbs.
Soap	1 lb.
Rouge	⅛ lb.
Water	3 pints

that is, sufficient water is used to enable mixing the compound. This is added to the barrel and the barrel is revolved for about 48 hours, after which the water and the abrasive mixture is drained from the fragments and the fragments flushed with clean water. In this prepared form the fragments are comparatively smooth-sided although their irregular shapes and sizes are not destroyed.

This tumbling barrel aggregate may be used in the tumbling mixtures employed in the roughing or first step of our "dry" polishing method and also in the second step of our "wet" polishing method described in our application filed concurrently herewith.

However, for the second step of the method of the present application, the limestone fragments process, as above described, are further processed by loading a standard type of "dry" burnishing tumbling barrel with the fragments and a so-called fine abrasive compound and adding thereto kerosene and stearic acid in substantial quantities. This load is then revolved for a period of a few hours after which time additional lubricant is added until the limestone fragments have apparently absorbed all the kerosene and stearic acid which seems possible. The result is a very smooth-feeling fragment. These fragments are then ready for use in the "fine" finishing step and produce a very fine finish.

It may be stated at this time that the consumption of the fragments in both steps is very small and it is found in practice that only a few pounds need to be added to each tumbling barrel compartment even when in continuous daily operation and it is not necessary for the added material to have been subjected to the preliminary treatment as the compound used with the aggregate

preferably contains stearic acid and kerosene as will later appear and in view of the small amount added they do not require the second step in the preparation of the fragments.

The "dry" process of our invention is highly useful in the polishing or burnishing of parts which do not require the removal of large quantities of the material in order to produce the smoothness and polish desired and it is primarily designed for use on stampings or die castings which are in reasonably good condition. The process has the further advantage that it is relatively clean and economical and requires no drainage as is the case with our "wet" process.

As an example of the practical use of our process, we employ a tumbling barrel having two compartments. Each compartment is loaded with 200 pounds of our aggregate above described with the abrasive compound and other materials which may be the same as that disclosed in our copending application Serial No. 330,468, as follows:

Hardwood sawdust	75 lbs.
Powdered pumice	25 lbs.
Powdered oyster shell	12 lbs.
Rouge	1 lb. 7 ozs.
Stearic acid	5 lbs.
Kerosene	5 quarts

It is found in practice effective to use 52 lbs. of old or used compound and 16 lbs. of new or unused compound although it is obvious that initially a new compound of the same quantity would be used.

The parts to be burnished or polished are then loaded into the compartments, the load depending upon the size, weight and shape of the parts to be operated upon. It may vary greatly but the parts to be polished should be well surrounded by the aggregate and the same is thoroughly mixed. The barrel is then revolved from 24 to 48 hours although the time element is controlled by the finish desired. After a proper time has elapsed to secure the desired finish, the mass including the work is dumped into a suitable shaker or grader which separates the fragments, compound, and work. The barrel is then recharged with the same fragments along with the old compound and new compound as described and the operation may be repeated. From time to time additional aggregate is added. By using a portion of the old compound together with the new compound, substantial economy is effected and the cutting or grinding action is less severe.

When it is desired to produce a high finish or luster, the same machine or types of machines may be used but instead of the compound described for the initial step, the following compound is found to give very satisfactory results—

Cob meal	112 lbs.
Tripoli	17 lbs.
Oyster shell	8 lbs.
Lime	5 lbs.
Rouge	2 lbs.
Stearic acid	3 lbs.
Kerosene	5 quarts

The proportions we have given may be varied considerably and still attain very satisfactory results and, further, it will be appreciated that other types of compounds may be used, depending somewhat on the character of the articles which are to be burnished or polished and the finish desired. However, the method of our invention may be very efficiently practiced following the proportions and materials as indicated, and it results in great economy of materials inasmuch as the aggregate is inexpensive and is very efficient so that the desired results are very rapidly and inexpensively attained both in the matter of materials and time and also the very great durability of the aggregate.

It should be understood that the terminology we have used herein is used descriptively rather than in a limiting sense and with the intention to include equivalents of the features shown and described within the scope of the following claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. The method of treating limestone fragments of widely varying irregular outlines and widely varying sizes which are in substantially the condition resulting from the fracturing of the limestone which comprises tumbling such fragments in the presence of an abrasive until the sharp points and edges have been removed therefrom without destroying the irregular outlines thereof, washing the same to remove the abrasive and thereafter subjecting such fragments to tumbling in the presence of an abrasive and an emulsifiable oil until a substantial amount of the oil has been absorbed by the fragments and they have smooth surfaces.

2. The method of treating fractured limestone fragments of widely varying irregular outline which are in substantially the condition resulting from the fracturing of the limestone comprising the steps of tumbling such fragments in the presence of an abrasive until the sharp points and edges have been removed therefrom without destroying the irregular forms thereof, washing the abrasive therefrom and thereafter tumbling the fragments in the presence of an emulsifiable oil until substantial amounts of the oil have been absorbed.

3. A material comprising fragments of crushed limestone of widely varying irregular outlines corresponding substantially to the condition resulting from the fracturing of the limestone and ranging in size from approximately one-half to one and a half inches and having the sharp points and edges thereof removed without destroying their irregular shapes, and having substantially smooth surfaces and a substantial amount of absorbed emulsifiable oil.

4. A material comprising fragments of crushed limestone of widely varying irregular outlines and sizes substantially as resulting from the fracturing of the limestone but with the sharp points and edges thereof removed and the surfaces substantially smooth and impregnated to a substantial extent with an emulsifiable oil.

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