No. 863,643. PATENTED AUG. 20, 1907.

G. P. RANSOM.

GRINDING MACHINE.

APPLICATION FILED MAY 29, 1907.

2 SHEETS—SHEET 1.

Fig. 2.

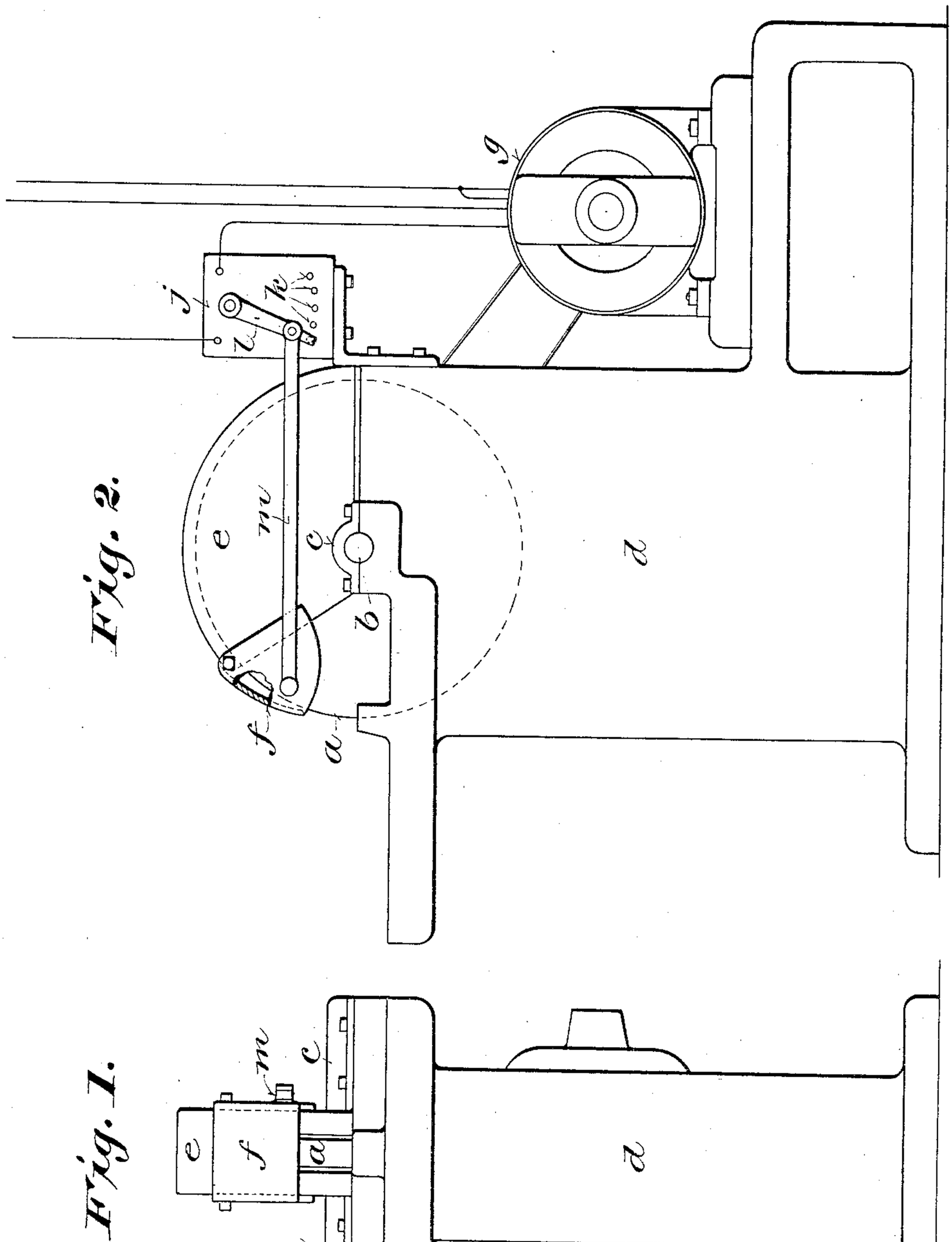

Fig. 1.

Witnesses:

Fred Palm.

Chas. L. Goss.

Inventor:

George P. Ransom,

By Winkler, Flanders, Smith, Bottum & Howson

Attorneys.

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2 SHEETS—SHEET 2.

Fig. 3.

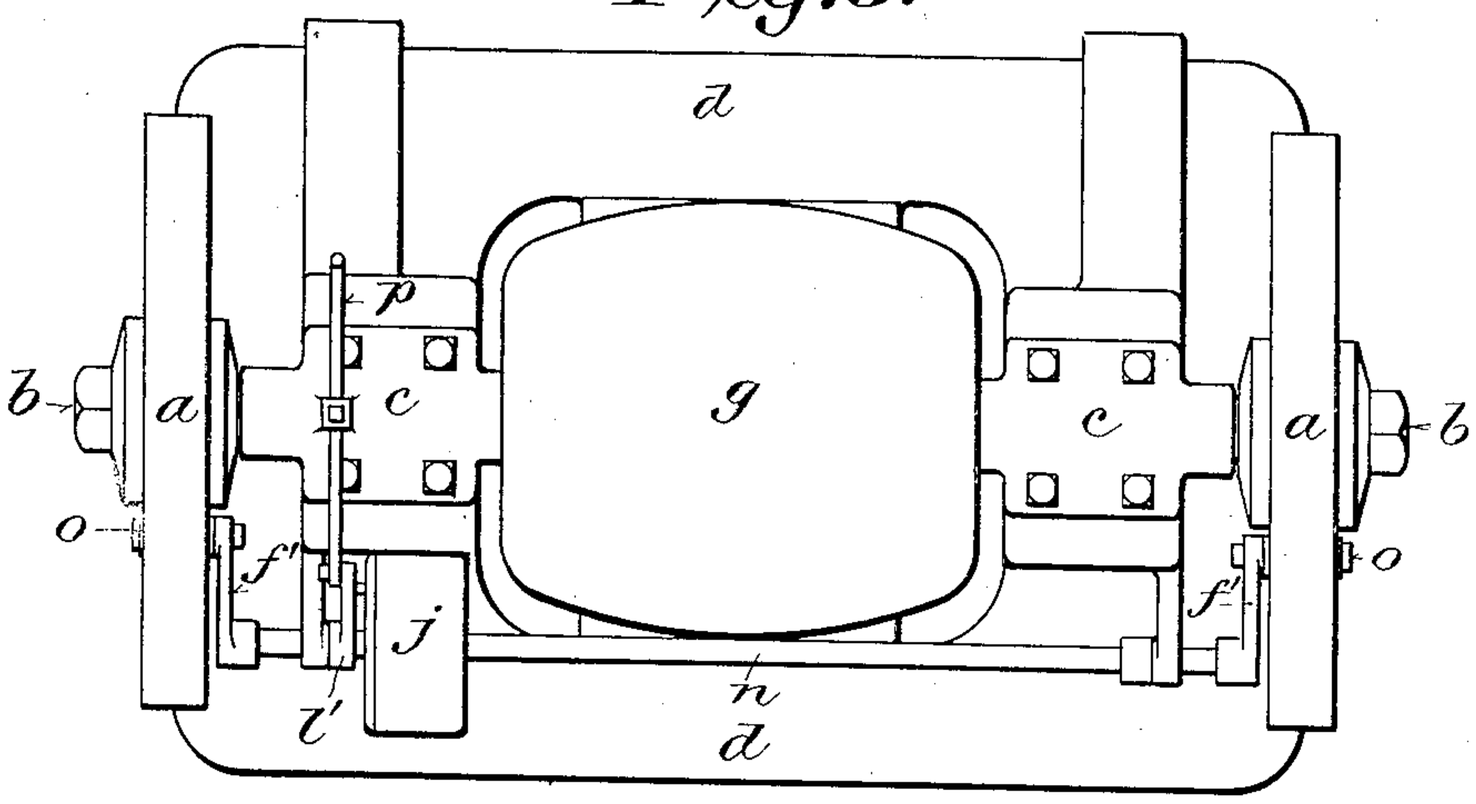


Fig. 4.

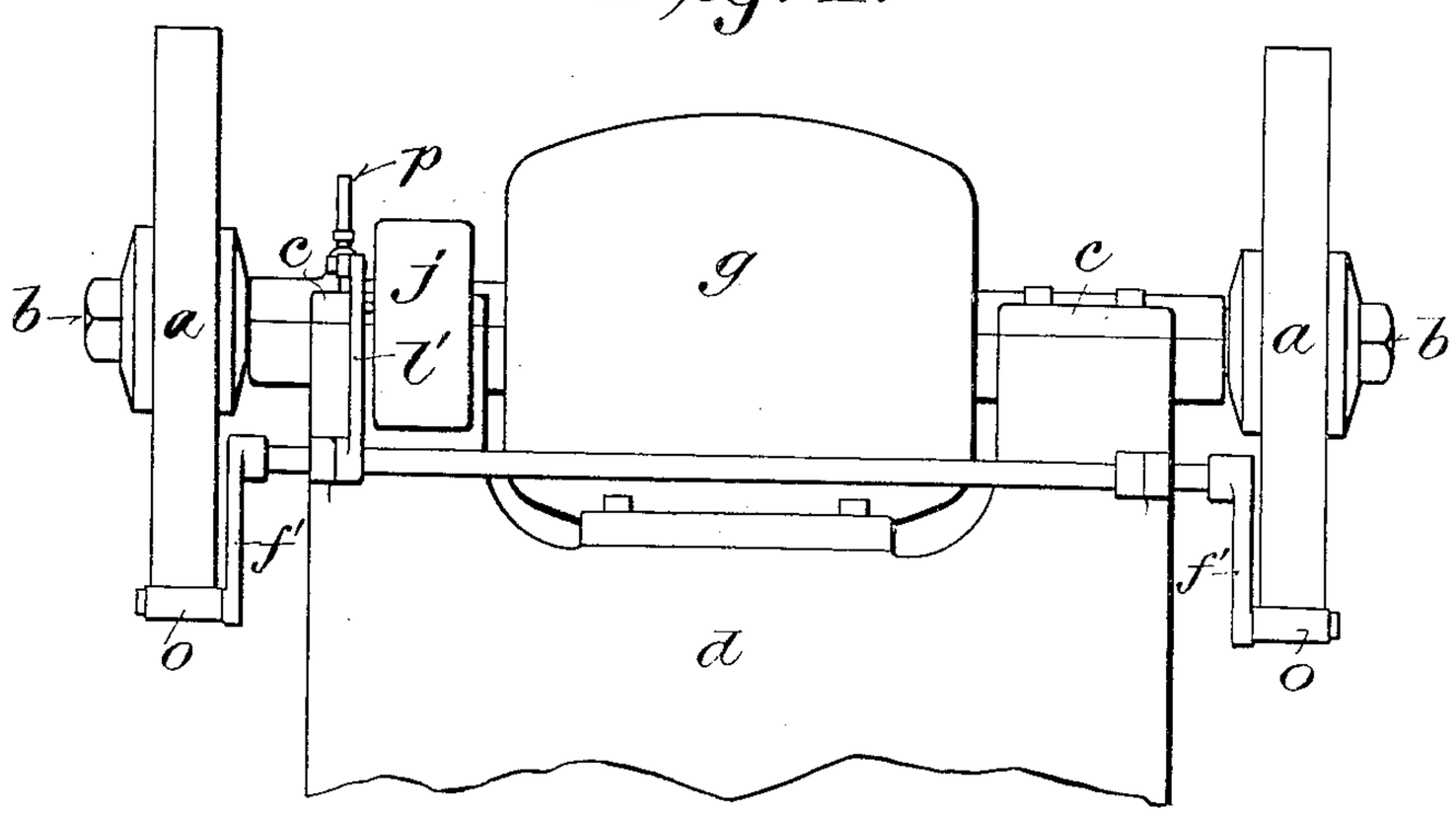
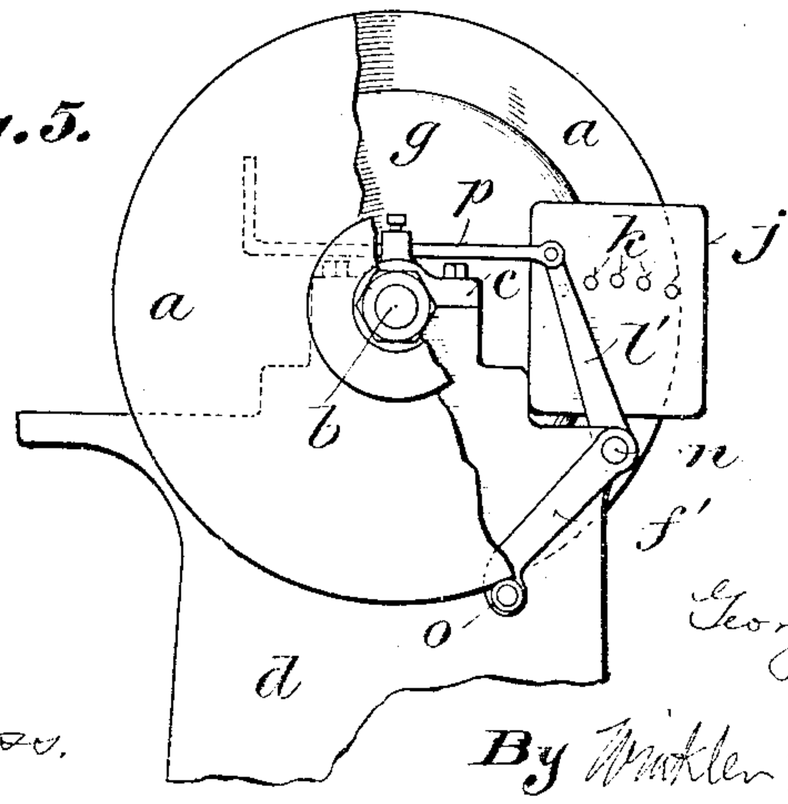


Fig. 5.



Witnesses:

Fred Palm.

Chas. L. Goss.

Inventor:

George P. Ransom,

By Winkler Flanders Bolton & Mcneill

Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE PERRY RANSOM, OF OSHKOSH, WISCONSIN.

GRINDING-MACHINE.

No. 863,643. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed May 29, 1907. Serial No. 376,233.

To all whom it may concern:

Be it known that I, GEORGE PERRY RANSOM, a citizen of the United States, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

The main objects of this invention are to facilitate variation of the rotary speed of grinding wheels corresponding with their reduction in diameter by wear, so as to maintain an approximately constant maximum peripheral speed within safe limits, and generally to improve the construction and operation of machines of this class.

It consists essentially in means for readily adjusting the rotary speed or number or revolutions per minute of a grinding wheel so as to produce the desired peripheral speed of the wheel at any diameter, also in certain novel features of construction and in the peculiar arrangement and combination of parts as hereinafter particularly described and pointed out in the claims.

The invention may be incorporated in grinding machines of different kinds and in various ways. For the purpose of illustration it will be shown and described in connection with two different forms of grinding machines.

In the accompanying drawing like characters designate the same parts in the several figures.

Figures 1 and 2 are front and side elevations respectively of a single wheel grinding machine embodying the invention; Figs. 3, 4 and 5 are a plan view and front elevation and a fragmentary side elevation of a two wheel grinding machine embodying the invention.

In the operation of emery and other grinding wheels which revolve at a high rate of speed and vary considerably in diameter as they are worn away with use, it is desirable to run them at as high a peripheral speed as is safe in order to make them grind as fast as possible. It is, however, impracticable to run wheels of this kind above a certain speed because above that limit they are liable to break and thus endanger life, besides being destroyed themselves.

As a grinding wheel wears down and is reduced in diameter its rotary speed or number of revolutions per minute should be increased in order to maintain an approximately constant peripheral speed so that the working capacity of the wheel will not be reduced according to its reduction in diameter.

Various devices have been employed to accomplish this, as for example, cone pulleys, variable speed motors, etc. The usual practice has been to start the wheel when it is of full size at the slowest speed, and then shift the driving belt on the cone pulleys or speed up the motor as the wheel is worn down and reduced in diameter. This is done by guess. While the maximum speed at which a grinding wheel of any given diameter may be run can be ascertained by the use of a speed indicator and by computation, but few operators are competent to make such computation, and those who are will not ordinarily take the time and trouble to do so. The result is grinding wheels of this kind are either run too slow to do their work properly and efficiently or too fast for safety. These difficulties and objections are overcome and avoided by the present invention.

Referring to Figs. 1 and 2 of the drawing, *a* designates a rotary grinding wheel having its arbor *b* mounted in the usual or any suitable manner in bearings *c* on a stand or frame *d*. The upper and rear portion of the wheel is covered by the usual hood *e*.

f is a guard pivoted to the hood *e* adjacent to the periphery of the wheel on the front or working side of the machine, according to common practice in the construction of machines of this class.

g is a variable speed electric motor having on its armature shaft a pulley *h* which is connected by a belt with a pulley *i* on the grinding wheel arbor, as shown in Fig. 1.

j is a rheostat or controller comprising resistance coils connected in series with contact pieces *k* and with the motor circuit in the usual way, and a swinging arm *l* arranged to sweep over the contact pieces *k* so as to cut the resistance coils one after another in and out of the motor circuit. The shield *f* is connected by a rod *m* with the controller arm *l* and serves as a gage to determine the proper adjustment of said arm. The parts of the machine are so connected and adjusted that when the shield *f* is set up against or close to the periphery of the wheel *a*, the controller arm *l* will be in position to cause the motor to run at such a speed as will drive the grinding wheel at the maximum or desired peripheral speed below the limit of safety, and an approximately constant peripheral speed will be maintained as the wheel wears down by simply keeping the shield *f* close to the face of the grinding wheel according to the usual practice.

Referring to Figs. 3, 4 and 5 showing a machine in which two grinding wheels *a* are mounted on opposite ends of the same arbor *b*, and the armature of the motor *g* is mounted on said arbor between the grinding wheels, the speed of the motor may be regulated so as to maintain an approximately constant maximum peripheral speed of the grinding wheels as they are worn away and reduced in diameter and positively prevent rotation of said wheels above a safe limit of speed by arms *f'* mounted on a transverse rocker shaft *n* and provided with crank pins and rollers *o* opposite and adjacent to the peripheries of said wheels. The swinging contact arm *f'* of the controller *j* is mounted directly on the shaft *n*, and a rod *p* pivotally connected with said arm extends forwardly within easy reach of the operator

and affords convenient means for adjusting the crank arms f' so as to keep the rollers o which serve in this case, like the shield f of Fig. 2, as gages, close to the faces of the grinding wheels as they are worn away and reduced in diameter. In this case one of the grinding wheels may be worn away and reduced in diameter faster than the other, but in such case the larger wheel will control the rotary speed of both, preventing their being run above a safe limit of speed and at the same time admitting of an approximately constant peripheral speed of both wheels within or below a safe limit.

With both forms of the machine herein shown and described, the operator is enabled by a simple manipulation to quickly adjust the speed of the motor to drive a grinding wheel at the proper number of revolutions per minute to maintain an approximately constant and maximum peripheral speed below a safe limit.

I claim:

1. In a grinding machine the combination of a grinding wheel, means for rotating said wheel and an adjustable gage connected with said rotating means so as to vary the rotary speed of the wheel to correspond with variations in its diameter, substantially as described.

2. In a grinding machine the combination of a grinding wheel, means for rotating said wheel, and a movable gage connected with said rotating means and adjustable to the periphery of said wheel so as to cause it to rotate at a predetermined speed corresponding with its diameter, substantially as described.

3. In a grinding machine the combination of a grinding wheel, means for rotating said wheel, a gage movable to the periphery of said wheel as it is worn away, and a connection between said gage and rotating means whereby an approximately constant peripheral speed of the grinding wheel will be maintained when the gage is kept moved up to the wheel, substantially as described.

4. In a grinding machine the combination of a grinding wheel, means for rotating said wheel, a pivoted gage movable towards and from the axis of said wheel adjacent to its periphery, and a connection between said gage and rotating means adapted to regulate the rotation of said wheel according to its diameter, substantially as described.

5. In a grinding machine the combination of a grinding wheel, a motor connected with and adapted to rotate said wheel, a controller for regulating the speed of the motor, and a gage movable towards and from the axis of said wheel adjacent to its periphery and connected with said motor, substantially as described.

6. In a grinding machine the combination of a rotary grinding wheel, an electric motor connected therewith and adapted to rotate the same, a controller comprising variable resistance in the motor circuit and a movable arm for cutting such resistance in and out, and a gage connected with the controller arm and movable towards and from the axis of the grinding wheel adjacent to its periphery, substantially as described.

7. In a grinding machine the combination with a grinding wheel and means for rotating said wheel, of means connected with the rotating means and adapted to limit the rotary speed of the wheel according to its diameter, substantially as described.

In witness whereof I hereto affix my signature in presence of two witnesses.

GEORGE PERRY RANSOM.

Witnesses:
HENRY DENDE,
JAS. B. MULVA.