Sept. 29, 1936. H. N. SMITH 2,055,709

GRINDER

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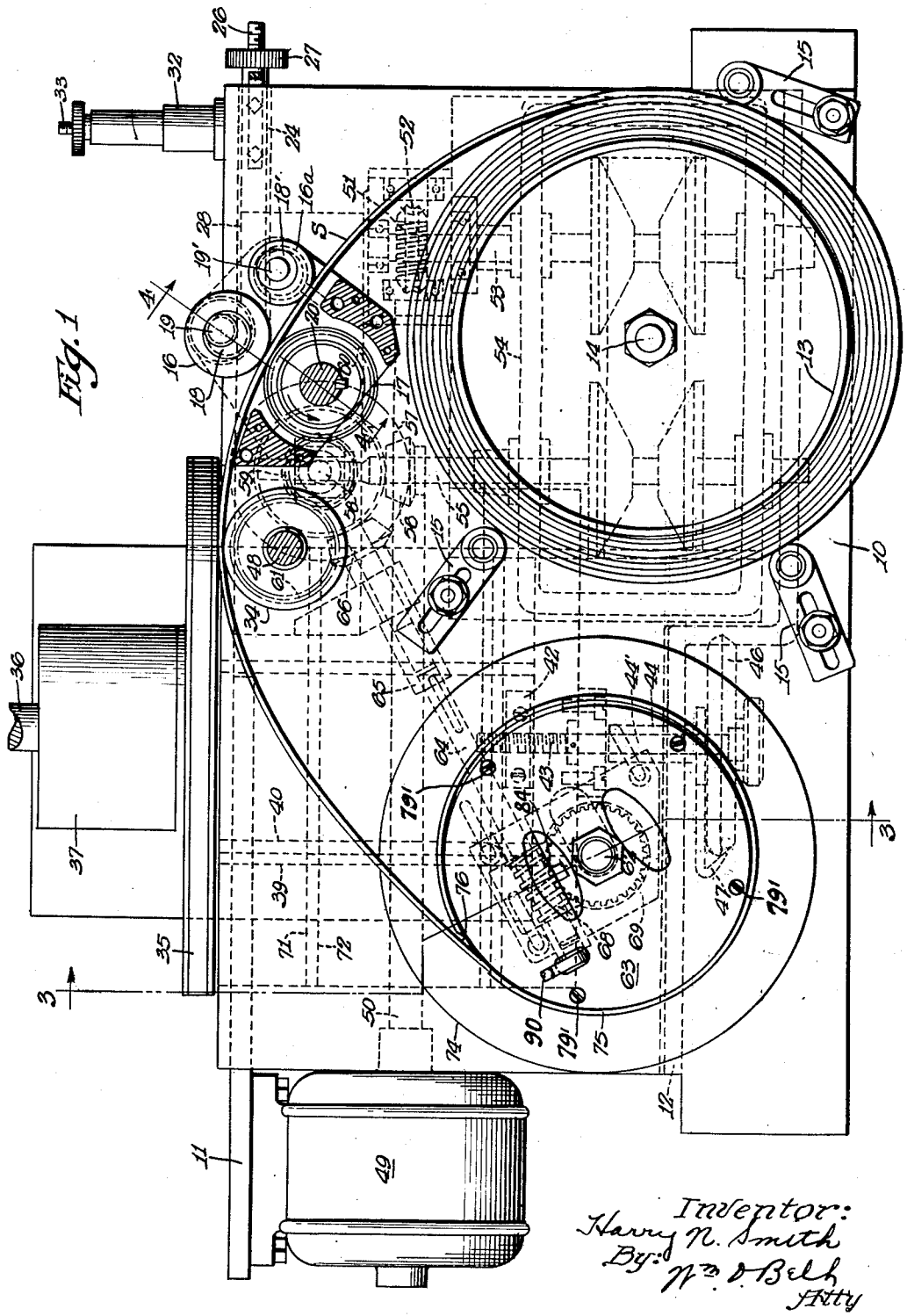


Fig. 1

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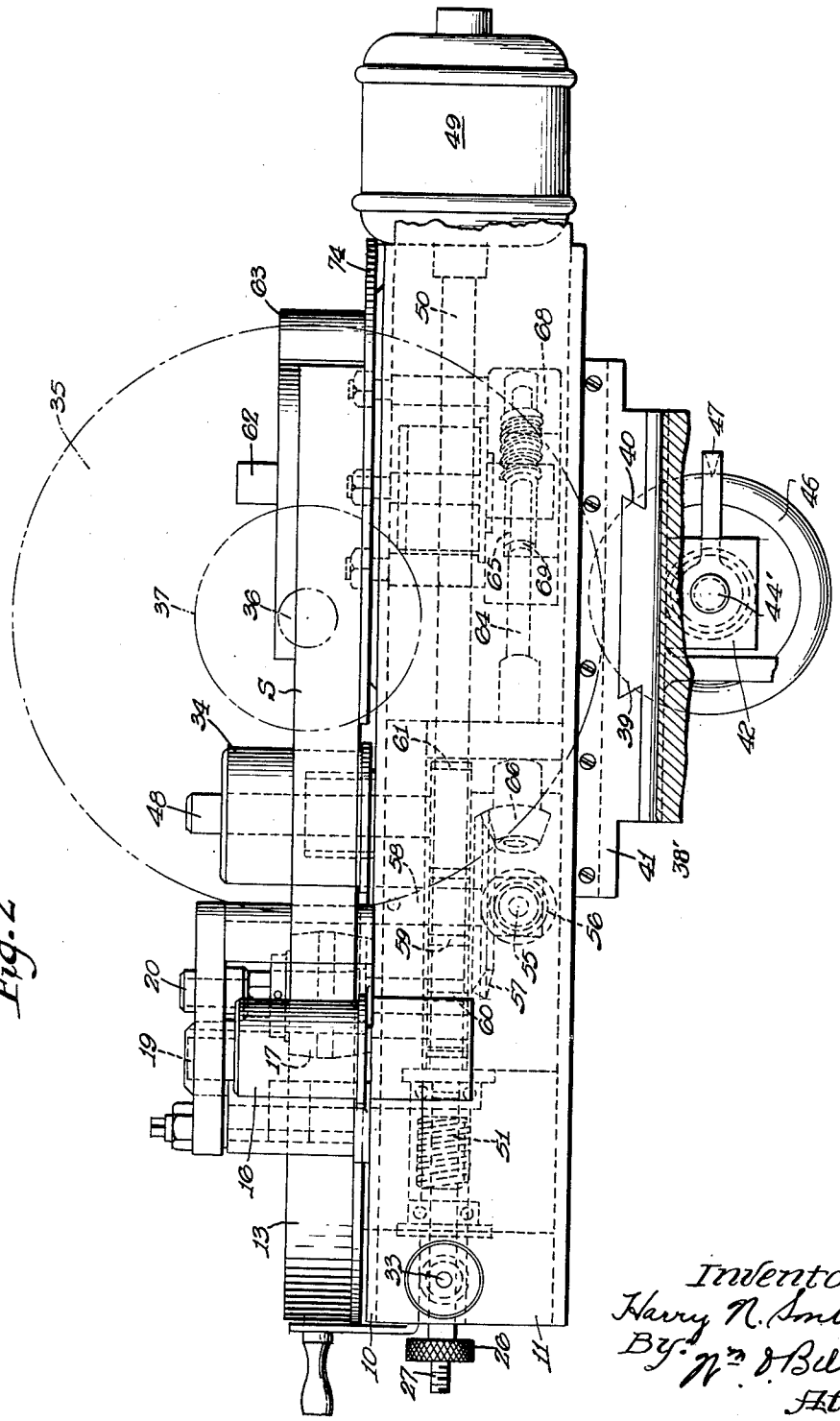


Fig. 2

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GRINDER

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Fig. 3

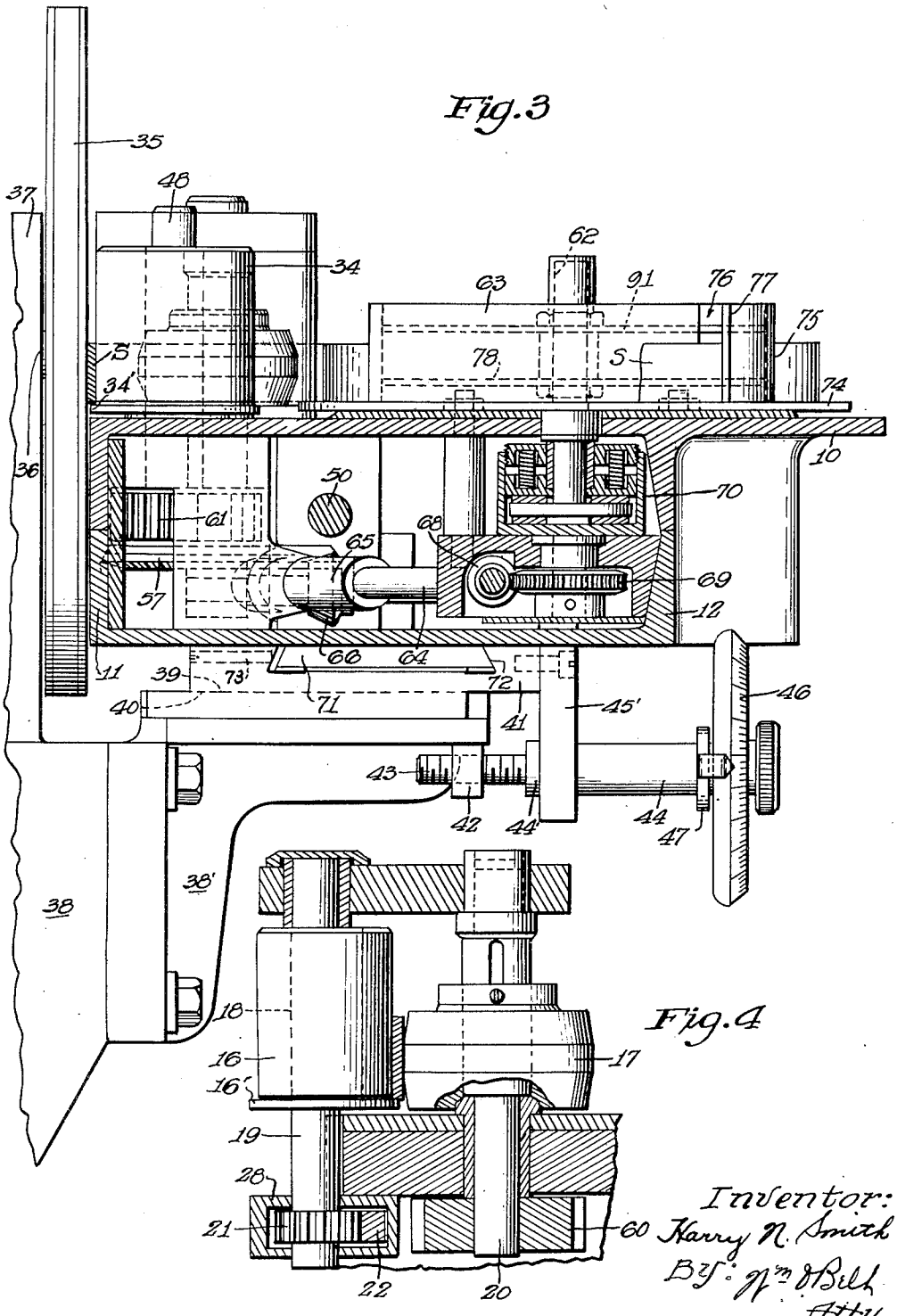


Fig. 4

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GRINDER

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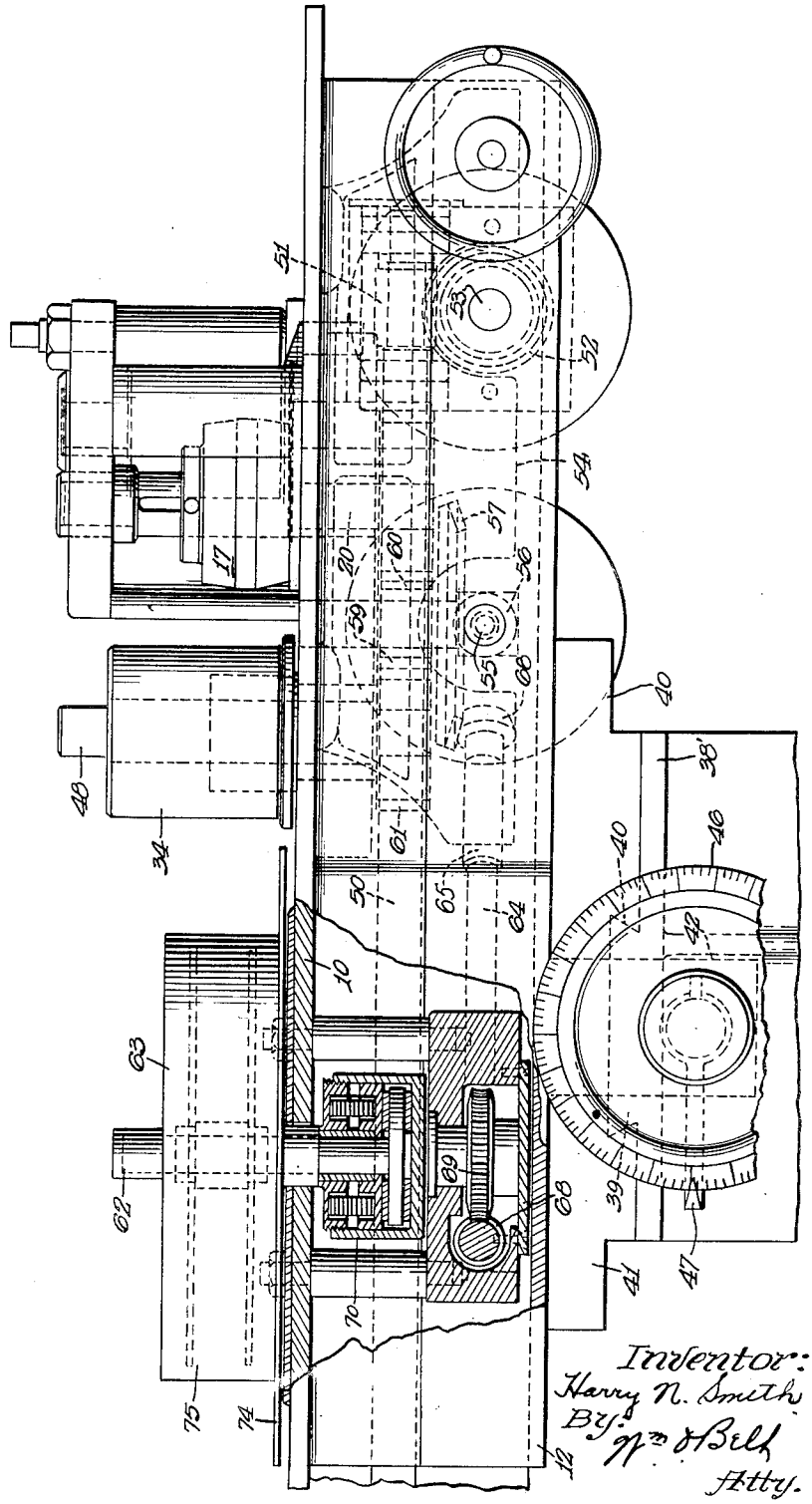


Fig. 5

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Sept. 29, 1936. H. N. SMITH 2,055,709

GRINDER

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Fig. 6

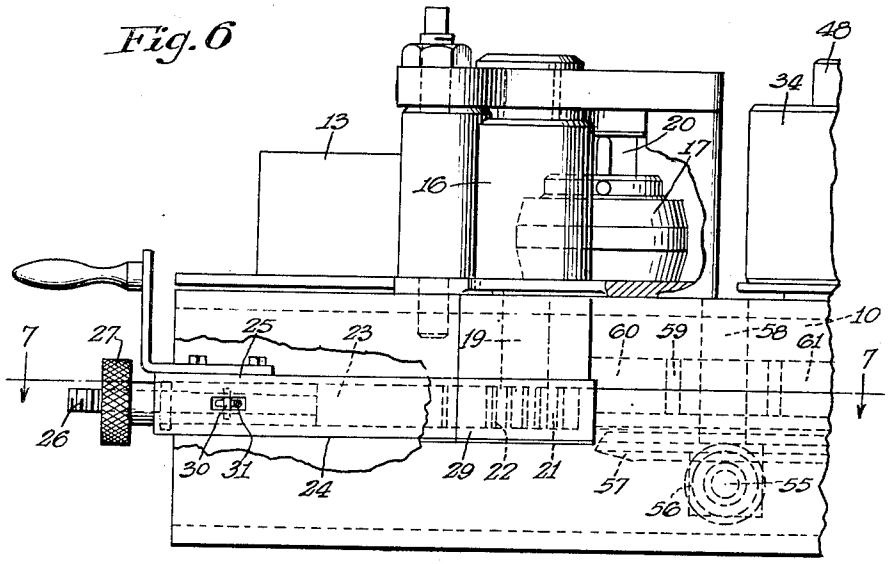
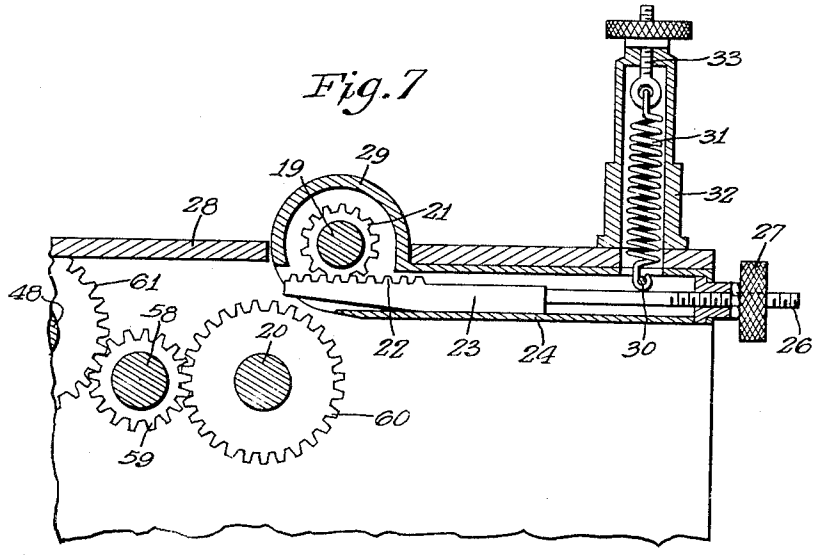


Fig. 7



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GRINDER

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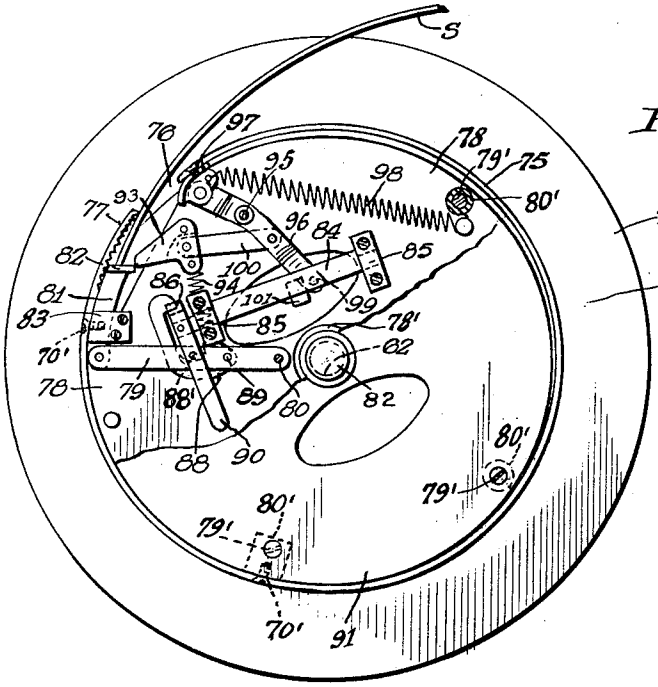


Fig. 9

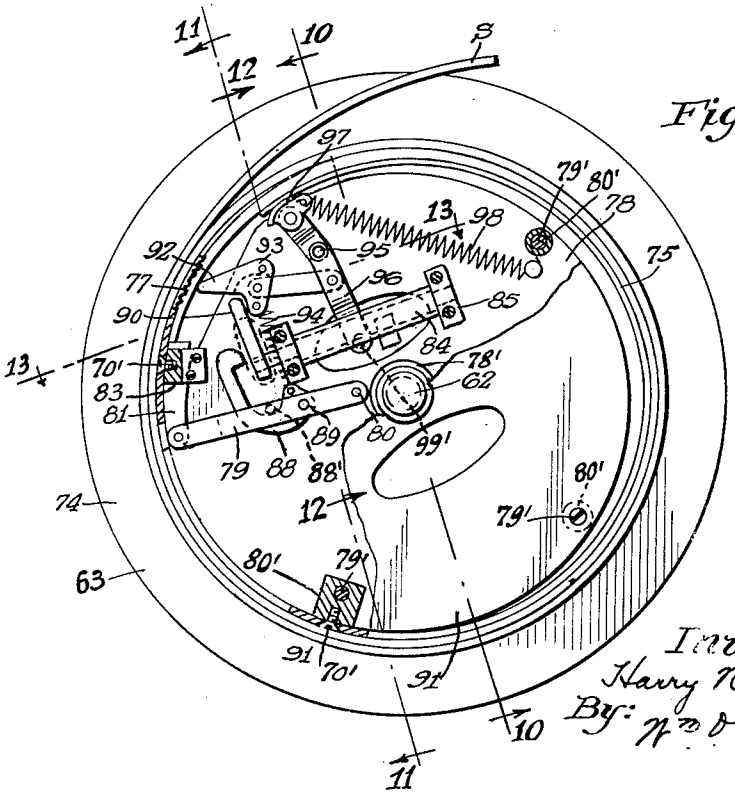


Fig. 8

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Fig. 10.

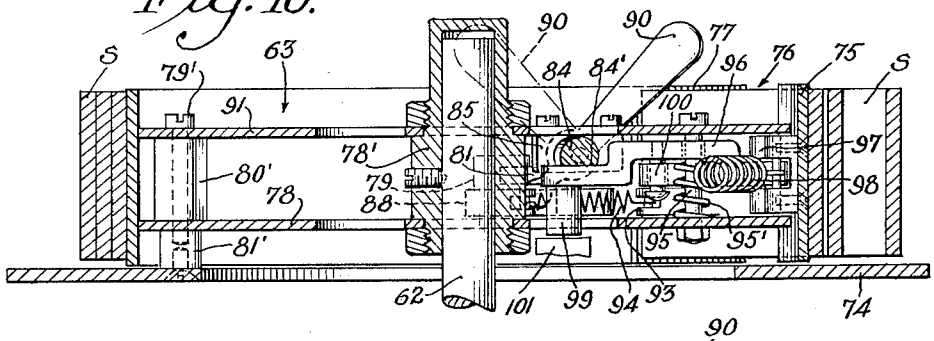


Fig. 11.

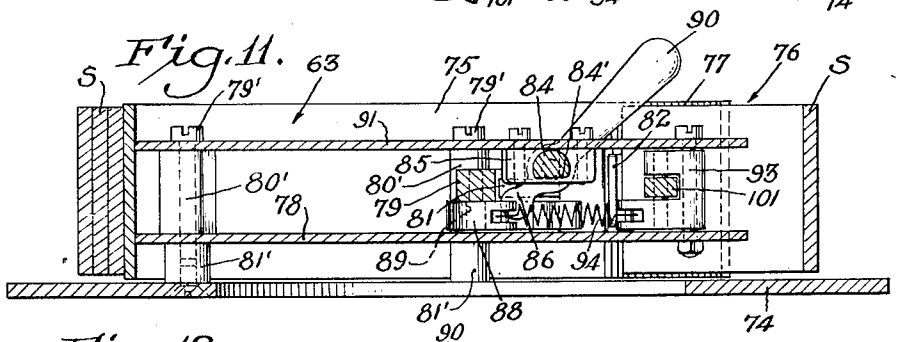


Fig. 12.

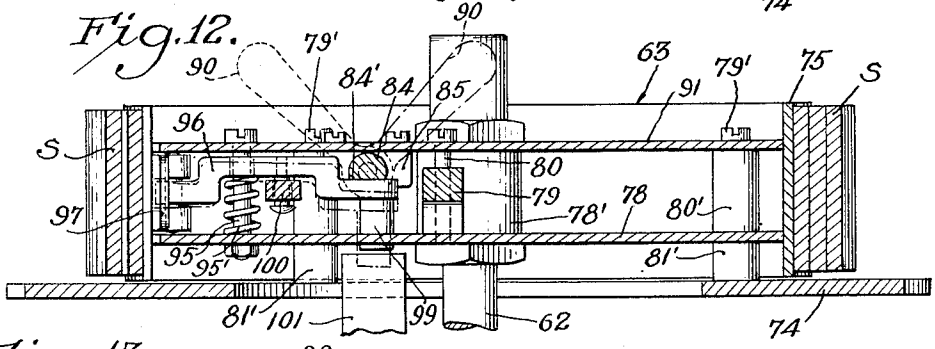
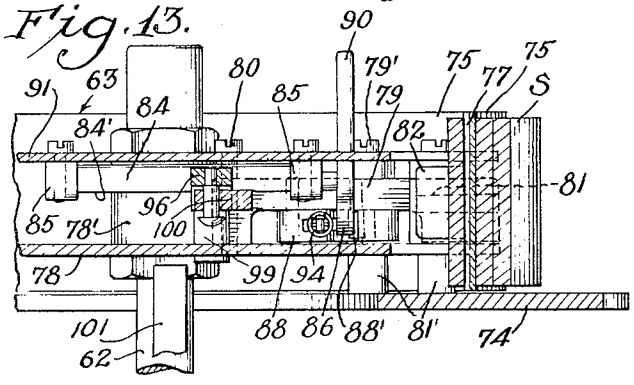


Fig. 13.



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Patented Sept. 29, 1936 2,055,709

UNITED STATES PATENT OFFICE

2,055,709

GRINDER

Harry N. Smith, Detroit, Mich., assignor to American Brakeblok Corporation, New York, N. Y., a corporation of New York

Application June 9, 1932, Serial No. 616,228

16 Claims. (Cl. 51—110)

This invention relates to certain novel improvements in grinders and more particularly to a grinder adapted for dressing and truing strip material.

It is among the objects of my invention to unwind strip material from one coil and wind into another coil in a grinder and to perform grinding and other operations on the extent of the strip material between the coils; to apply pressure to the material as it moves from one coil to the other to remove distortion and thereby true the material; to provide an adjustment whereby the amount of pressure applied to the material may be varied; to so pass the material past the grinding element that the line of contact with the grinding element may be expeditiously varied; to operate parts of the machine in definite timed relation with each other to expedite winding or coiling of the material and to compensate for the increase in winding speed as the diameter of the coil into which the material is being wound increases; to provide a material winding device in which the end of the material is expeditiously secured with minimum operation and from which winding device the material may be removed easily; and to provide a machine of simple and economical construction and efficient and positive operation.

In the selected embodiment of the invention illustrated in the accompanying drawings

Fig. 1 is a plan view of my improved machine;

Fig. 2 is a side elevational view;

Fig. 3 is a sectional view taken substantially on the line 3—3 on Fig. 1;

Fig. 4 is a sectional detail view taken substantially on the line 4—4 on Fig. 1;

Fig. 5 is a fragmentary side view looking in the opposite direction from Fig. 2;

Fig. 6 is a fragmentary detail view of an adjustment provided in the machine;

Fig. 7 is a sectional detail view taken substantially on the line 7—7 on Fig. 6;

Fig. 8 is a plan view with a portion broken away of a clamping device employed in the machine and wherein the parts are shown in clamping position;

Fig. 9 is a view similar to Fig. 8 showing the parts in unclamped position;

Fig. 10 is a transverse sectional detail view taken substantially on the line 10—10 on Fig. 8;

Fig. 11 is a transverse sectional detail view taken substantially on the line 11—11 on Fig. 8;

Fig. 12 is a transverse sectional detail view taken substantially on the line 12—12 on Fig. 8; and

Fig. 13 is a transverse sectional detail view taken on the line 13—13 on Fig. 8.

In the selected embodiment of my invention illustrated in the accompanying drawings, 10 indicates a table mounted on the frame members 11 and 12. A drum 13 is fast on the shaft 14 suitably journaled in bearings below the table and the drum is arranged above the table. My machine is particularly adapted for grinding and removing distortion from strip material of the kind made in a machine disclosed in my co-pending application, Serial No. 491,375, filed October 27, 1930, now Patent No. 1,920,023, patented July 25, 1933. Such strip material is especially adapted for use as a friction element in the brake couples of automotive vehicles and the like and comprises a friction material joined to a reticulated flexible reenforcing back. In my co-pending application, Serial No. 491,944, filed October 29, 1930, now Patent No. 1,965,132, patented July 3, 1934, I disclose a machine for reeling and cutting such strip material and the material made in the machine of the first-named application is passed into the machine of the second-named application and is wound into a coil of predetermined length. Preferably, the strip material is cured after being wound into such a coil. When the strip material is cured, the friction material thereon is rendered hard and possesses but a limited degree of flexibility whereas the reenforcing back, which is usually metal, is not materially affected by the cure and remains flexible. It is therefore essential that the material be carefully handled especially during grinding so as to prevent undue manipulation of the friction material which might result in rupturing the face of the friction material or which might cause the friction material to be broken away from the back. A coil of such strip material is mounted on the periphery of the drum 13 and three elements 15 are mounted on the table 10 to act on the periphery of the coil to create a drag to retard unwinding movement.

The free end of the strip material mounted on the drum 13 is led to and passed between the rollers 16 and 17. The roller 16 is rotatably mounted on a bushing 18 eccentrically arranged on the shaft 19. The roller 17 is adjustably mounted on the shaft 20. A pinion 21 on the shaft 19 meshes with a rack 22 (Fig. 7) on the slide bar 23 mounted in the guideway 24. A rod 25 extends from the slide bar 23 and the free end portion thereof is threaded as at 26, and a nut 27 is mounted on this threaded end portion and is

held against endwise movement relative to the guideway 24. The guideway 24 is mounted in a housing 28 and includes a guard portion 29 which surrounds the pinion 21. One end of a spring 31 is fast to a pin 30 secured in the guideway 24 and a spring extends through an opening in the wall of the housing 28 and through a bushing 32. The other end of the spring is secured to an adjustable spring anchor 33 arranged at the outer end of the bushing 32 and by varying the position of this spring anchor the tension of the spring 31 is adjusted. The spring 31 holds the guideway 24 against a wall of the housing 28 and insures intermeshing of the rack 22 and the pinion 21. When the nut 27 is turned, the cooperation thereof with the screw thread 26 causes the slide bar 23 to move through the guideway 24, and by reason of the intermeshing of the rack 22 and the pinion 21 rotative movement is imparted to the shaft 19 and to the bushing 18. Such movement of the bushing 18 causes the roller 16 to move relative to the roller 17 and in this way the spacing of the rollers is varied to accommodate different thicknesses of material and this also controls the pressure exerted by these rollers on the strip material indicated by S. It has been explained that it is important that the strip material be prevented from buckling, and in the present instance to prevent the strip material from buckling as it enters the bight between the rollers 16 and 17 I provide a roller 16a having an eccentric opening therein embracing a bushing 18' concentric with and mounted on a stud 19' fast in the table. The eccentric opening in the roller 16a enables this roller to be so adjusted on the bushing that it so engages the strip S that the strip is smoothly guided into the bight between the rollers 16 and 17 whereby buckling of the strip as it enters the rollers is prevented. The bushing 18' is fast to the stud 19' and the roller 16a is held in adjusted positions on the bushing by a set screw or like fastening means.

The strip material S usually distorts transversely and I have found that this distortion can best be removed by the action of a crowned roller thereon and therefore the roller 17 is crowned with the highest portion thereof intermediate its sides as is illustrated in Fig. 4. As the strip S passes between the vertical rollers 16 and 17 it is supported by a flange 16' at the lower end of the roller 16, as best shown in Fig. 4.

After passing between the rollers 16 and 17, the strip material is directed to the vertical pressure roller 34 which urges it into engagement with the grinding element 35 fast on the shaft 36. The grinding element is a flat disc and in the present instance has a suitable abrasive on one face thereof. In the illustrated embodiment of the invention the grinding element is mounted for rotation in a vertical plane. The shaft 36 is journaled in a bearing 37 carried by the bracket 38 (Fig. 3) secured to the fixedly mounted support 38' which includes a dovetail key 39 mounted in the dovetail slot 40 in the frame plate 41 secured to the underside of the unit comprising frame members 11 and 12 and the table 10.

A bearing 42 is provided on the support 38' and the screw-threaded end 43 of shaft 44' is threaded into this bearing. A graduated hand wheel 46 is fast to the shaft 44' and has calibrations thereon which cooperate with an indicator 47. The shaft 44' is journaled in a sleeve 44 which is connected to the frame plate 41 by an arm 45'. When the hand wheel 46 is turned, the cooperation of the screw threads 43 with the bearing 42 causes the shaft 44' and the sleeve 44 to be moved in and out and as the sleeve is connected to the frame plate 41 this frame plate is likewise moved so that the dovetail slot 40 moves along the key 39 and in this way the unit is moved toward and away from the grinding element. The pressure roller 34 is fast on a shaft 48 journaled in bearings in the unit and consequently when the unit is adjusted the space between the pressure roller and the face of the grinding element is varied to alter the pressure exerted by the pressure roller 34 and this adjustment is also utilized to accommodate different thicknesses of strip material. The strip S is supported by a flange 34' at the lower end of the roller 34 as it moves past the grinding element 35, as best shown in Fig. 3.

As the strip moves between the rollers 16 and 17 it is trued and as it passes between the pressure roller 34 and the grinding element 35 the face thereof is dressed by the action of the grinding element thereon, the shaft 36 being driven independently of the other portions of the machine so that the grinding element is operated at a high speed to insure efficient operation.

A motor 49 is mounted at one end of the unit including the table 10 and the shaft 50 of the motor is elongated and extends between the frame members 11 and 12, a suitable journal being provided for the free end of the shaft. A worm gear 51 is fast on the shaft adjacent the free end thereof and meshes with a worm wheel 52 fast on the shaft 53. The shaft 53 is an extension of one of the shafts of a variable speed transmission 54 and another shaft 55 of this transmission extends parallel to and in spaced relation with the shaft 53. A bevel gear 56 fast on the shaft 55 meshes with a bevel gear 57 fast on the shaft 58 suitably journaled in bearings in the unit between the frame members 11 and 12. A pinion 59 on shaft 58 meshes with a gear 60 fast on the shaft 20 and with a gear 61 fast on the shaft 48. The gears 60 and 61 are of the same size and as both receive movement from the pinion 59 it is manifest that the shafts 20 and 48 are rotated at the same speed. The rollers 17 and 34 are of the same size and consequently these rollers act on the strip S to impart uniform movement thereto so that the strip is moved past the roller 16 and the grinding element 35 at the same speed. The speed of the strip may be varied by manipulation of the variable speed transmission 54.

A sectional shaft 62 (Fig. 3) is journaled in suitable bearings carried by the unit including the table 10 and extends above the table and a drum 63 is mounted on the extended portion of this shaft. The drum 63 constitutes the winding or coiling device and after passing between the roller 34 and the grinding element 35 the free end of the strip is secured to this drum in the manner to be described. The drum 63 operates in timed relation with the rollers 34 and 17 so that the strip is wound thereon in a uniform manner. However, as the strip is wound on the drum 63 the diameter of the coil into which it is wound increases and the strip will tend to wind more rapidly as the diameter of the coil increases. To insure uniform winding and to maintain the timed relation between the operation of the rollers 17 and 34 and the winding of the strip on the drum 63 I provide the following driving mechanism for the drum 63. A shaft 64 is journaled in bearings in the unit and has a slidable connection 65 therein. A bevel gear 66 is fast

on the shaft 64 and meshes with the bevel gear 57. A worm gear 68 is provided on the other end of the shaft 64 and meshes with a worm wheel 69 fast on the shaft 62. A slip clutch 70 is mounted between the sections of the shaft 62 intermediate the worm wheel 69 and the drum 63. So long as the strip is being wound on the drum 63 in synchronism with the delivery thereof from the bight between the roller 34 and the grinding element 35, the shaft 64 drives the drum 63. However, when the speed of winding exceeds the speed of the delivery of the strip from the grinding element, the clutch 70 slips so that the portion of the shaft 62 carrying the drum 63 rotates slower than that portion of the shaft carrying the worm wheel 69 and in this way the winding speed is synchronized with the delivery speed. Inasmuch as the friction material on the strip may be ruptured or broken away from the flexible backing, the strip S is led from the coil on the drum 13 to the rollers 16 and 17 and pressure roller 34 and grinder 35 and to the take-up drum 63 through a wide and substantially uniform arc having a center located between but somewhat offset from the center line between the drums 13 and 63. It is essential, in order to prevent rupture or other damage to the material, that this wide arc be maintained and that the strip not be directed about a short radius. The friction drag on the coil of strip material on the drum 13 prevents overrunning of the strip material as it is withdrawn by the action of the rollers 16 and 17. The rollers 16 and 17 are spaced from the roller 34 and its bight with the grinder so that the uniformity of the arc through which the strip material is directed may be maintained and since the rollers 17 and 34 operate synchronically a uniform section of material extends between these rollers and buckling of the material is prevented. It is quite essential to prevent buckling of the material for if the material buckles it may contact with the grinder prior to the time it passes through the bight between the pressure roller and the grinder, and if this should occur the strip might be so ground that it would be undersize at the point of contact which might form an undulating surface on the strip material which would render it unfit for use as a friction element. Inasmuch as a slip clutch is provided in the drive for the drum 63 the uniformity of the arc through which the strip material is directed between the roller 34 and the drum 63 may be maintained. Hence, inasmuch as the strip material may be passed through this machine in a uniform manner, it is possible to true and dress the strip material without injury such as rupture of the friction surface or breaking of the friction material away from the flexible back.

It is sometimes desirable to shift the strip S relative to the grinding element 35 to change the line of contact of the strip with the grinding element and to this end I provide a dovetail key 71 on the bottom of the unit including the table 10. This key is mounted in a dovetail keyway 72 in the frame plate 41, this providing the interconnection between the unit and the frame plate. A set screw 73 in the plate 41 locks the dovetail key in the keyway in transversely adjusted positions and when this set screw is loosened the entire unit including the frame members 11 and 12, the table 10, and all the parts carried by this unit may be shifted relative to the grinding element and after the desired position has been attained the set screw is tightened to prevent further movement.

It is desirable that the connection of the free end of the strip S to the winding drum 63 be as simple as possible and to this end I provide an automatic clamping arrangement illustrated in Figs. 8 to 13, inclusive. The winding drum 63 includes an annular ring 74 and extending upwardly from the face of this ring and arranged about the shaft 62 is a band 75, the ends of which are spaced apart to provide an opening 76. The inner surface of one end of the band 75 is serrated adjacent the opening 76 as indicated at 77 and the end of the strip to be secured to the drum 63 is passed through the opening 76 into position adjacent the serrations 77. A plate 78 is fast to a hub 78' pinned to the shaft 62 and a link 79 is pivotally mounted thereon at 80. An arm 81 is pivotally connected to the free end of the link 79 and has a pad 82 at the free end thereof. The end of the strip passed through the opening 76 is engaged with the pad 82 and upon this engagement and further movement of the strip S, the pad is moved from the position shown in Fig. 9 into the position shown in Fig. 8 and this movement pivots the link 79 in a counter-clockwise direction as viewed in Fig. 9. The ends of the rod 84 are journaled in bearings 85 fast on a plate 91 that is secured to the hub 78' above the plate 78, the plates 78 and 91 being interconnected by screws 79' passed through sleeves 80' and 81' respectively disposed between the two plates and the ring 74. The rod 84 has a flattened portion 84' on the periphery thereof. A dog 88 is pivotally mounted on the link 79 and includes a nose which is engageable with the depending tail 86 of the handle 90 that is fast on the rod 84. When the link 79 is pivoted in a counter-clockwise direction, as described, the nose of the dog 88 engages the tail 86 and pivots the handle 90 from the broken line position of Fig. 10 into the full line position of this figure, and near the end of this movement the pin 88' on the link 79 withdraws the nose of dog 88 from engagement with the tail 86. This movement of handle 90 so rotates the rod 84 that the flattened portion 84' thereon is presented to the lever 96. The lever 96 is pivotally mounted on a pin 95 that extends between and is carried by the plates 78 and 91, and a spring 95' acts on this lever 96 to normally urge it upwardly so that when the flattened portion 84' of the rod 84 is presented to this lever the spring 95' forces it upwardly into the position shown in Fig. 10. A pin 99 is provided on the lever 96 and when the winding drum 63 is at rest this pin engages a stop 101 for when the drum 63 is at rest the round portion of the rod 84 is presented to the lever 96 and holds the pin 99 in a lowered position against the action of the spring 95'. Hence when the spring 95' forces the lever 96 upwardly the pin 99 is retracted from engagement with the pin 101 whereupon the drum 63 starts to rotate and wind the strip S thereon.

At the same time the pin 99 is elevated the band 75 is expanded into circular formation and the free end of the strip S engaging the pad 82 is clamped against the serrations 77 and these operations are brought about in the following manner: The end of the band 75 adjacent the serrations 77 is connected to spaced blocks by screws 70', the spaced blocks being used in place of sleeves 80' about adjacent of these screws 79'. The remaining portion of the band is free from the ring 74.

A lug 97 on the lever 96 is connected to the unserrated free end of the band 75, and when the pin 99 is engaged with the stop 101, as shown in Fig. 9, the free end of band 75 is retracted inwardly. However, when the pin 99 is disengaged from the stop 101, the spring 98 connected to lug 97 pulls the free end of band 75 outwardly into circular outline as shown in Fig. 8 and the strip S is wound about the band as drum 63 rotates. At the same time the spring 98 pulls the band 75 outwardly the lever 96 is pivoted from the position shown in Fig. 9 into the position shown in Fig. 8. A link 100 is connected to the lever 96 and carries a clamping shoe 93. Hence when lever 96 moves from the position shown in Fig. 9 into the position shown in Fig. 8 the movement is transmitted through link 100 and shoe 93 clamps the end of the strip S against the serrations 77 and therefore the free end of the strip is clamped to the drum 63 during rotation thereof.

When the desired length of the band has been wound about the band 75, the operator moves the handle 90 from the full line position of Fig. 10 into the broken line position thereof whereupon the pin 99 is lowered against the action of the spring 95'. Thereupon the flattened portion 84' is moved from engagement with the lever 96 and the rounded portion of this rod is presented to this lever and therefore the pin 99 is forced downwardly. When the pin is in this downward position it will strike the stop 101 during rotation of the drum and when the pin 99 engages the stop 101 rotation of the drum 63 is interrupted. Likewise the engagement of the pin 99 with the stop 101 pivots the lever 96 from the position shown in Fig. 8 into the position shown in Fig. 9 which retracts the free end of the band 75 inwardly and also disengages the clamping shoe 93 from engagement with the band. Then the strip which has been wound about the band 75 may be easily lifted from the drum 63 since it is disconnected therefrom. The leading free end of the succeeding length of strip S will then be passed through the opening 76 to be engaged with the pad 82. When the clamping shoe 93 is disengaged from the strip the spring 94 moves the link 79 from the position shown in Fig. 8 into the position shown in Fig. 9 and in this movement the pin 88' permits the nose of the dog 88 to again move into position to engage the tail 86. Hence when the free end of the strip passed through the opening 76 is engaged with the pad 82 and this pad is forced inwardly the link 79 is pivoted as described and the above described automatic clamping operation is repeated whereupon the drum 63 again starts to rotate.

It is manifest that I have provided a machine wherein pressure is applied to strip material passing therethrough to remove distortion from the strip to true the same. The machine dresses the face of the strip material to remove unevenness and irregularities therefrom and to provide a proper finish on the face of the strip. The strip is introduced into the machine as a coil and it is unwound from this coil and after the desired operations have been performed thereon it is recoiled. Further, the end of the strip is easily directed through the machine and is easily connected to the winding device particularly because I have provided a self-actuated clamp in this winding device.

While I have illustrated and described a selected embodiment of my invention it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the spirit and scope of the following claims.

I claim:

1. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, means for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having means engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, means for removing distortion from the strip material prior to contact thereof with the grinding element and including a part engageable with an edge of the strip material to support the strip material during movement thereof through the distortion removing means, and means for operating the strip material urging and moving means and the distortion removing means in synchronism to maintain a uniform length of strip material between the urging and moving means and the distortion removing means and thereby prevent bulging of the strip material during movement from one of said means to the other, the means supporting the material during movement thereof through the distortion removing means and past the grinding element preventing transverse bending of the material by the action of the distortion removing means and the grinding element thereon.

2. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, means for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having means engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, a pair of rollers mounted near the grinding element and between which the strip material is passed to remove distortion from the strip material and including means engageable with an edge of the strip material to support the strip material during movement thereof between the rollers, and means for operating the strip material urging and moving means and the rollers in synchronism to maintain a uniform length of strip material between the urging and moving means and the rollers and thereby prevent bulging of the strip material during the movement from the rollers to the urging means, the means supporting the material during movement thereof between the rollers and past the grinding element preventing transverse bending of the material by the action of the rollers and the grinding element thereon.

3. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, a roller for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having a flange thereon

engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, means for pressing the strip material and including a part engageable with an edge of the strip material to support the strip material during movement thereof through the pressing means, and means for operating said roller and the pressing means in synchronism to maintain a uniform length of strip material between the roller and the pressing means and thereby prevent bulging of the strip material during movement from the pressing means to the roller, the means supporting the material during movement thereof through the pressing means and past the grinding element preventing transverse bending of the material by the action of the pressing means and the grinding element thereon.

4. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, a roller for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having a flange thereon engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, a pair of rollers between which the strip material is passed prior to movement thereof to the grinding element, one of said rollers having a flange thereon engageable with an edge of the strip material to support the strip material during movement thereof between the rollers, and means for operating said urging and moving roller and said pair of rollers in synchronism to maintain a uniform length of strip material between said roller and pair of rollers and thereby prevent bulging of the strip material during movement from one of said rollers to the other, the flanges preventing transverse bending of the material by the action of said pair of rollers and the grinding element thereon.

5. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, means for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having means engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, means for pressing the strip material and including a part engageable with an edge of the strip material to support the strip material during movement thereof through the pressing means, means for coiling the strip material after movement thereof past the grinding element and the pressing means, and means for operating the strip material urging and moving means, the pressing means and the coiling means in synchronism to maintain uniform lengths of strip material in the intervals between the urging and moving means and the pressing means and the coiling means and thereby prevent bulging of the strip material during passage thereof through the machine, the means supporting the material during movement thereof through the pressing means and past the grinding element preventing transverse bending of the material by the action of the pressing means and the grinding element thereon.

6. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, means for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having means engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, means for removing distortion from the strip material prior to contact thereof with the grinding element and including a part engageable with an edge of the strip material to support the strip material during movement thereof through the distortion removing means, means for coiling the strip material after movement thereof past the grinding element and the distortion removing means, and common means for operating the strip material urging and moving means, the distortion removing means and the coiling means to maintain uniform lengths of strip material between said urging and moving means, distortion removing means and coiling means and thereby prevent bulging of the strip material during passage thereof through the machine, the means supporting the material during movement thereof through the distortion removing means and past the grinding element preventing transverse bending of the material by the action of the distortion removing means and the grinding element thereon.

7. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, means for urging the face of the strip material into engagement with the face of the grinding element and for moving the strip material past the grinding element and having means engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, a pair of rollers mounted near the grinding element and between which the strip material is passed to remove distortion from the strip material and including means engageable with an edge of the strip material to support the strip material during movement thereof between the rollers, means for coiling the strip material after movement thereof past the grinding element and the pair of rollers, and common means for operating the strip material urging and moving means, the rollers and the coiling means in synchronism to maintain uniform lengths of strip material between said urging and moving means, rollers and coiling means and thereby prevent bulging of the strip material during passage thereof through the machine, the means supporting the material during movement thereof between the pair of rollers and past the grinding element preventing transverse bending of the material by the action of the pair of rollers and the grinding element thereon.

8. In a machine for grinding strip material, a flat face grinding element mounted for movement transversely across the strip material as the strip material is moved past said grinding element, a roller for urging the face of the strip material into

engagement with the face of the grinding element and for moving the strip material past the grinding element and having a flange thereon engageable with an edge of the strip material to support the strip material during engagement thereof with the face of the grinding element, means for imparting rotative movement to the grinding element, means for pressing the strip material and including a part engageable with an edge of the strip material to support the strip material during movement thereof through the pressing means, means for coiling the strip material after movement thereof past the urging and moving roller and the pressing means, and common means for operating the urging and moving roller, the pressing means and the coiling means to maintain uniform lengths of strip material between said urging and moving roller, pressing means and coiling means and thereby prevent bulging of the strip material during passage thereof through the machine, the flange on said roller and the part in said pressing means supporting the material during movement thereof through the pressing means and past the grinding element and preventing transverse bending of the material by the action of the pressing means and the grinding element thereon.

9. In a machine of the class described, a distortion removing means including a driven roller, a shaft having an eccentric bushing thereon, a second roller cooperating with the driven roller and mounted on said eccentric bushing, means for moving said shaft to move said eccentric bushing to thereby vary the cooperation of the roller on said bushing with the driven roller, and means for operating said moving means and for holding said shaft against movement to retain the roller on said bushing in adjusted position relative to the driven roller and including a threaded pin passed through a bushing supported in the machine, and a lock nut arrangement engaging said threaded pin.

10. In a machine of the class described, a distortion removing means including a driven roller, a shaft having an eccentric bushing thereon, a second roller mounted on said eccentric bushing and cooperating with the driven roller, a pinion on said shaft, a rack meshing with said pinion, and means imparting movement to said rack to move said pinion to rotate said shaft to thereby move said eccentric bushing whereby the roller mounted on said bushing is moved relative to the driven roller to regulate the pressure exerted by said rollers on material passed therebetween.

11. In a grinding machine, a fixed support, a grinding element having a flat face and journaled in said fixed support, a table unit, means on the table unit supporting a coil of strip material for unwinding movement, means on the table for rewinding the strip of material into a coil, means on the table unit intermediate said supporting and rewinding means and adapted to urge the strip material into engagement with the grinding element, means supporting the table unit for movement toward and away from the flat face of the grinding element and transversely across the face of the grinding element, and means securing the table unit in adjusted position relative to said grinding element to regulate the grinding operation.

12. In a grinding machine, a fixed support, a grinding element having a flat face and journaled in said fixed support, a table unit, means on the table unit supporting a coil of strip material for unwinding movement, means on the table for rewinding the strip of material into a coil, means on the table unit intermediate said supporting and rewinding means and adapted to urge the strip material into engagement with the grinding element, a key on the support, a keyway on the table unit and engaged with the key, and means for moving said table unit along said key and for holding said table unit in adjusted positions to regulate the grinding operation of said grinding element on the strip material.

13. In a grinding machine, a fixed support, a grinding element having a flat face and journaled in said fixed support, a table unit, means on the table unit supporting a coil of strip material for unwinding movement, means on the table for rewinding the strip of material into a coil, means on the table unit intermediate said supporting and rewinding means and adapted to urge the strip material into engagement with the grinding element, said table unit including upper and lower parts slidably connected together whereby the upper part may be moved relative to the lower part, and means securing said upper part in adjusted position on said lower part to determine the line of contact of said strip material with the flat face of said grinding element.

14. In a grinding machine, a fixed support, a grinding element having a flat face and journaled in said fixed support, a table unit, means on the table unit supporting a coil of strip material for unwinding movement, means on the table for rewinding the strip of material into a coil, means on the table unit intermediate said supporting and rewinding means and adapted to urge the strip material into engagement with the grinding element, said table unit including upper and lower parts slidably connected together whereby the upper part may be moved relative to the lower part, means securing said upper part in adjusted position on said lower part to determine the line of contact of said strip material with the flat face of said grinding element, a key on the support, a keyway on the lower part of said table unit and engaged with the key, and means for moving said table unit along said key and for holding said table unit in adjusted positions to regulate the grinding operation of said grinding element on the strip material.

15. In a machine for grinding the face of a strip consisting of friction material having a backing embedded in the rear side thereof, a flat face grinding element, a roller having the extent of the periphery thereof disposed in parallel relation with the face of the grinding element and positioned to urge the face of the strip into engagement with the flat face of the grinding element, means for rotating the roller to move the strip material past the grinding element, means for rotating the grinding element in a direction such that the action of the grinding element on the face of the strip tends to force the strip along the extent of the periphery of the roller, and a flange at one end of the roller and against which a side edge of the strip is urged by the action of the grinding element on the strip whereby the side edge of said strip is firmly seated on said flange and movement of the strip by the roller past the grinding element in a uniform manner is assured.

16. In a machine for grinding the face of a strip consisting of friction material having a backing embedded in the rear side thereof, a

bed, a flat face grinding element mounted outwardly of one edge of the bed, a roller mounted on said bed near said edge thereof and having the extent of the periphery thereof disposed in parallel relation with the face of the grinding element, said roller being positioned to urge the face of the strip into engagement with the flat face of the grinding element, means for rotating the roller to move the strip material past the grinding element, means for rotating the grinding element in a direction such that the action of the grinding element on the face of the strip tends to force the strip along the extent of the periphery of the roller, adjustable means operable to adjust the spacing between said roller and the vertical center plane of the axis of rotation of said grinding element whereby the position of said roller relative to said center plane may be varied, and a flange at one end of said roller and against which a side edge of the strip material is urged by the action of the grinding element on the strip whereby the side edge of said strip is firmly seated on said flange and movement of the strip by the roller past the grinding element in a uniform manner is assured.

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