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VERTICAL FEED CONTROL FOR RAIL GRINDERS

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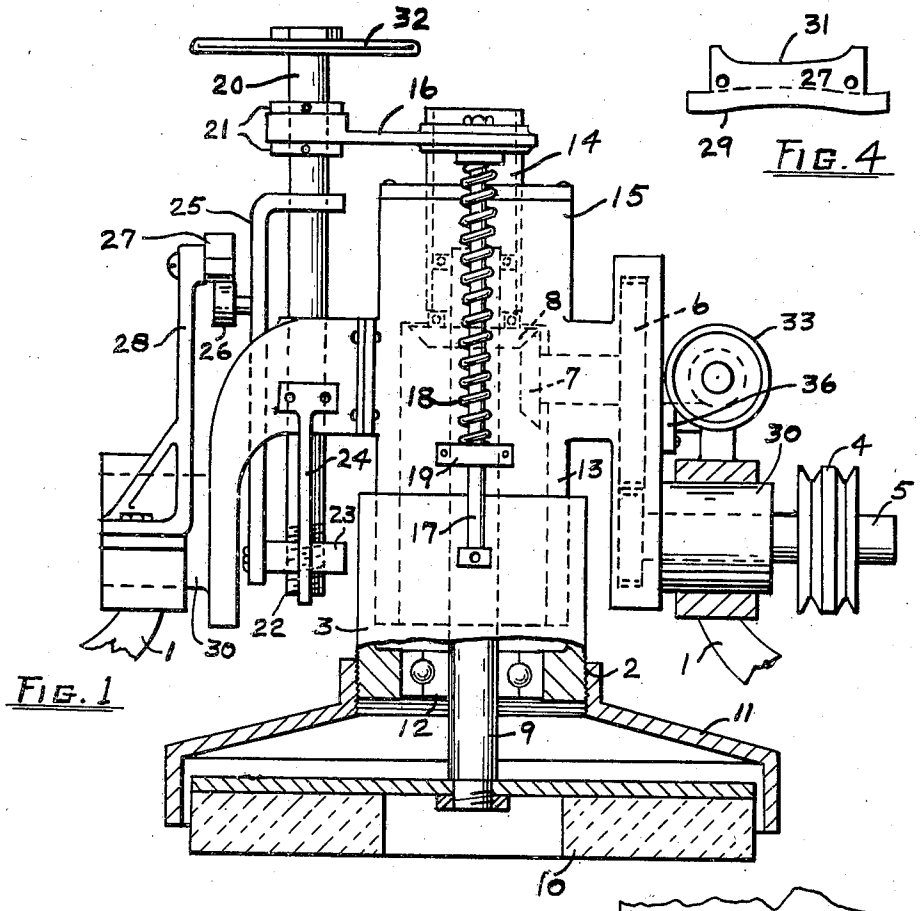


FIG. 1

FIG. 4

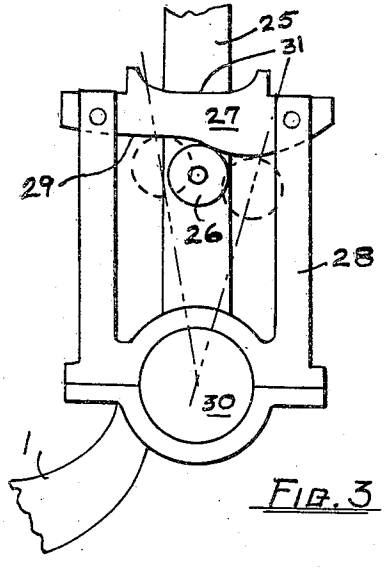


FIG. 3

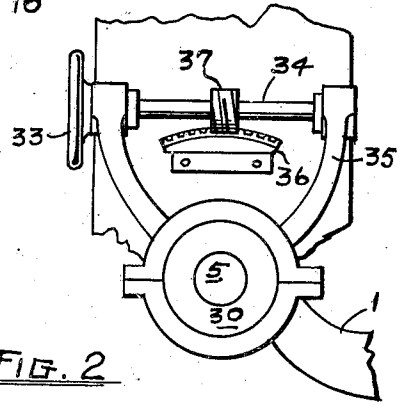


FIG. 2

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VERTICAL FEED CONTROL FOR RAIL GRINDERS

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8 Claims. (Cl. 51—178)

This invention relates to improvements in vertical feed control for rail grinders and has particular application to grinding devices adapted for grinding the surface of railroad rails in place, such as shown and described in my copending application filed September 15, 1934, Serial No. 744,235, now Patent No. 2,076,089, dated April 6, 1937.

An object of the present invention is to provide a grinder having features of control that materially contribute to satisfactory and economical operation and which possesses marked commercial advantages.

A further object of this invention is to provide a standardized grinding head adapted for use singly or in gangs and capable of following the entire contour of the rail head surface and automatically grinding it to any predetermined contour.

Another object of my invention is to provide a grinder simple to operate, sturdy and reliable in construction, and readily adapted to the variety of tasks involved in grinding and surfacing of the many and various rail heads on a railroad system.

With the foregoing and other objects in view, as will be apparent to those skilled in the art as the description proceeds, my invention resides in the combination and arrangement of parts and in the details of construction described in this specification and particularly pointed out in the appended claims, it being understood that changes in the particular embodiment of my invention may be made within the scope of what is claimed, without departing from the spirit of the invention. I intend no limitations other than those of the claims when fairly interpreted in the light of the full disclosure and the present state of the art.

Referring now to the accompanying drawing furnished for illustrative purposes:

Fig. 1 is an elevational view, partly in section, illustrating a grinding head with vertical feed control embodying my invention;

Fig. 2 is a fragmentary conventional side elevational view of the grinder of Fig. 1 from the power shaft side, with pulley removed, illustrating the grinder head tilting mechanism;

Fig. 3 is a similar fragmentary conventional side elevation from the left of Fig. 1, illustrating a vertical feed control cam and follower arrangement;

Fig. 4 is a detail illustrative of a form of cam for use in the arrangement of Fig. 3.

Similar reference characters relate to similar parts in all the views.

In the preferred embodiment of my invention, shown in Fig. 1, a grinding wheel **10** is mounted at the end of a vertically adjustable shaft **9** which is driven as by bevel gears **8**, **7**, which in turn are driven preferably by a gear **6** in mesh with a gear on the power shaft **5** which shaft may carry a driven pulley **4** to which, in this embodiment of my invention, any form of driving motor may be belted. It may be observed clearly that rotation of shaft **5** by any means results in rotation of the grinding wheel **10**.

Preferably the grinding wheel shaft **9** is journaled, as at **12**, so that the shaft **9** and a sleeve **3**, with which a wheel guard **11** is adjustably associated as by screw threads **2**, move together vertically, the sleeve **3** sliding over a body member **13** and the shaft **9** slipping through the beveled drive gear **8**, as by the usual spline connection or the like. The upper part of the shaft **9** is preferably journaled and guided in a hollow fixed post **14** held in a body casing **15**.

Slidably positioned on the fixed post **14** is an arm **16** to which rods **17** are attached on either side, the lower ends of the rods **17** being affixed to the sleeve **3**. Free on each rod is a coiled spring **18** abutting at the lower end against a fixed rod guide **19** on the body casing **15**, through which guide the rod **17** moves freely. The tension of springs **18**, **18**, when compressed forces the arm **16** upwardly and by reason of rods **17**, **17**, also forces upwardly the sleeve **3**, its attached guard **11**, and also the grinding wheel **10**.

A rotatable control spindle **20** with a hand wheel **32** is carried by the arm **16**, suitable collars **21** preventing axial movement of the spindle **20** relative to the arm **16** but leaving the spindle **20** free to rotate. The lower end **22** of the spindle **20** is threaded into a nut or threaded block **23** which block carries a cam follower frame **25** to which a cam follower wheel **26** is suitably connected. Slide guides **24** are provided for the block **23** which is prevented from turning.

The entire grinding head is journaled or pivoted as by pins or trunnions **30**, **30**, in fixed supports carried by the main frame arms **1**, **1**. One of these fixed supports (at the left in Fig. 1 and shown in Fig. 3) carries a fixed cam frame **28** on which a cam **27** is removably fastened, the under edge **29** of the cam **27** contacting and guiding the cam follower wheel **26**. It is apparent that the tension of the springs **18**, **18**, which forces the arm **16** upwardly, results in the follower **26**

being held against the under edge 29 of the cam 27 at all times.

It may be observed that rotation of the spindle 20 serves either to thread the end 22 into block 23 or to back the end 22 out, depending on the rotation. In the first instance springs 18 will be compressed and the grinding wheel 10 forced down. In the instance of backing end 22 out of block 23, the tension of springs 18 will be relieved and the grinding wheel raised. It may be noted that the end 22 is never disengaged from block 23 and that the springs 18 are sufficiently long to give substantially constant pressure at all times.

At any given setting of the control spindle 20, axial movement of the grinding wheel 10 is controlled by the cam follower 26. If the cam follower 26 is forced down, the follower frame 25 forces the spindle 20 down and with it the arm 16, the rods 17, the sleeve 3, the shaft 9, guard 11, and the grinding wheel 10. Likewise, when the cam follower 26 is permitted to rise, the springs 18 will force it up and carry upwardly the grinding wheel 10.

The up and down motion of the cam follower 26 may be controlled by the shape of the lower edge 29 of the control cam 27, as the grinder head is rocked back and forth on trunnions or the pivot pins 30, as shown in Fig. 3, where dot-dash lines represent the center line position of the grinder head in more or less extreme angles, and the corresponding positions of the cam follower 26 is shown by dotted circles. Another cam shape is shown in Fig. 4. It is apparent that, because of the varying angularity of the shaft and the tilt of the wheel which brings different parts of the wheel face into action, the particular cam shape to give the desired predetermined contour to the rail head, must be carefully drafted. It may be so arranged as to grind only one side of the head or to grind the entire rail head surface or to lift away from the rail head at any point, as will be clear from the foregoing description.

For convenience of matching a definite rail head contour, I prefer to shape the upper edge 31 of the cam 27 to fit the given rail head and shape the lower or control edge 29 so as to induce such up and down motion of the grinding wheel as it is tilted back and forth, as will cause it to follow that particular contour. In this way, for example, when a joint is to be ground down to match an adjacent rail, the proper cam can be selected by merely fitting the upper edge 31 to the rail head to be matched. Then, with the selected cam in place, and the grinding head in any position, preferably vertical, the control spindle may be turned until the grinding wheel 10 has contacted one element of the rail head and then the grinding head may be merely rocked back and forth, reciprocated along the rail as desired, and the wheel fed in or out from time to time as needed by rotation of the spindle 20. The resulting ground joint contour will be the same as that of the adjacent rail when the joint grinding is finished. It is elementary that the final setting of the grinding wheel to contact an element of the adjacent rail must not be changed during the rocking and reciprocating motions of the grinder head.

Preferably, to rock the grinding head back and forth transversely of the rail while grinding, I use mechanism similar to that described and claimed in the above mentioned copending application, as best illustrated in Fig. 2.

A hand wheel 33 on a shaft 34 is journaled in fixed bracket arms 35, preferably integral with the main frame arms 1 or the bearings for the trunnions 30. A partial gear segment 36 fixed to the grinding head (Figs. 1 and 2) is engaged by a worm 37 fixed on shaft 34. Operation of the handwheel 33, thus turning worm 37, will tilt the grinding head on pivots 30 to whatever angle may be desired so that as much of the rail head surface may be followed as is required.

What I claim is:

1. In a grinder for railroad rails, the combination with a grinding head comprising an operating shaft, a grinding wheel operatively mounted adjacent one end of said shaft and adapted and arranged to rotate in a plane parallel to the rail surface to be ground and a wheel guard mounted concentric with said wheel, of means to raise and lower said wheel and guard together, means to adjust said guard independently of said wheel, support means for said grinding head, means to tilt said grinding head on said support means while said wheel is rotating, and means to automatically raise and lower said wheel and guard together as said grinding head is tilted whereby to produce a predetermined ground contour.

2. A structure as defined in claim 1 in which said last named means comprises a cam member and a follower member, one of which is fixed relative to said grinding head, and means insuring contact of said follower with said cam.

3. A grinder for railroad rails including a grinding assembly including an axially adjustable grinding wheel, means to tilt said wheel while it is rotating, and other means to move said grinding wheel axially automatically operative as said wheel is tilted and so constructed and arranged that the grinding surface of said wheel will produce any desired predetermined contour of the rail head.

4. In a grinder for railroad rails, a grinding wheel, means to rock said wheel transversely of the rail to be ground, of such a character as to tilt the plane of rotation of said wheel, and means to move said wheel axially while rotating, of such nature that the grinding surface of said wheel will automatically follow a predetermined contour as said wheel is rocked.

5. In a grinder for railroad rails, a rocking grinding assembly including a grinding wheel, means to automatically move said grinding wheel axially of such a character that the grinding surface of said wheel will produce a predetermined rail head contour.

6. In a grinder for railroad rails, a grinding assembly including a grinding wheel, an axial feed for initial adjustment of the cut of said wheel, an automatic axial feed for said wheel operable as said grinding assembly is tilted, and means to tilt said grinding assembly while said grinding wheel is operating.

7. In a grinder for railroad rails, a grinding assembly including a grinding wheel, support members on which said grinding assembly may be rocked transversely of the rail and axial feed means automatically operable as said assembly is rocked.

8. As an article of manufacture for railroad rail grinders, a control cam provided with a cam surface adapted to control the production of a predetermined rail head contour and further provided with a surface of said predetermined contour whereby to identify said cam.

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