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D. A. BOLTZ
GRINDING MACHINES

2,850,848

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2 Sheets-Sheet 1

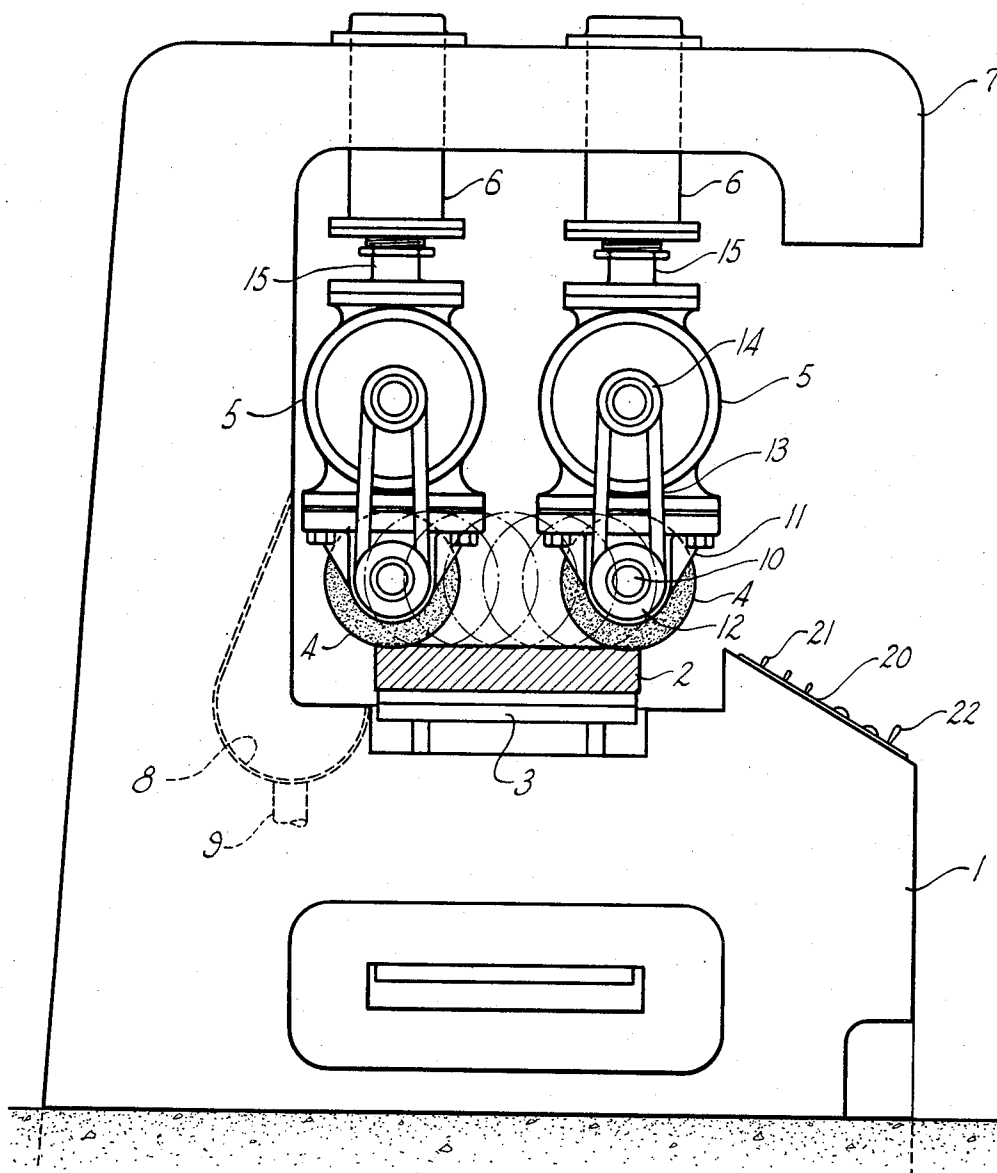


Fig. 1

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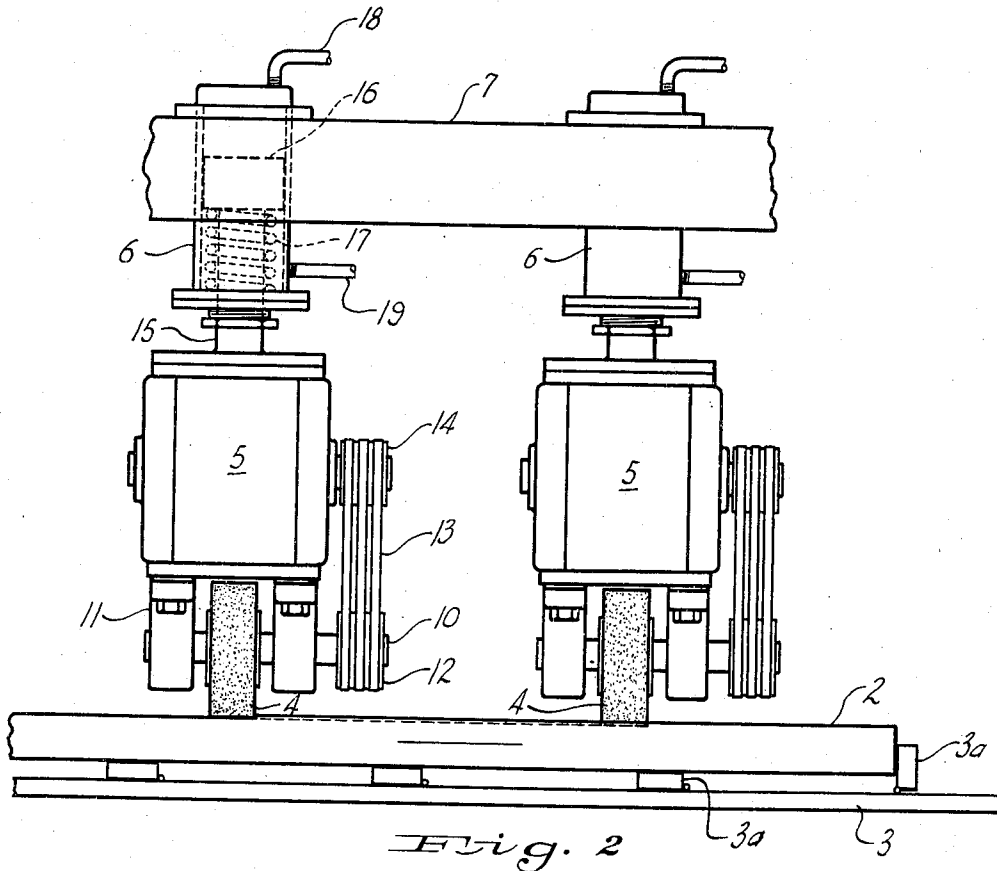


Fig. 2

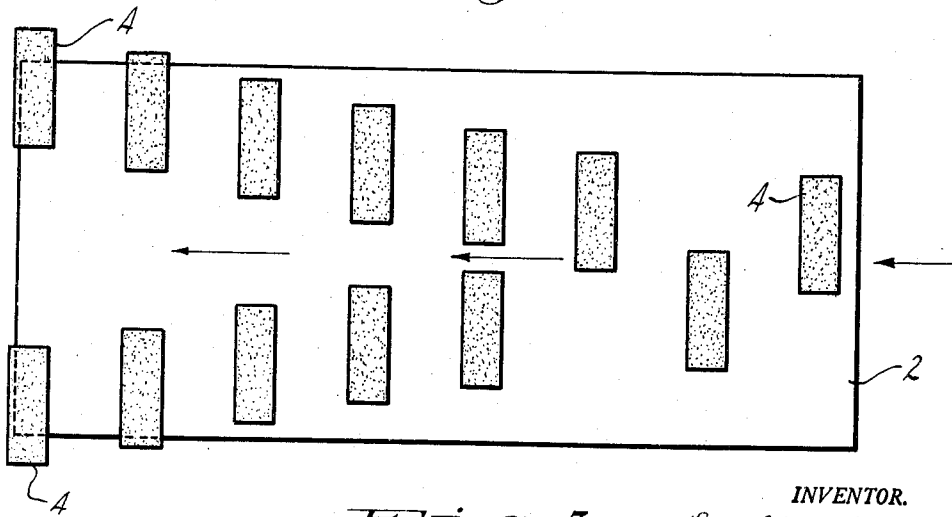


Fig. 3

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GRINDING MACHINES

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2 Claims. (Cl. 51—74)

This invention relates to new and useful improvements in grinding machines, more particularly to apparatus for surface grinding billets, slabs, ingots and the like to remove scale and other surface imperfections preliminary to subsequent rolling and fabricating operations and it is among the objects thereof to provide apparatus in which a plurality of grinding wheels are suspended by individual power units mounted in pneumatic or hydraulic supports for applying grinding pressure to the wheels such wheels being arranged in staggered relation whereby in a single pass of the object to be ground underneath the wheels the entire surface is ground.

In conventional practice, a single wheel is employed for surface grinding slabs, billets, ingots or the like by multiple passes of the work below the wheel, the size of the wheel being relatively large to cover a substantial portion of the surface worked upon. The bite of grinding is limited by the ability of the abrasive wheel to withstand grinding pressure at high speeds.

In accordance with the present invention, a large number of smaller wheels are employed to engage the smaller bites of the surface to be ground whereby the bite of grinding can be substantially increased with the result that a billet or ingot may be ground in a fraction of time required by the single wheel grinding operation. The invention will become more apparent from a consideration of the accompanying drawings constituting a part hereof in which like reference characters designate like parts and in which:

Figure 1 is an end elevational view of a billet grinding machine embodying the principles of this invention;

Figure 2 is a front elevational view of the billet and wheels; and

Fig. 3 a top plan view diagrammatically illustrating the staggered relation of the wheels when acting upon the billet surface. With reference to the several figures of the drawing, the numeral 1 constitutes a base on which a billet 2 to be ground may be supported on a movable table or conveyor 3 capable of traversing the billet 2 beneath a plurality of grinding wheels 4 having power units 5 suspended from pneumatic cylinders 6 that are mounted in a crop head 7 extending vertically upward from and formed integrally with the base 1. A trough 8 is provided in the base for receiving the coolant fluid supplied to the grinding wheels, which is run off by a drain 9, as shown in Figure 1.

The wheels 4 are mounted on axles 10 journaled in brackets 11, the axles being provided with sheave wheels 12 connected by V-belts 13 to sheaves 14 of the power unit or motor 5. The motor is suspended in cylinder 6 by a piston connection 15 to be subject to vertical movement up or down and for maintaining working pressure on the grinding wheel 4. As shown in Fig. 2, the piston 16 is biased by a spring 17, which is of a strength to counteract the weight of the grinding wheel head so that by the application of fluid pressure through the conduits 18 and 19 on opposite sides of the piston, the grinding wheels may be raised or lowered and pressure may be brought to bear thereon by the controlled application of the pressure fluid.

The billet 2 is shown mounted on the conveyor 3, which is provided with hinged lugs 3a so that when the

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billet 2 is slid onto the conveyor, the lugs 3a will collapse, as shown in Fig. 2, and the next lug approaching the billet will abut the edge of the billet and convey it in the direction of the arrow head of the bite of the grinding wheels 4.

As shown in Fig. 3, a plurality of such grinding wheels and heads are mounted on the cross arm 7 in staggered relation so that a single pass of the billet 2 below the wheels will grind the entire upper surface of the billet, a wheel taking about a two to four inch cut depending upon the depth of feed. As is apparent, there is no need for a smooth planed surface in the finished job as the purpose of the grinding is only to remove scale and other surface defects resulting from the processing of the steel to the slab, billet or ingot stage.

As shown in Fig. 1, a control panel 20 having levers 21 and 22 for controlling the motors and pneumatic cylinders of the wheels provides for quick adjustment of the wheels in maintaining suitable pressure bearing upon the surface to be ground and after the slab has been traversed beneath the wheels, it is turned to rest upon the ground surface and the other face is ground. It is further evident that wheels may be applied to the side edges of the slab or billet to grind them at the same time that the wide surfaces are ground so that a slab or billet may be ground in two passes.

It is evident from the foregoing description of the invention that by speeding up the grinding operation because of less pressure and consequently greater speed on each of the grinding wheels, a substantial saving in labor and cost of grinding is effected, which is important in the manufacture of alloy steel such as stainless steel where labor costs materially increase the cost per ton of the finished metal.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. In a multiple wheel grinding machine, a conveying means for supporting the work to be ground, a plurality of grinding heads mounted in staggered relation above said conveying support, each head consisting of a piston suspended in a cylinder having its axis vertically disposed, a motor mounted on the end of the piston rod and an abrasive wheel mounted below the motor having drive connection therewith, a coil spring below the piston resting against the lower end of the cylinder to counterbalance the weight of the grinding head and fluid pressure connections on opposite sides of the piston for applying pressure fluid to raise the lower the grinding head and to maintain a predetermined pressure of the abrasive wheel against the work surface.

2. A multiple grinding machine as set forth in claim 1 in which the abrasive wheels are disposed with their axes parallel to the line of travel of the work and said grinding heads and wheels being spaced longitudinally and transversely in a converging double row to contact the entire surface to be ground by a single pass.

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