

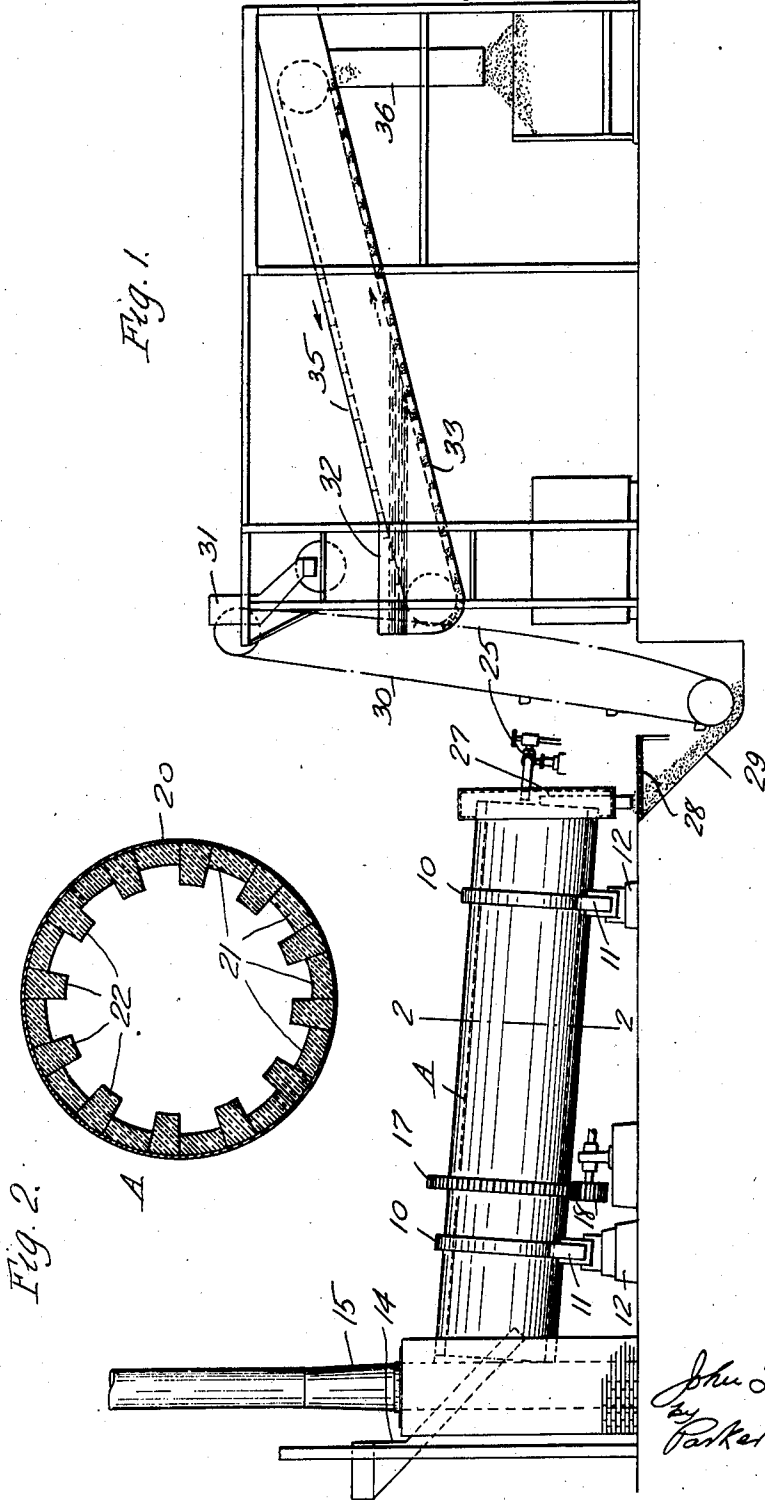
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PROCESS OF RECLAIMING CORE SAND AND THE LIKE

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PROCESS OF RECLAIMING CORE SAND AND THE LIKE.

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To all whom it may concern:

Be it known that I, JOHN F. GROEBE, a citizen of the United States, residing at Kenmore, in the county of Erie and State of New York, have invented a new and useful Improvement in Processes of Reclaiming Core Sand and the like, of which the following is a specification.

This invention relates to processes of reclaiming core sand and the like, so that the sand may repeatedly be used in connection with the making of cores.

Sand cores for use in the molding of metals are made by mixing sand with a mixture of oils and resin for binding the particles of sand together, and after this mixture is formed into the shape of a core, it is baked. The cores are inserted into the molds and after the metal has been poured into the mold the heat of the molten metal chars or burns the binder between the particles of sand so that the core becomes disintegrated and can be readily removed from the casting. During the burning of the core in the mold, the sand particles become covered or coated with a deposit or film of carbon, so that this sand heretofore could not be used again for forming other cores, and consequently was a waste product which was sometimes expensive to dispose of. It also frequently happens, in the making of cores, that the cores become broken or are otherwise defective, and such sand can also be reclaimed by my process and apparatus, this sand having also heretofore been considered unfit for further use.

One of the objects of this invention is to provide a process whereby the core sand can be treated to remove the carbon film or deposit on the outer surface of the sand grains so that the sand can again be used for making cores. Other objects of the invention are to provide a process of this kind in which the heat obtained from the burning of the carbon from the sand is utilized in the reclamation of the core sand; and also to improve processes of this kind in other respects hereinafter specified.

In the accompanying drawings,
Fig. 1 is a side elevation of an apparatus for use in reclaiming core sand, by

means of which the process embodying my invention can be carried out.

Fig. 2 is a transverse, sectional view on line 2—2, Fig. 1.

In the carrying out of this process the sand is first screened to remove any foreign matter and any large pieces of cores are crushed so that the resulting product will be of reasonably uniform size. This sand is then subjected repeatedly to the action of a flame, for example, by placing the sand in a rotary kiln, which is provided with a series of internal ribs or scoops which carry the sand toward the upper portion of the kiln and let the same fall through the kiln where it is subjected repeatedly to the action of a flame, which burns the carbon or carbonaceous material from the particles of sand. The heat of the burning carbon assists in heating the kiln and when the sand is discharged from the kiln, it is practically free from carbon. The sand is preferably washed to remove other impurities and is then ready to be again used for making cores or for any other purpose.

In the accompanying drawings A represents a kiln, which is preferably in the form of a rotary drum, provided with two or more bearing rings 10, which cooperate with bearings or rollers 11 mounted on pedestals 12. The core sand is first screened to remove any large particles of foreign matter, and the large particles of cores are crushed so that the resulting product can be fed or delivered into the kiln at a uniform rate. These screening and crushing means may be of any suitable or desired construction and are consequently not shown in the drawings. The screened and crushed sand is then fed to the upper end of the drum or kiln A, which is inclined so that the sand will feed by gravity through the kiln, a chute 14 being indicated to supply the finely divided sand to the upper end of the kiln. The upper end of the kiln also communicates with a smoke stack 15 for carrying off the products of combustion. The kiln or drum A is preferably rotated continuously during the carrying on of the process and for this purpose a ring gear 17 is provided which is secured to the drum of kiln A and

which meshes with a pinion 18, which may be driven in any suitable manner, not shown.

The drum or kiln A may be of any suitable or desired construction, being preferably provided with an outer metal shell 20 which is lined with a suitable refractory material such, for example, as fire brick 21 suitably arranged inside of the metal shell 20. The interior of the drum is also provided with means for carrying the sand from the bottom of the interior of the cylindrical drum to the upper portion thereof and discharging the sand through the interior of the drum, so that the sand may be acted upon by a flame which is directed lengthwise of the interior of the drum. In the particular construction shown for this purpose another series of fire brick or the like 22 is provided, which are arranged between the fire brick 21 and which extend inwardly, so that each of the bricks or ribs 22 act as a scoop to carry sand upwardly during the rotation of the drum and drop the sand to the interior of the drum or kiln.

In order to provide the heat necessary to burn the carbon deposit from the grains of sand, a burner or jet is provided which projects a hot and practically smokeless flame into the kiln or drum A. In the construction shown, a burner or nozzle 25 is illustrated, which may operate in connection with fuel oil, gas, or other heating medium, and which is intended to project a hot flame substantially throughout the length of the kiln or drum A. Consequently the sand entering into the drum or kiln A becomes rapidly heated and is dropped repeatedly through the interior of the drum, until the flame finally ignites the carbonaceous deposit on the outside of the grains, and the heat derived from the burning of this deposit is communicated to other sand entering into the drum and assists in carrying out the process. It will be understood that sufficient air is passed into the drum with the flame so that the complete burning of the carbonaceous material, which may be in the nature of a core oil compound in the case of sand derived from defective cores, or the charred remnants of such compound in the case of core sand received from castings, will be burned.

The sand on leaving the drum or kiln A enters a discharge spout or chute 27, from which it may be discharged through a suitable screen 28 into a trough or receptacle 29, from which the sand may be conveyed in any suitable manner to a washing apparatus. In the construction shown for this purpose a conveyor 30 is employed, which is preferably of the bucket type, whereby buckets enter into the depression or receptacle 29 and become filled with sand, which is dis-

charged at the upper end of the conveyor into a hopper 31, from which the sand may be passed into a basin or receptacle 32, containing water or other washing medium. This receptacle preferably has an inclined bottom 33 and the sand may be scraped or moved along the inclined bottom 33 by means of scrapers or the like carried on an endless chain 35, the lower run of which passes over the inclined bottom of the tank 32. Consequently this conveyor moves the sand upwardly along the inclined bottom and discharges the same into a chute or hopper 36, whereupon the sand is ready for use, or if desired, the sand may be dried in any suitable and well known manner. The washing which may be effected by any other or desired method, completes the purification of the sand so that any foreign matter contained therein which was not removed by the burning, will be removed during the washing of the sand in the container 32.

The process described is decidedly efficient in operation and make it possible to utilize core sand which was heretofore considered a practically worthless material. The core sand may be mixed with some molding sand adhering to the castings while the cores are removed therefrom and such molding sand will be removed from the core sand in the washing process and will not interfere with the use of the reclaimed sand for making cores. The drum or rotary kiln described is decidedly efficient in use and makes it possible to reclaim the core sand with the minimum use of fuel. By dropping the sand repeatedly through the interior of the drum, the particles of sand are separated from each other so that the flame can act on each particle of sand. Core sand which has been treated by my process and apparatus is similar in appearance and other characteristics to the sand ordinarily used in the making of cores, and cores made from the reclaimed sand are equal in every respect to cores made from new sand. Since the individual grains or particles of sand are not changed by the heat which burns off the carbon, the sand may be used repeatedly in the making of cores.

I claim as my invention:

1. The hereindescribed process of reclaiming core sand and the like which consists of burning the carbonaceous coating on the grains of sand.

2. The hereindescribed process of reclaiming core sand and the like which consists of screening the sand, and burning the carbonaceous coating on the screened sand.

3. The hereindescribed process of reclaiming core sand and the like which consists of subjecting the sand to the action of a flame for burning the carbonaceous material adhering to the grains of sand.

4. The hereindescribed process of reclaim-

ing core sand and the like which consists of dropping the sand through a flame so that the particles are separated from each other, to burn the carbonaceous deposit from the grains of sand.

5 5. The hereindescribed process of reclaiming core sand and the like, consisting of subjecting the sand to heat to burn the carbonaceous deposit therefrom, and utilizing the heat resulting from the burning of the carbon deposit for heating other sand.

10 6. The hereindescribed process of reclaiming core sand and the like, consisting of

feeding the sand to a hollow rotary kiln, dropping the sand repeatedly through said kiln, and passing a flame through said kiln to burn the carbonaceous deposit from the particles of sand.

15 7. The hereindescribed process of reclaiming core sand and the like which consists of crushing the sand to separate the particles from each other, and subjecting the finely divided sand to the action of a flame in the presence of air to burn the carbonaceous coating from the grains of sand.

20 JOHN F. GROEBE.