

B. M. W. HANSON.
GRINDING MACHINE.
APPLICATION FILED SEPT. 2, 1909.

975,382.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

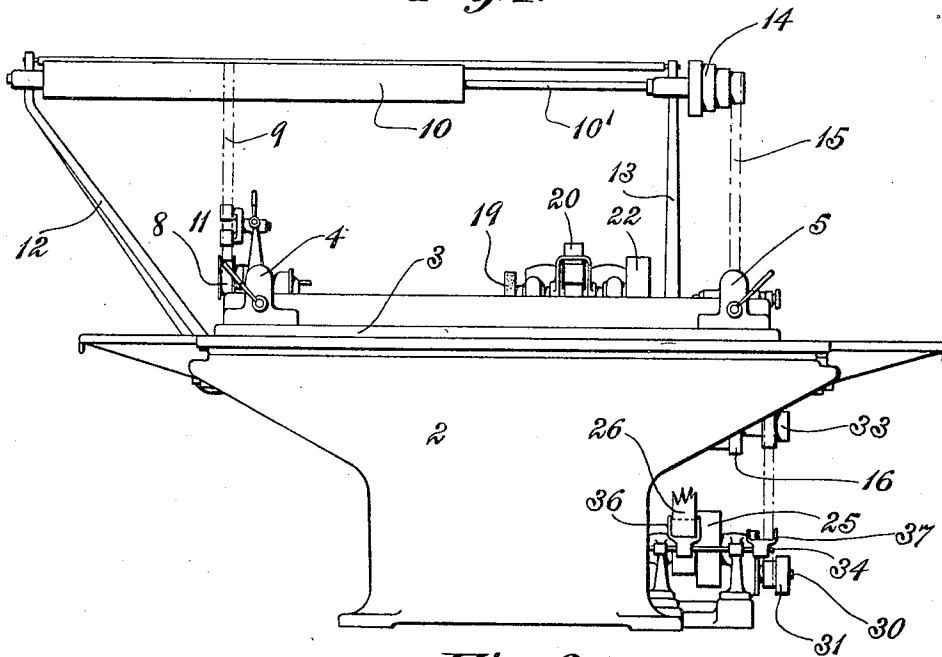
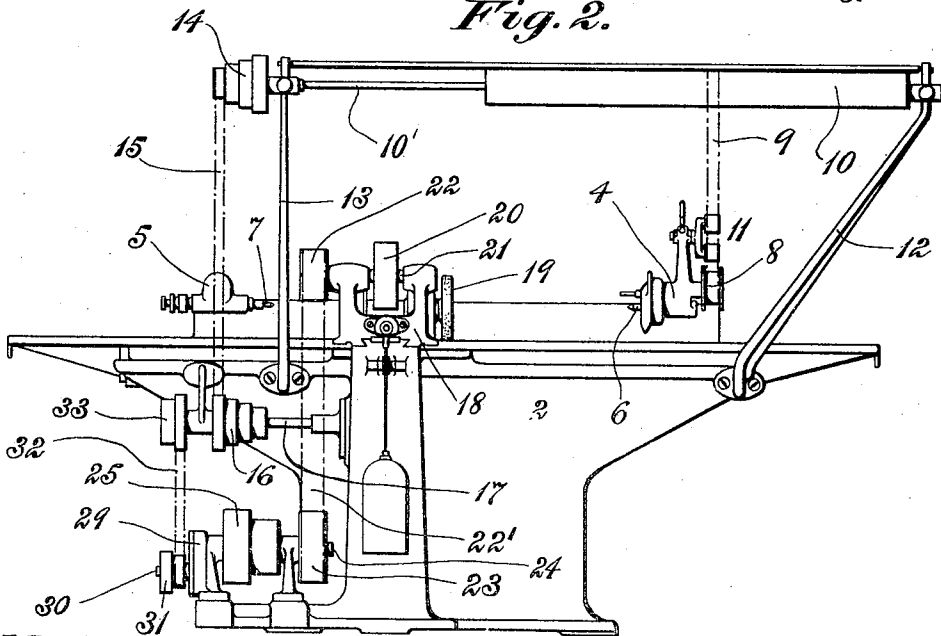


Fig. 2.



Witnesses:

Chas E Hoer
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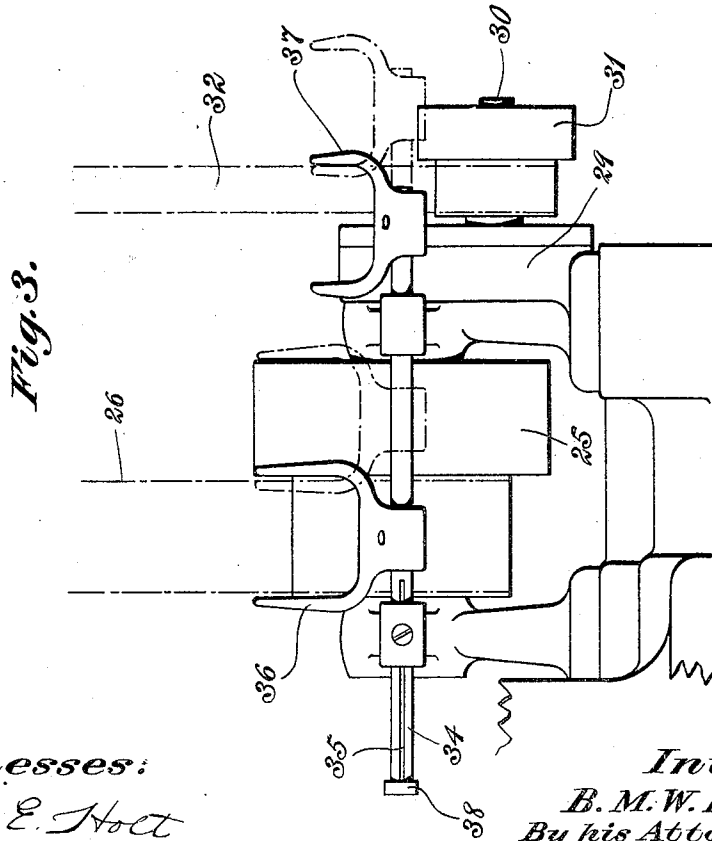
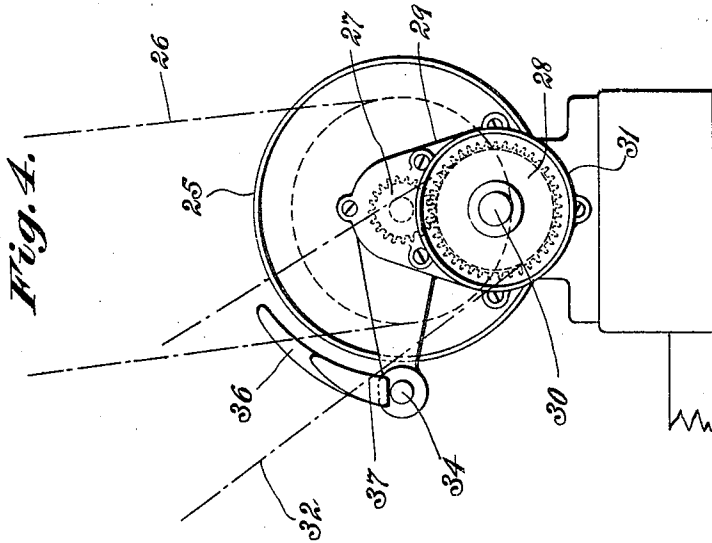
Inventor:

B. M. W. Hanson
By his Attorneys,

Sutherland & Anderson.

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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF NEW JERSEY.

GRINDING-MACHINE.

975,382.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Original application filed April 20, 1909, Serial No. 491,102. Divided and this application filed September 2, 1909. Serial No. 515,907.

To all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to grinding machines the object of the invention being to provide an effective means for driving the grinding wheel and for reciprocating the carriage, which is of such nature that when the grinding wheel is speeded up to compensate for peripheral wear the carriage will be positively caused to remain at the same speed.

In the drawings accompanying and forming part of the present specification I illustrate in detail one form of embodiment of the invention which to enable those skilled in the art to practice the same will be fully set forth in the following description while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings, Figure 1 is a front elevation of a grinding machine involving my invention. Fig. 2 is a rear elevation of said machine. Fig. 3 is a front elevation on a somewhat larger scale of portion of the driving mechanism, and, Fig. 4 is a view on a similar scale of the parts shown in said Fig. 3 and as seen from the right in the latter figure.

Like characters refer to like parts throughout the several figures.

The present application is a division of my application Serial No. 491,102 filed April 20, 1909 now merged in Patent No. 948,697 of February 8, 1910.

I shall describe somewhat briefly a grinding machine possessing certain known features so that it will be more easy to understand the nature of the present invention and in Figs. 1 and 2 of the drawings appears such a machine which comprises a bed as 2 upon which is mounted for reciprocation longitudinally thereof the work-carriage 3 provided with a head-stock 4 and a tail-stock 5 between spindles 6 and 7 respectively of which the work (not shown) is supported. The head stock 4 sustains a pulley 8 connected through the intervention of suitable mechanism with said spindle 6 so

that when said pulley is rotated the work will be turned. Over the pulley 8 is passed a belt 9 connected with an overhead drum 10 the length of which equals approximately the traverse of the carriage so that no matter where said carriage may be within the limits of its stroke it will be in driving connection with said overhead drum. In connection with said belt is a belt-tightener such as that denoted in a general way by 11. The shaft for the drum 10 is denoted by 10' and it is sustained by the standards or uprights 12 and 13 rising from and fastened to the bed 2. The said drum therefore while overhead is not carried by a shaft separate or independent of the machine but forms an organized part of the machine and presents a very effective means for turning or driving the work in that as will hereinafter appear the machine may be driven by an electric motor. It is therefore evident that no undue care need be exercised in placing the machine upon a factory floor, the only requisite being the proper relative positions of the driving motor and the machine itself.

I have shown as fastened to one end of the shaft 10' a cone pulley 14 connected by a belt 15 with a similarly constructed but oppositely disposed pulley 16 fastened to the shaft 17 rotatively supported by suitable bearings upon the bed 2 said two cone pulleys and the belt presenting a simple means for driving the said overhead drum 10 and for also changing the speed thereof.

The tool-carriage is denoted by 18 and it has a reciprocatory movement upon the upper surface of the bed 2 transversely thereof. The grinding-wheel is designated by 19 being suitably supported by said tool-carriage and being operatively connected with the pulley 20 although the intermediate connections are not shown. Said pulley 20 is fastened to a shaft 21 on the carriage 18 and I will hereinafter indicate how said shaft 21 is driven.

The carriage 3 is reciprocated by connections driven from the shaft 17 but I have not deemed it necessary to describe or show the connections between said shaft 17 and the said work-carriage as the same are so well known. I might at this point however consider the shaft 17 a carriage-reciprocating shaft and the shaft 21 a tool-turning or driving shaft. Upon one end of said tool-

driving shaft 21 I have shown fastened a pulley 22 connected by a belt 22' with the pulley 23 fastened to the shaft 24 mounted upon suitable bearings upon the base of the machine. Therefore when the shaft 24 is turned the tool 19 will be operated. To said shaft 24 is rigidly connected a cone pulley 25 shown as having two steps and which is adapted to be driven by a belt 26 extending from a suitable motor. It will be evident that by means of the stepped cone pulley 25 the speed of the shaft 24 may be varied and this variation in speed is what I utilize in the present instance to increase the speed of the grinding wheel 19 when the latter has its surface worn away or reduced by reason of use. At the commencement of operation or when the grinding wheel 19 is new the belt 26 will be on the large step of the pulley 25; when the working surface of said grinding wheel is worn away in the manner indicated said belt will be shifted onto the smaller step of said pulley 25 so that the speed of the grinding wheel will be increased and although, as will hereinafter appear, the carriage-reciprocating shaft 17 is driven from said shaft 24, the speed of the carriage will not be changed the parts being so related that the relative velocities of the same will remain constant. The shaft 24 is shown as having fixed to one end thereof the pinion 27 in mesh with a spur-gear 28 both said gears being incased in a boxing 29 on the framework of the machine, and said spur gear 28 being fastened to a shaft 30 also supported by said framework. To said shaft 30 is also fastened a stepped cone pulley 31 connected by a belt 32 with a stepped pulley 33 the steps of which face oppositely to those of the pulley 31. Owing to the presence of the speed-reducing gears 27 and 28 I can drive the carriage-reciprocating shaft 17 at a relatively slow speed at all times.

As intimated hereinbefore when the grinding wheel 19 is new the belt 26 will be on the large section of the cone pulley 25 while the belt 32 will be on the small section of the pulley 33 and the larger step of the pulley 31 by reason of which the grinding wheel 19 and the carriage 3 will be operated at the proper relative speeds. Should the attendant of the machine see the necessity of speeding up said grinding wheel he will shift the belt 26 onto the smaller section of the pulley 25 and simultaneously shift the belt 32 from the smaller section of the pulley 33 and naturally at the same time from the larger step of the pulley 31 onto the smaller step thereof and although the speed of the shaft 24 is increased the speed of the shaft 17 will not be. I provide means whereby it will be impossible to shift one of said belts 26 and 32 without simultaneously shifting the other although as will hereinafter ap-

pear the belt 26 has a movement while the belt 32 is at rest, this being due simply to the fact that the belt 26 is somewhat wider than the belt 32. I should state at this point that in Figs. 2 and 3 the belts are shown as occupying their shifted positions and also that with the exception of a portion of the belt 26 in Fig. 1, all the belts are represented, for clearness, in dotted lines. The belt-shifting mechanism is best shown in the enlarged Figs. 3 and 4 and the same comprises a shifter rod 34 which with its adjuncts is shown in Fig. 3 as occupying its two extreme positions by dotted and full lines respectively, the full line position of said shifter rod being what has been considered as the shifted position thereof. Said rod is supported by suitable bearings on the framework and it has a splined connection as 35 therewith so that as said rod slides back and forth it cannot turn. Said rod 34 is shown as equipped with two forks 36 and 37 the fork 36 being somewhat wider than the belt 32. It is therefore clear that one of said belts (26 and 32) cannot be shifted without shifting the other although the fork 37 has some lost motion caused by the difference in width of the two belts. The fork 37 by abutting against the framework limits the motion of the rod 34 in one direction while the stop 38 limits the movement of said rod in the opposite direction. By the construction described nothing is left to chance which might be the case were the belts 26 and 32 separately shifted for an attendant might shift one and neglect to shift the other.

I do not restrict myself to the exact disclosure made by the accompanying drawings and description as certain changes may be made within the scope of my invention. I wish also to state that there are certain features hereinbefore described and illustrated in the accompanying drawings which are not claimed herein but which are claimed in the parent application to which I have already alluded.

What I claim is:

1. The combination of a base or bed, a work carriage reciprocatory longitudinally of said bed, a tool carriage movable transversely of said bed, a tool operating device coöperative with and for operating the tool on said tool carriage, a carriage reciprocating device for reciprocating the carriage, and mechanism for operating the tool operating device and the carriage reciprocating device, said mechanism involving means operable at will for increasing the speed of the tool operating device and for positively preventing an increase in speed of the carriage reciprocating device when the speed of the tool operating device is increased.

2. The combination of a bed, a work carriage reciprocatory on said bed, a tool car-

riage movable transversely of the bed, standards rising from the bed, a shaft supported by said standards, a drum connected with said shaft, the length of the drum equaling
5 approximately the length of movement of said work carriage, a work supporting spindle on the work carriage, a pulley connected with said spindle and adapted to be driven by said drum through a belt in the different
10 positions of the work carriage, a carriage reciprocating device, a tool operating device for operating the tool on the tool carriage, mechanism for operating said carriage reciprocating and tool operating de-

vices, said mechanism involving hand operable means for increasing the speed of the tool operating device and for positively preventing an increase of speed of the carriage reciprocating device when the speed of the tool operating device is increased, and operative connections between one of said operating devices and said drum. 15 20

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

BENGT M. W. HANSON.

Witnesses:

F. E. ANDERSON,

CHAS. E. HOLT.