

Apr. 10, 1923.

A. SUNDH ET AL

1,451,281

INDICATOR

Original Filed Oct. 8, 1920

2 sheets-sheet 1

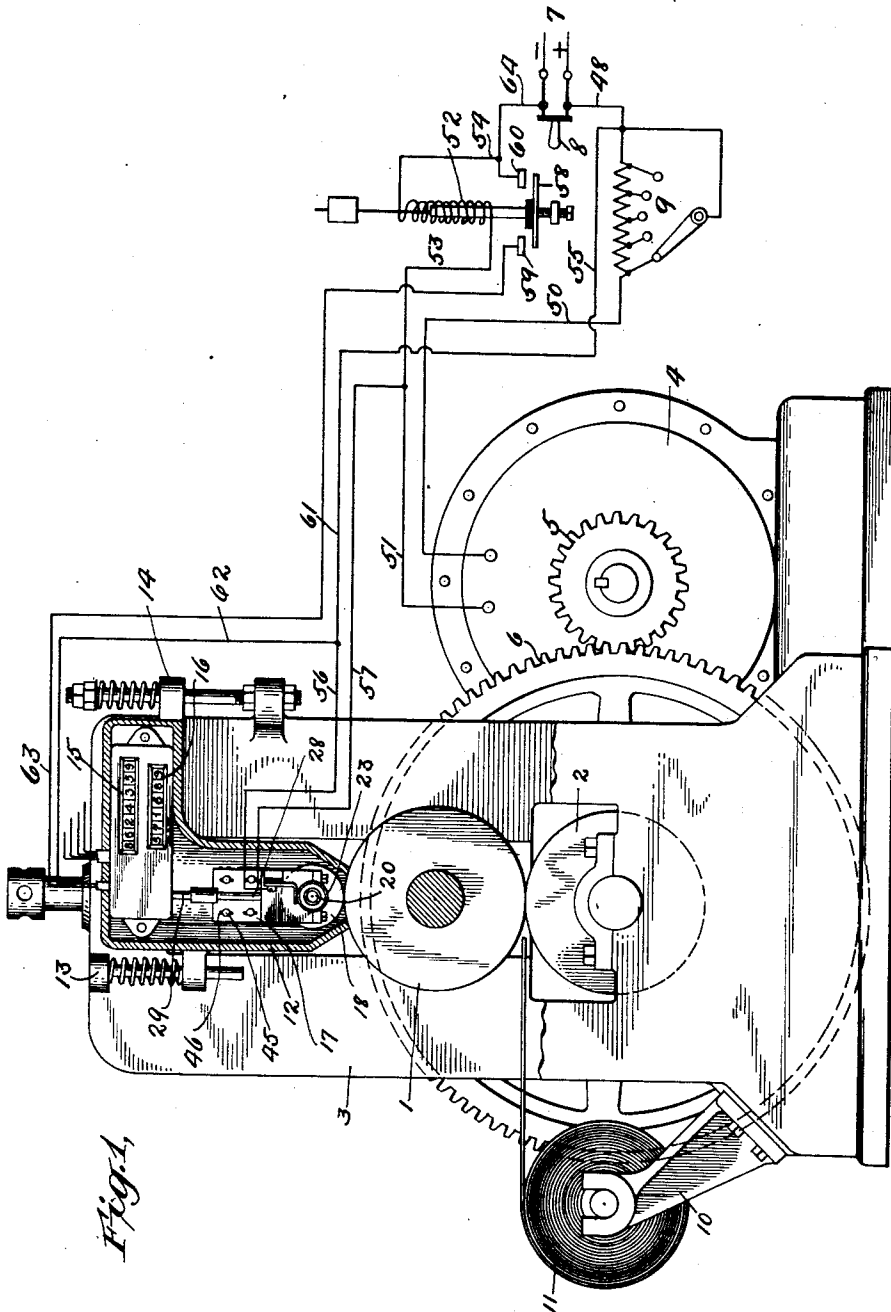


Fig. 1.

INVENTORS.
August Sundh.
William Wetherman.
BY
Kiddie & Margeson.
ATTORNEYS.

Apr. 10, 1923.

A. SUNDH ET AL

1,451,281

INDICATOR

Original Filed Oct. 8, 1920

2 sheets-sheet 2

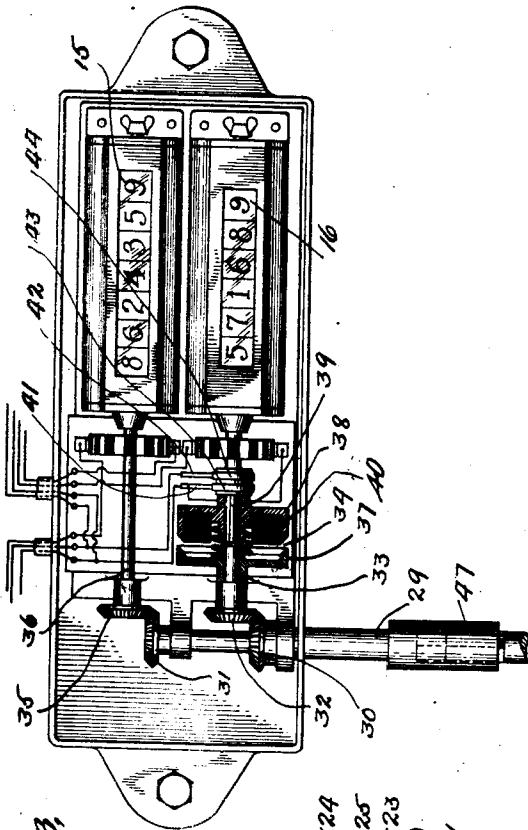


Fig. 3.

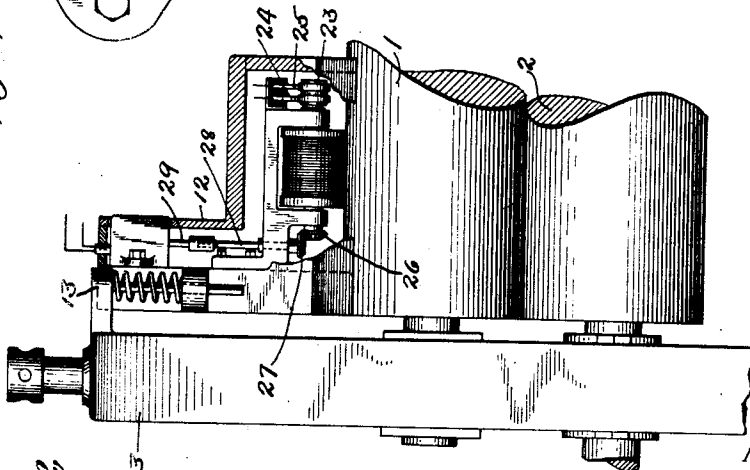


Fig. 2.

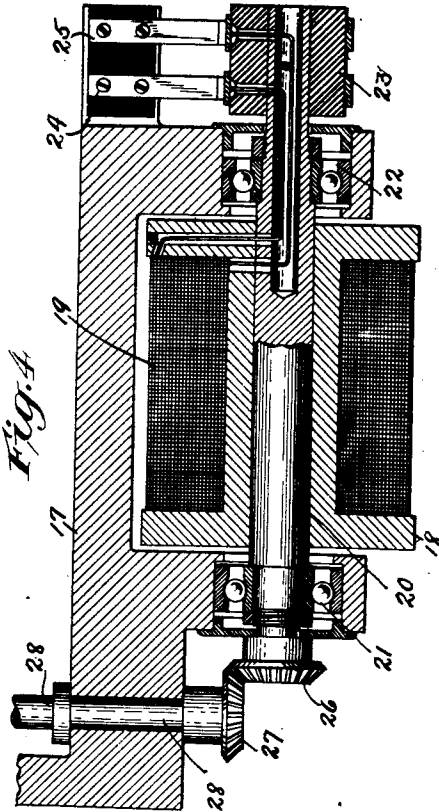


Fig. 4.

INVENTORS.
August Sundh.
William Waterman.
Riddle & Marquon,
ATTORNEYS.

UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF HASTINGS-UPON-HUDSON, NEW YORK, AND WILLIAM WESTERMAN, OF DETROIT, MICHIGAN.

INDICATOR.

Original application filed October 8, 1920, Serial No. 415,512. Divided and this application filed December 24, 1921. Serial No. 524,620.

To all whom it may concern:

Be it known that we, AUGUST SUNDH, a citizen of the United States, and a resident of Hastings-upon-Hudson, county of Westchester, and State of New York, and WILLIAM WESTERMAN, a citizen of the United States, and a resident of Detroit, county of Wayne, and State of Michigan, have invented certain new and useful Improvements in Indicators, of which the following is a specification.

This invention relates to a device to be applied to mills for indicating the travel of a moving part of the mill, the device also being adapted to indicate the amount of material passing through the mill at any time.

In general, the invention relates to a device particularly adapted for application to a rolling mill, an object of the application of this device to a rolling mill being to indicate the peripheral travel of a roll of the rolling mill and to indicate also the amount of material which is passed through the mill.

Another object of the invention is the provision of a device of the character designated which is automatically controlled, means having been provided whereby the device is set in operation by the energization of a relay energized by current drawn from the line by an electric motor which is employed for driving the mill.

A further object of the invention is the provision of a device of the character designated wherein the indicating element for indicating the travel of a roll of the rolling mill will be set in operation as soon as the rolls of the mill begin to rotate and wherein the other indicating element if not indicating the amount of material passed through the mill, will remain idle until the material is fed to the mill.

In the accompanying drawings wherein an embodiment of our invention has been illustrated,—

Fig. 1 shows in part sectional elevation the device applied to a rolling mill;

Fig. 2 is a front elevation of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged view of the indicating element and part of the driving means therefor; and

Fig. 4 shows on an enlarged scale a mag-

netizable element adapted to be driven by a roll of the mill and which element constitutes a driving element for both indicating elements.

Referring now to the drawings in detail,—1 and 2 designate respectively the upper and lower rolls of a rolling mill to which our device is applied. It is to be understood, however, that the device forming the subject-matter of this invention is capable of use with other than rolling mills if desired. The rolls 1 and 2 are supported for rotation in side frames 3 and are driven by an electric motor 4, the armature shaft of which carries a small spur gear 5 meshing with a large gear 6 connected in the usual way to the rolls 1 and 2 of the mill. The motor 4 receives its current from a source of electrical supply 7, the circuit for the motor being controlled by the usual switch 8, resistance 9 having been provided in the motor circuit as is customary. The metal to be rolled is conveniently supported on brackets 10 at one side of the machine, the metal here having been designated 11. As pointed out above, however, it is to be understood that the present invention is not to be limited to the application of our improved device to a mill of this character for rolling metal as obviously the device is applicable to other types of machines.

Supported by one of the side frames 3 is a casing 12, this casing being supported by brackets 13 and 14 immediately above the upper roll 1 of the mill. Carried within the casing 12 at the upper part thereof in the present instance, are indicating elements 15 and 16 respectively, the indicating element 15 being adapted to register or indicate the peripheral travel of the roll 1 while the indicating element 16 is adapted to register or indicate the amount of material, that is to say metal 11, passed between the rolls 1 and 2. Inasmuch as the particular type of indicating element, 15 or 16 as the case may be, does not form any part of the present invention we have deemed it unnecessary to show the details of construction thereof, inasmuch as any of the well-known forms of indicator now on the market are adapted for use in connection with our device.

Within the casing 12 and supported by a bracket 17 therein is a rotatable, magnetiza-

ble element 18 shown on an enlarged scale in Fig. 4. This element is adapted to engage or be engaged by the upper mill roll 1 and is provided for the purpose of driving the indicating elements 15 and 16. This element is wired as indicated at 19 and receives current from the source of power 7 in a manner which will be hereinafter pointed out. The element 18 is provided with a shaft 20 mounted in bearings 21 and 22 in the bracket 17, this shaft carrying at one end a rotatable member 23 cooperating with contacts 24 and 25 and carrying at its other end a bevelled gear 26. The gear 26 is in constant mesh with a bevelled gear 27 mounted upon a vertically extending shaft 28, this shaft being adjustable vertically, relative to a vertically extending shaft 29 in alinement therewith and carrying adjacent its upper end bevelled gears 30 and 31. The gear 30 meshes with a bevelled gear 32 carried upon a shaft 33, this shaft carrying one portion of a cone-clutch 34 presently to be described. The gear 31 is in constant mesh with the bevelled gear 35 carried upon a shaft 36, the latter constituting a driving or actuating means for the indicating element 15. The clutch 34 already referred to, comprises two portions 37 and 38, the member 37 being rigidly mounted upon the shaft 33 already referred to, while the member 38 is mounted upon and has longitudinal movement relative to a shaft 39 connected to the indicating element 16 and adapted to drive the same. The clutch is electrically operated, being provided with a winding 40 which when energized will cause the member 38 to move into clutching position relative to the member 37 so that if at that time the gear 32 and therefore the shaft 33 be rotating the shaft 39 will be driven to drive the indicating element 16. The winding 40 of the clutch 34 is adapted to receive current from the source of supply 7 and for this reason is provided with contacts 41 and 42 and collector rings 43 and 44.

The element 18 is adapted to be adjusted with respect to the casing 12 vertically thereof, being secured to the casing by members 45 passing through slots 46 in the bracket 17. This adjustment is provided so that the element 18 may always be in engagement with the mill roll 1. As heretofore pointed out the shafts 28 and 29 are adjustable relative to each other, being coupled together at 47 so that when the bracket 17 is adjusted either up or down the shaft 28 will be carried with it. This ensures that the gear trains will always be in mesh and the indicating elements 15 and 16 driven.

The wiring for our device is indicated in Fig. 1 from which it will be seen that the motor 4 receives its current from a supply 7 when the switch 8 is closed, the current passing through the motor from the plus side of the line by way of conductor 48, resistance 9,

initially, conductor 50 through the motor, conductor 51, winding 52 of a relay 53, conductor 54 to the minus side of the line. The closing of the switch 8 also closes a circuit to the winding 19 of the magnetizable element 18, this circuit being from the plus side of the line by way of connectors 55 and 56, contact 24, collector ring 23, contact 25, conductor 57, winding 52 of the relay 53, conductor 54, to the minus side of the line. The winding 19 being energized, the element 18 will adhere to the roll 1 of the rolling mill so that the latter will drive the former and through the gears 26, 27, 30 and 31 drive the indicating element 15. The circuit for the winding 40 of the clutch 34 is at this time open and therefore the indicating element 16 is not functioning. As soon, however, as the metal 11 is fed to the rolling mill, the increased load on the motor 4 will cause the latter to draw an increased current from the line so that the winding 52 of the relay 53 will be sufficiently energized to cause the relay 53 to function and lift a contact 58 into position to bridge stationary contacts 59 and 60. A circuit for the winding 40 of the clutch 34 will now be closed, which circuit may be traced as follows: from the plus side of the line 7 by way of conductors 48, 55, 61, 62 through the winding 40, conductor 63, contacts 59, 58 and 60, and conductor 64 to the minus side of the line. The energization of the winding 40 will cause the member 38 of the clutch 34 to travel into clutching position relative to the clutch member 37 so that the indicating element 16 will now be driven also to register the amount of material passed through the mill, the drive for this indicating element being from the shaft 20, gears 26 and 27, shafts 28 and 29, gears 30 and 32, through the clutch 34 to the indicating element. The relay 53 will maintain its contact 58 in position to bridge the contacts 59 and 60 so long as the extra load on the motor 4 due to the strip 11 passing through the mill is maintained, but as soon as the strip has passed entirely through the mill and the load is therefore relieved on the motor 4, the relay 53 will automatically drop this contact 48 to open the circuit of the winding 40 of the clutch 34 so that although the rolling mill may continue to be driven the indicating element 16 will not function while the indicating element 15 will continue to function, to register or indicate the peripheral travel of the mill roll 1.

From the foregoing it will be seen that we have provided a device adapted to be applied to a mill, which device is capable of registering the travel of a moving part of the mill and which device is also capable of registering the amount of material passed through the mill, the indicating element for registering the travel of the moving

part of the mill, however, being operable independently of the other indicating element. This results in a device which is capable at all times of registering the travel of some moving part of the mill and also one capable of registering the amount of material passed through the mill when the same is in operation.

It will be apparent also that we have provided a device of the character described in detail wherein the indicating element for registering the amount of material passed through the mill is under the control of the motor by which the mill is driven and is automatic in its operation.

It will be obvious also that means have been provided for driving the indicating element whereby no slippage will occur between the mill roll and the element driven thereby which in turn drives the indicators, so that the indicators will always register accurately.

It is to be understood that while we have illustrated herein a particular embodiment of our invention, we are not to be limited to the exact details of structure so illustrated and herein described as obviously changes may be made herein within the purview of our invention.

This application is a division of our co-pending application, Serial No. 415,512, filed October 8, 1920.

What is claimed as new is:

1. An indicator comprising an indicating element, a drive shaft, a magnetizable device for driving said shaft, and an electrically operated clutch for connecting the indicating element to the drive shaft.

2. An indicator comprising an indicating element, a drive shaft, a permanent connection between said indicating element and drive shaft, a second indicating element driven from said drive shaft, and an electrically operated clutch for connecting the last-named indicating element to the drive

shaft, the first-mentioned indicating element functioning while the driving means for the drive shaft are in operation, the second indicating element functioning only when there is a load on the machine to which the indicator is applied.

3. An indicator, comprising indicating elements, a drive shaft, permanent connections between said drive shaft and one of said indicating elements, an electric clutch for connecting the other of said indicating elements to said drive shaft, a magnetizable device for connecting said drive shaft to the driving means for said indicating elements, said clutch and magnetizable device receiving their energy from a common source.

4. In an indicating device, the combination of an indicating element, a drive shaft therefor, an electric clutch for clutching the indicator to the drive shaft, and an automatically controlled and operated relay for controlling the energization of said clutch.

5. In an indicating device adapted to be attached to a mill the combination of a magnetizable device the circuit of which is controlled by the mill and which device when energized is clutched to the mill, a drive shaft operatively connected to said magnetizable device, an indicating element having a permanent connection to said drive shaft and constantly driven thereby, a second indicating element adapted to register the amount of material passing through said mill, an electrically operated and controlled clutch for clutching the last-mentioned indicator to said drive shaft, said clutch being operable only when material is passing through said mill.

This specification signed this 20th day of Dec., 1921.

AUGUST SUNDH.

This specification signed this 5th day of Dec., 1921.

WILLIAM WESTERMAN.