No. 741,537. PATENTED OCT. 13, 1903.

P. NOUSSE.

KNIFE GRINDING MACHINE.

APPLICATION FILED APR. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

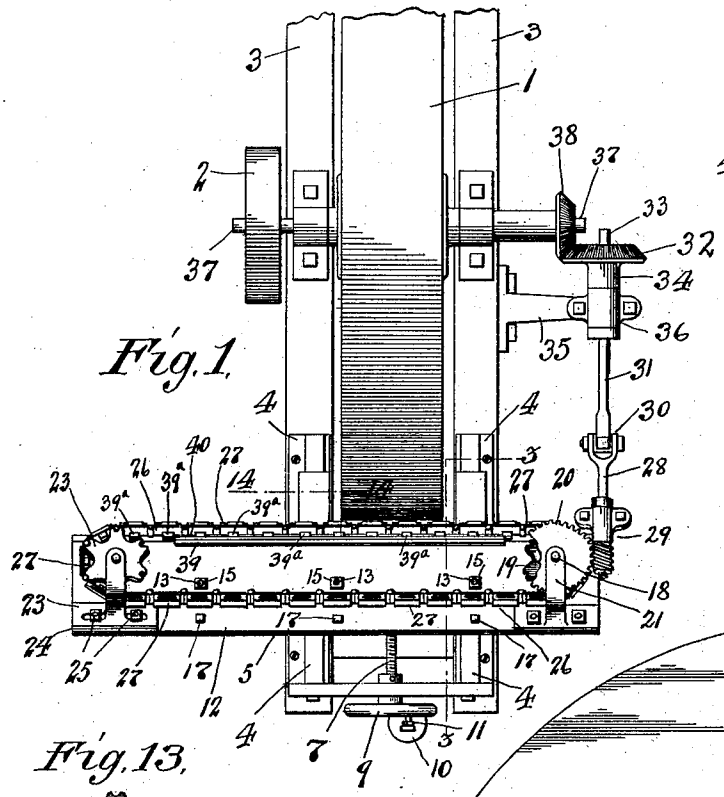


Fig. 1.

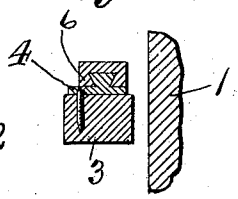


Fig. 14.

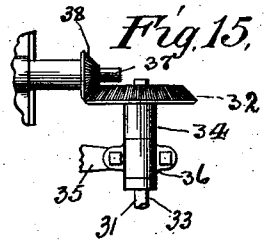


Fig. 15.



Fig. 13.

Fig. 2.

Witnesses:
Watson Hurlburt,
Fred' G. Fischer

Inventor:
Peter Nousse
By Burton & Burton
his Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4

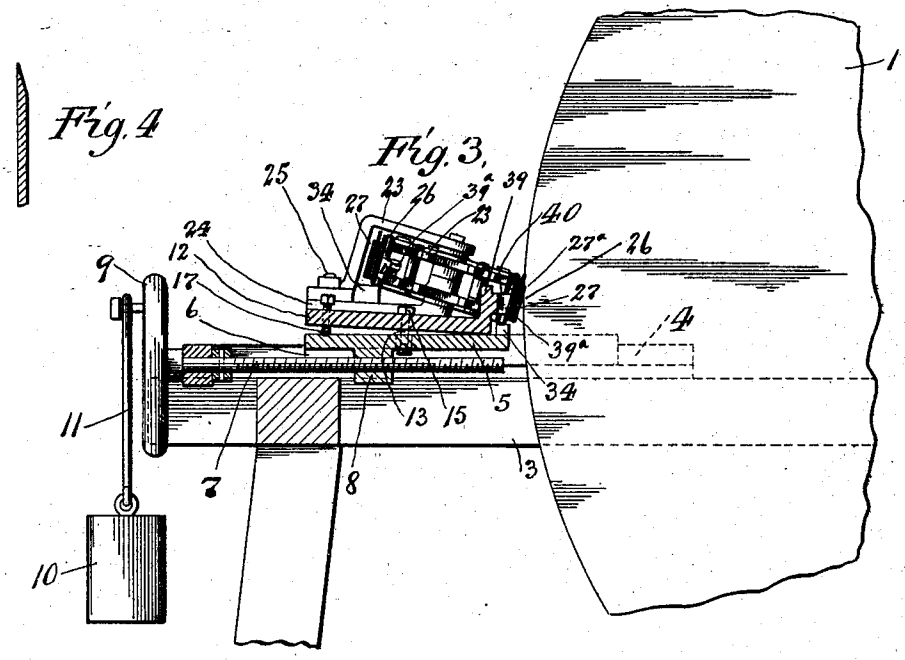


Fig. 3.

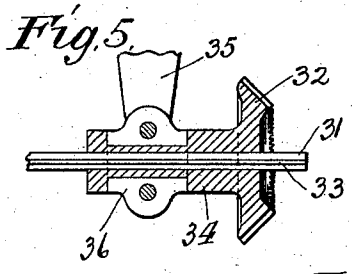


Fig. 5.

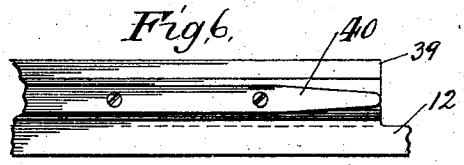


Fig. 6.

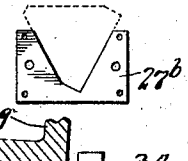


Fig. 8.

Fig. 11.

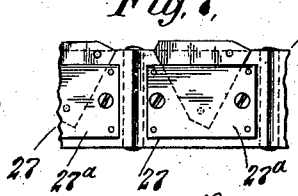


Fig. 7.

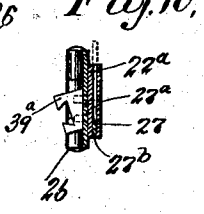


Fig. 10.

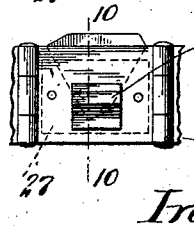


Fig. 9.

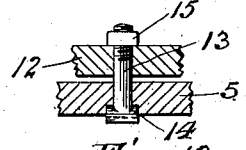


Fig. 12.

Witnesses:

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Inventor:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 741,537. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

PETER NOUSSE, OF CHICAGO, ILLINOIS.

KNIFE-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 741,537, dated October 13, 1903.

Application filed April 16, 1903. Serial No. 152,850. (No model.)

To all whom it may concern:

Be it known that I, PETER NOUSSE, a subject of the Emperor of Germany, residing at No. 1232 Marshfield avenue, in the city of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Knife-Grinding Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide a means for rapidly grinding the knives of the sickle of a harvester or mower or other knives adapted to be handled in a similar manner.

It consists of the features of construction set out in the claims.

In the drawings, Figure 1 is a plan view of my machine, the grinding wheel or stone being partly broken away. Fig. 2 is a side elevation of the same. Fig. 3 is a detail section at the line 3 3 on Fig. 1 on an enlarged scale. Fig. 4 is a detail section of a portion of one of the knives, including the edge to be ground, full size. Fig. 5 is a detail section at the line 5 5 on Fig. 2 upon an enlarged scale. Fig. 6 is a detail face elevation of a portion of the guideway for the knife-carrying chain. Fig. 7 is a face elevation of a portion of the knife-carrying chain, showing the knives in position in the pockets of the links. Fig. 8 is a detail elevation of a single link with one plate removed, the position of the knife therein being indicated in dotted line. Fig. 9 is a rear or inner side elevation of a portion of the chain, showing a knife in a link-pocket thereof. Fig. 10 is a section at the line 10 10 on Fig. 9. Fig. 11 is a fore and aft detail section of the carriage, taken at the vertical plane of the adjusting-screws. Fig. 12 is a detail section at the line 12 12 on Fig. 11. Fig. 13 is a plan view of one of the sprocket-wheels for the knife-carrying chain. Fig. 14 is a detail section at the line 14 14 on Fig. 1 on an enlarged scale. Fig. 15 is a detail plan showing a pair of bevel-gears and their immediate bearings for changing the speed of the knife-carrier.

In my machine the ordinary grindstone 1 is driven by power in any convenient manner, as by belt over the pulley 2. The frame 3, which supports the grinding-wheel, is extended to afford slide-guideways 4 4, upon which a carriage 5 may move toward and from the grinding-face of the wheel, the carriage having suitable slide-bearings 6 to adapt it to such action. A screw-shaft 7 is journaled and longitudinally stopped in the carriage and takes through a threaded aperture in the cross-bar 8 of the frame, so that the rotation of the shaft feeds the carriage toward and from the grinding-wheel. At the forward end of the shaft, it has a pulley or hand-wheel 9 rigid with it, and a weight 10 is suspended from the periphery of the pulley by a cable 11 passing around the latter in direction to cause the descent of the weight to rotate the shaft to feed the carriage toward the grinding-wheel. On the base-plate of the carriage there is mounted a plate 12, which is secured to the base-plate by bolts 13 13, taking through the base-plate and through the plate 12, having cross-heads 14, by which they are stopped on the under side of the base-plate and being provided above the plate 12 with nuts 15, which serve to clamp the plates together, (rocking washers 16 being preferably interposed under the nuts for a purpose which will shortly appear.) Through the plate 12 there are set spacing-screws 17 17, which impinge on the upper face of the base-plate, so that by screwing them down through the plate 12 said plate is lifted off from the base-plate at the point at which the screws are located. It will be understood that by coöperation of the bolts 13 and the spacing-screws 17 the plate 12 may be adjusted and securely held at a small angle to the base-plate and that such angle may be varied within a limited range by the adjustment of said screws.

Upon the plate 12 there are mounted the several parts of an endless carrier, by which the knives to be ground are carried successively past the grinding-face of the wheel, and mechanism for operating such endless carrier to cause the same to carry the knives steadily and with a speed bearing a definite relation to the speed of rotation of the wheel, such relation being determined by the mechanism constituting the train through which power is communicated from the shaft of the

grinding-wheel to the carrier. This carrier and operating mechanism will now be described.

At one end, preferably the right-hand end, of the plate 12 there is secured thereon an upwardly-projecting stud-axle 18, upon which there is journaled a double sprocket-wheel 19, adapted to engage and actuate a chain 26, which is provided with means on each link for supporting one of the knives to be ground, as hereinafter more particularly described. This sprocket-wheel has rigid with it a worm-gear 20, which is most conveniently located at the upper end of the sprocket-wheel. A bracket 21, adapted to be secured rigidly to the plate 12 and having an eye to engage and stay the upper end of the stud-axle, is applied after the sprocket-wheel and gear, with the chain encompassing the former, have been located in proper position on the stud-axle. At the other side of the plate 12 a sprocket-wheel 23, similar to the sprocket-wheel 19, is journaled in a bracket formed of two parts 23 and 24, each of which has one bearing for the axle of the sprocket-wheel and which are adapted to be separated, so that the sprocket-wheel, with the chain thereon, can be introduced between them and its axle ends entered into their respective bearings, wherein they are retained by securing together the two parts 23 and 24 by the bolts 25. This two-part bracket is mounted on the plate 12, with capacity for adjustment toward and from the sprocket-wheel 19, in order to take up any slack which may occur in the chain. Upon each of the links of the chain there is secured rigidly a knife-holder 27. This knife-holder consists of two plates 27^a 27^a, which are secured together by rivets and spaced from each other by a plate 27^b, the latter plate being formed with a recess cut in from one edge of the proper form and size to accommodate one of the knives to be ground, so that when said holder is completed by riveting the plates 27^a on opposite sides of the spacing-plate 27^b there is formed between said plates 27^a a pocket into which a knife may be inserted edgewise to the bottom thereof and from which there will protrude so much of the edge of the knife as should be exposed to the wheel for grinding, said edge being thus exposed in a position parallel to the direction of travel of the chain, so that the knife thus carried by the latter may have its exposed edge pressed against and passed in direct line across the face of the grinding-wheel by the travel of the chain. It will be understood that if the chain has its several links each loaded with a knife in the pocket of the knife-holder and is caused to travel so as to carry the knives successively past the wheel with the exposed edge in contact therewith the weight operating on the hand-wheel 9, tending to rotate the screw-shaft 7 in direction to advance the carriage toward the grinding-wheel, will cause the knives to be held with definite pressure on the face of the wheel during their travel thereacross. The weight 10 may be made in several pieces, as illustrated, so that it may be varied by removing one or more or adding additional pieces to adapt the pressure to the character of the knives being ground and to the character of the grinding-wheel, so that the knives shall be ground away only the desired amount during their travel across the face of the wheel.

For the purpose of communicating movement of travel to the knife-carrying chain and relating that movement properly to the circumferential movement of the grinding-wheel and to the extent of the face of said wheel over which the knives pass I prefer to employ connections from the shaft of the grinding-wheel. Since the rate of travel of the chain with a wheel of a given face should bear relation to the circumferential speed of the wheel which will diminish as the wheel is ground away by continued use, assuming that it continues to be driven at the same number of revolutions per minute, it is necessary to provide for adjusting the driving connections from time to time to compensate for the change in diameter of the grinding-wheel. It is also necessary to accommodate the driving connections to the movement of the carriage toward and from the wheel. To accomplish all these purposes, I have adopted as a preferred construction that which is illustrated in the drawings and which will now be described.

A worm-shaft 28 is provided with journal-bearings in a bracket 29, mounted on the plate 12 in position to give the worm-shaft proper operative engagement with the worm-gear 20. This worm-shaft is connected by a universal joint (shown at 30) with a shaft 31, which telescopes through a bevel-gear 32, with which it is in driving connection by means of the spline 33 on the shaft suitably engaging a corresponding groove in the hub of the gear. Said gear has a long hub 34, by which it is journaled in a bracket 35, mounted on the grinding-wheel frame, said hub being recessed between the ends to form its journal, and the bearing for it being a box 36, having a removable cap, so that the hub may be introduced laterally and stopped as to endwise movement by the ends of the box lodging between the shoulders at the ends of the reduced journal. On the shaft 37 of the grinding-wheel 1 there is mounted a bevel-gear 38, which meshes with the bevel-gear 32 and communicates motion through the latter and thence through the connections described to the chain-driving sprocket-wheel 19. For the purpose of adjusting the speed of the chain relatively to the rotary speed of the grinding-wheel the gears 38 and 32 may be made in pairs, the two wheels of each pair having to each other the proper ratio to communicate a certain speed, this ratio in each pair being different from that in all the other pairs, and when change is desired both gears

will be changed and a new pair be substituted. The journal of the hub of the gear 32 in each pair will be formed at proper position to locate the pitch-line of the gear properly with respect to the other member of the pair, and the hub of the gear 38 of each pair may be located and secured on the shaft of the grinding-wheel at proper position to mesh with the other wheel, and thus the change of gears can be made without requiring special skill in order to have the two gears properly adjusted to each other. For illustration merely there is shown in Fig. 15 a second pair of gears for giving a lower speed to the knife-carrying chain, as would be required when the grinding-wheel became considerably reduced in diameter.

In order that the knife-carrying chain may be held securely, so as to carry the knives in a definite path and at a proper angle to the grinding-wheel, as is necessary in order to insure grinding them uniformly as they pass over the face of the wheel, I provide at the forward side of the plate 12 a bar 40, dovetailed in cross-section, with its wider face toward the wheel, such bar being secured to the forward face of an upstanding lip 39 on the plate and extending parallel to the axis of the wheel just back of the path of the forward ply of the knife-carrying chain, and to the rear or inner side of each of the links of the chain I make fast a guide-block 39^a, having a dovetail slot adapted to receive the dovetail bar as each link in turn enters upon the forward portion of its path of travel. The left-hand end of the dovetail bar, being the end which enters the dovetail slot in the plate 39^a, is slightly tapered to insure such entry as the links successively reach it, and the dovetail bar at this end extends sufficiently beyond the left-hand side plane of the grinding-wheel so that the tapered portion is fully passed and the dovetail slotted block is fully entered on the dovetail bar at a portion of the latter at which said bar fits the slot accurately before the knife carried by the link reaches the grinding-wheel, and throughout the entire travel of the knife thereafter past the face of the wheel its position with respect to the wheel is rendered definite by the fit of the block on the dovetail bar. The forward face of the block, abutting on the link to which it is secured, is inclined with respect to the plane of movement of the carriage and of the forward face of the dovetail bar, so as to pitch the knives carried by the links in their pockets forward approximately at the proper angle to cause the grinding-wheel to give them the proper bevel. This reduces the amount of adjustment which is necessary to be given by means of the screws and bolts 13 and 17 to a conveniently small angle which will cover the variation in the bevel rather than the entire angle of such bevel. For convenience of applying the chain to the sprocket-wheel and also for simplicity of construction I make the double sprocket-wheels, as shown, with their spokes or fingers at each end angularly spaced the proper distance to adapt them to engage the pintle-bosses of the link-hinges at the upper and lower sides of the hinges, making no provision in the construction of the sprocket-wheels or links for preventing edgewise movement of the chain. This construction makes it easy to introduce the chain onto the sprocket-wheels; but to prevent such edgewise movement I provide on the plate 12 a track 34, on which the links rest at their lower edge throughout the entire travel of the chain. No provision is necessary to prevent the chain from rising on the sprocket-wheels, because both gravity and the action of the driving-wheel operate downward.

I claim—

1. A knife-grinding machine comprising, in combination with the grinding-wheel, an endless carrier for the knives to be ground; a carriage on which such carrier is mounted, and means for actuating it to carry the knives successively past the face of the grinding-wheel, and means for yieldingly feeding the carriage toward the grinding-wheel.

2. A knife-grinding machine comprising, in combination with the grinding-wheel, an endless carrier for the knives to be ground, having pockets for said knives in which they are individually held with their edges which are to be ground exposed; a carriage on which such endless carrier is mounted, and means for yieldingly feeding the carrier toward the grinding-wheel.

3. A knife-grinding machine comprising, in combination with a grinding-wheel, a carriage and guideways on the grinding-wheel frame on which the carriage is adapted to move toward and from the grinding-face of the wheel; means for yieldingly feeding the carriage toward said grinding-face, an endless carrier on the carriage having the paths of travel of its plies parallel to the axis of the wheel; means on said carrier for holding the knives with their edges which are to be ground exposed, and means for operating the carrier to cause it to carry said exposed edges of the knives successively across the grinding-face of the wheel.

4. In a knife-grinding machine, in combination with a grinding-wheel, a carriage mounted on guideways which are fixed with respect to the journal-bearings of the wheel; a carrier on said carriage for the knives to be ground, and means for operating it to carry the knives past the grinding-wheel; a screw-shaft having journal-bearings parallel with and fixed with respect to the guideways, and engaging the carriage; and a weight operating on said screw-shaft to rotate it for the purpose of feeding the carriage yieldingly toward the grinding-wheel.

5. A knife-grinding machine comprising, in combination with a grinding-wheel, an endless carrier for the knives to be ground; means for actuating it to give its forward ply movement of travel past the face of the grinding-

wheel to carry the knives in contact with such face; a guideway extending parallel with such face back of the forward ply of the chain, the links of the chain having on their inner sides each a seat for lodging against the guideway, whereby the knives are held in a definite path during their travel past the wheel.

6. A knife-grinding machine comprising, in combination with a grinding-wheel and endless carrier whose links have means for holding the knives with the edge to be ground exposed; means for actuating said carrier to give one ply thereof movement of travel past the grinding-face of the wheel to carry the exposed edge of the knives in contact therewith; a fixed guide-bar back of said ply of the carrier, and means on each link of the carrier for engaging said guide-bar and seating thereagainst to prevent tilting of the links or their deflection from the direct line of travel past the grinding-wheel while the knives respectively are on said wheel.

7. A knife-grinding machine comprising, in combination with a grinding-wheel, a carriage having guide-bearings by which it is adapted to move toward and from the grinding-face of the wheel; an endless carrier mounted on such carriage having means on its respective links for carrying the knives with their edges to be ground exposed; a plate on which such carrier is directly mounted secured to the carrier with capacity for angular adjustment with respect thereto, and means for giving the carrier proper movement of travel to carry the knives successively past the grinding-face of the wheel.

8. A knife-grinding machine comprising, in combination with a grinding-wheel and its supporting-frame, a carriage mounted on said frame movable toward and from the grinding-face of the wheel; an endless carrier mounted on such carriage having means for holding the knives with their edges to be ground exposed; an actuating-wheel for such endless carrier mounted on the carriage, and a train for driving such wheel, deriving movement from the grinding-wheel shaft.

9. A knife-grinding machine, in combination with a grinding-wheel and its supporting-frame; a carriage mounted on said frame movable toward and from the grinding-face of the wheel; an endless carrier mounted on such carriage having means for holding the knives with their edges to be ground exposed; a train for driving such endless carrier, comprising the sprocket-wheels about which the carrier travels, a worm-wheel rigid with one of them, a worm meshing with such wheel, a gear having its bearings supported on the grinding-wheel frame, and means by which it derives movement from the shaft of said wheel; a shaft telescoping through said gear and engaged therewith for rotation, and connected by universal joint to the worm.

10. A knife-grinding machine comprising, in combination with a grinding-wheel and a supporting-frame, a carriage mounted on such frame movable toward and from the grinding-face of the wheel; an endless carrier mounted on the carriage, having means for holding the knives with their edges to be ground exposed; a train for actuating such endless carrier to carry the knives successively past the grinding-face of the wheel, said train extending to and deriving movement from the shaft of the grinding-wheel and comprising flexible and telescoping connections to accommodate the variable position of the carriage.

11. A grinding-machine, comprising, in combination with the grinding-wheel, an endless carrier, having on its links, respectively, means for feeding the articles to be ground with the part thereon designed for grinding exposed; means for actuating the carrier to carry such articles past the grinding-face of the wheel, and means for yieldingly holding the carrier toward the wheel to press the exposed part thereagainst.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 6th day of October, 1902.

PETER NOUSSE.

In presence of—

CHAS. S. BURTON,

SAMUEL FEIST.