May 2, 1961 E. K. BASTRESS ET AL 2,982,531

AUTOMATIC FEEDING AND HEAT TREATING APPARATUS

Filed March 28, 1955 3 Sheets-Sheet 1

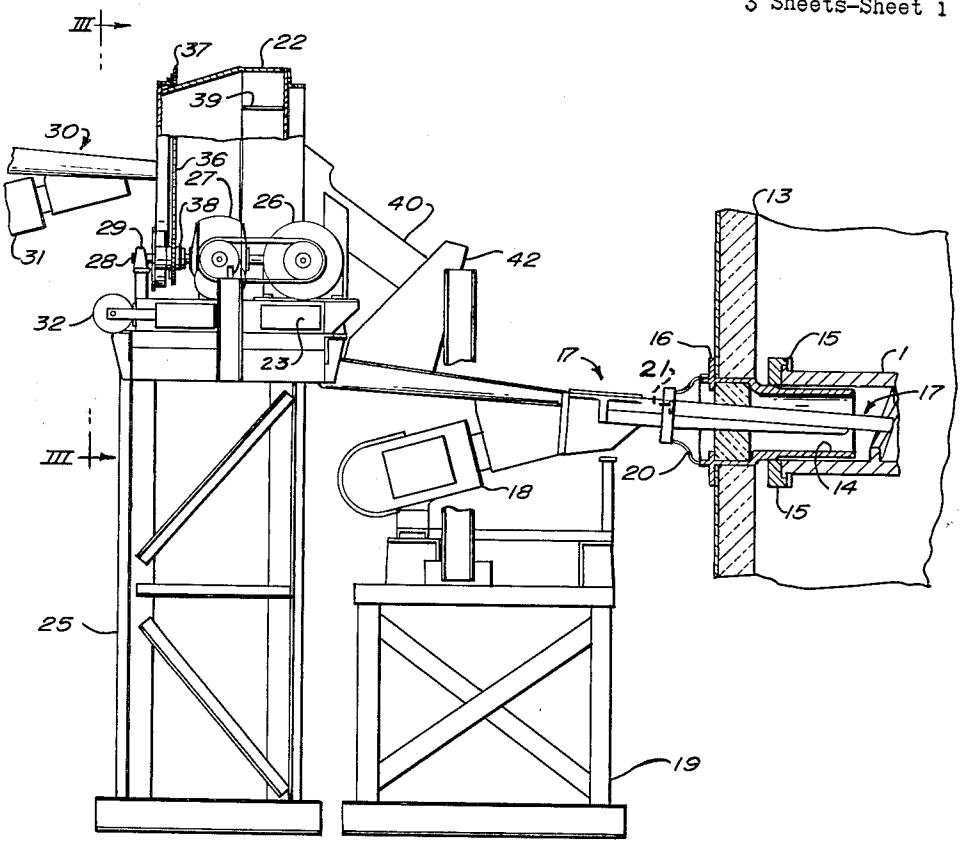


Fig. II

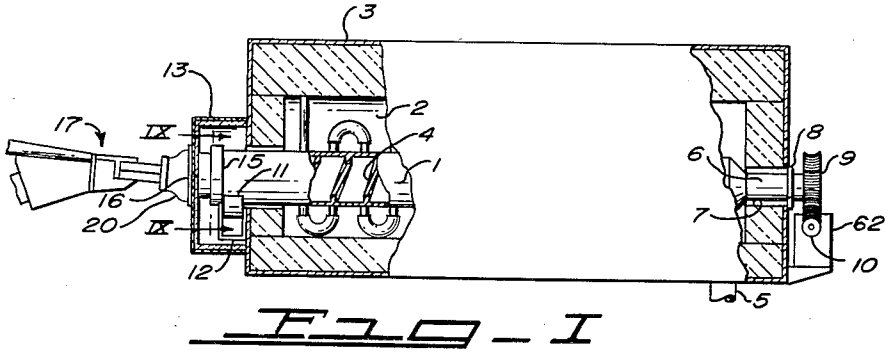


Fig. I

INVENTORS
ERNEST K. BASTRESS
CLARKE C. SYKES
BY ERNEST W. WEAVER
Charles N. Haughey
ATTORNEY

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AUTOMATIC FEEDING AND HEAT TREATING APPARATUS

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3 Sheets-Sheet 2

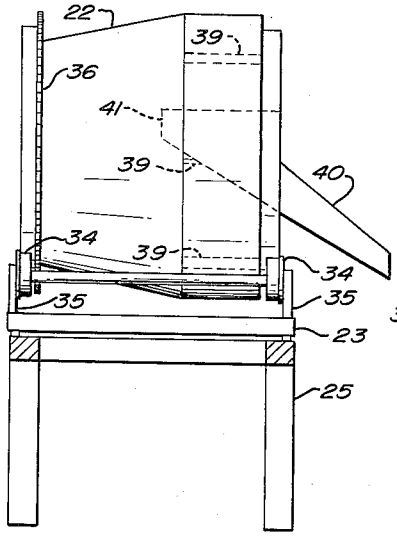


Fig. IV

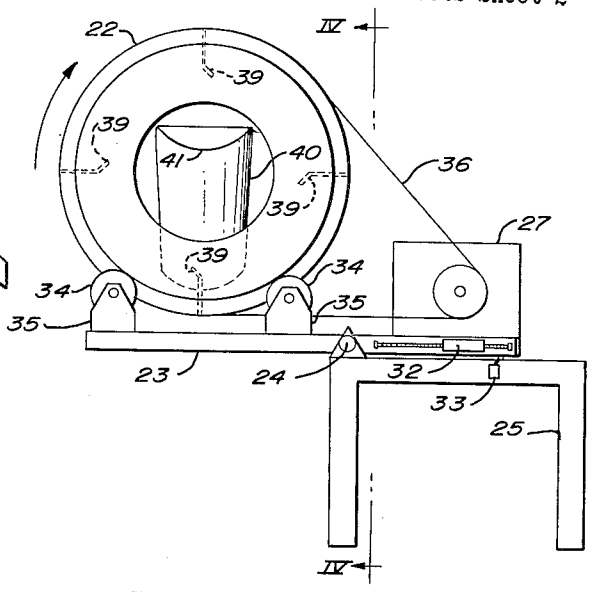


Fig. III

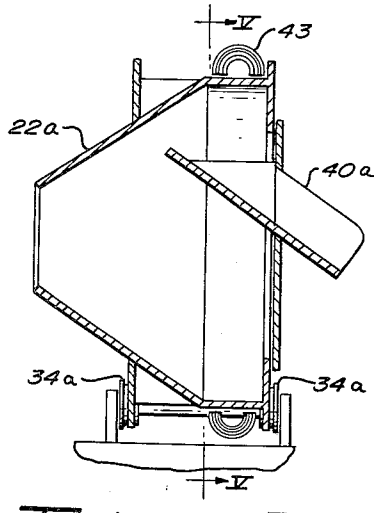


Fig. VI

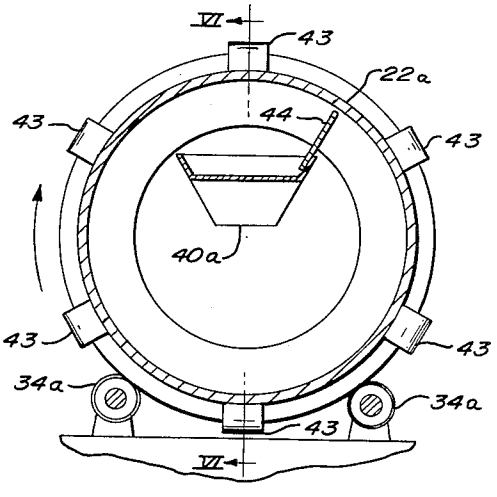


Fig. V

INVENTORS
ERNEST K. BASTRESS
CLARKE C. SYKES
BY ERNEST W. WEAVER

Charles J. Haughey
ATTORNEY

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AUTOMATIC FEEDING AND HEAT TREATING APPARATUS

Filed March 28, 1955 3 Sheets-Sheet 3

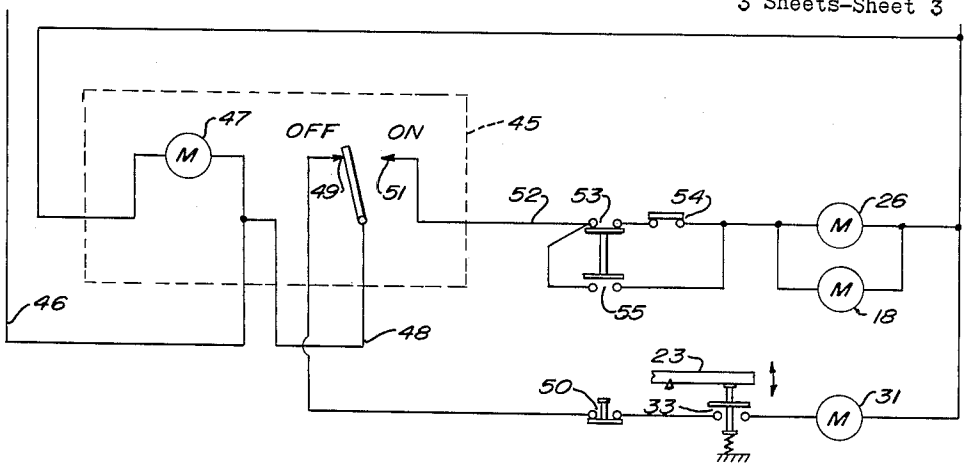


Fig. VII

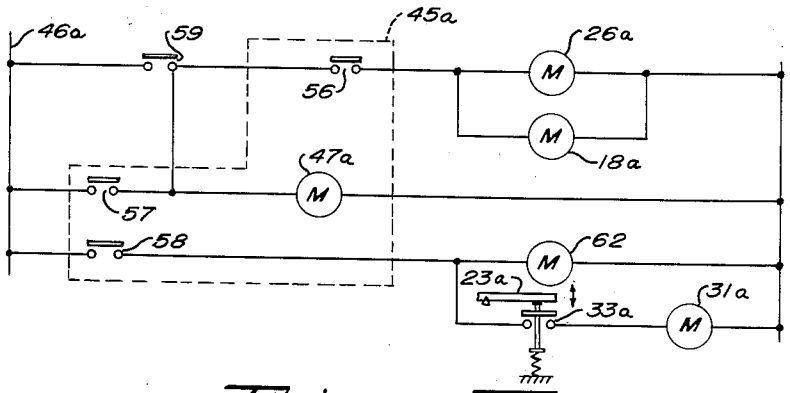


Fig. VIII

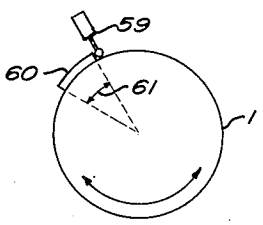


Fig. IX

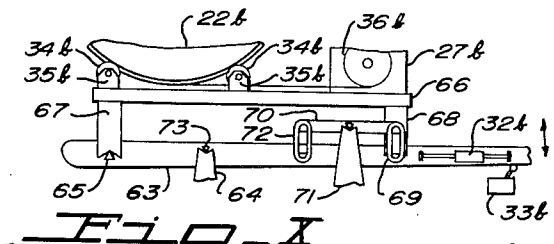


Fig. X

INVENTORS
ERNEST K. BASTRESS
CLARKE C. SYKES
BY ERNEST W. WEAVER

Charles S. Haughey
ATTORNEY

United States Patent Office

2,982,531

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AUTOMATIC FEEDING AND HEAT TREATING APPARATUS

Ernest K. Bastress, Clarke C. Sykes, and Ernest W. Weaver, Toledo, Ohio, assignors, by mesne assignments, to Midland-Ross Corporation, Cleveland, Ohio, a corporation of Ohio

Filed Mar. 28, 1955, Ser. No. 497,222

11 Claims. (Cl. 263—33)

This invention relates to apparatus for automatically feeding relatively small size articles to equipment requiring accurately metered charges.

Equipment of the type to which this invention is especially applicable are continuous furnaces having conveying means such as rotating retorts, belts, rotating hearths, vibrating hearths and gravity feeds. Such equipment may require both controlled rates of charging in regular cycles and accurately metered charges.

The principal object of this invention is to provide a device by means of which an efficient automatic process for feeding, at controlled rates and in regular cycles, accurately metered charges of relatively small size articles may be carried on.

Another object of this invention is to provide apparatus by means of which an efficient continuous heat treating process may be carried on.

More specific objects and advantages are apparent from the following description, in which reference is had to the accompanying drawings illustrating preferred embodiments of the invention.

Figure I of the drawings is a side elevational view, partly in vertical longitudinal section, of a heat treating furnace.

Figure II is a side elevational view, partly in vertical section, of apparatus for automatically feeding relatively small size articles, at controlled rates and in metered charges, to the heat treating furnace shown in Figure I, an enlarged, fragmentary sectional view of which furnace is illustrated in the right hand portion of Figure II.

Figure III is a diagrammatic end elevational view of the drum and its support as seen from the line III—III of Figure II.

Figure IV is a side elevational view as seen from the line IV—IV of Figure III.

Figure V is a vertical sectional view taken along the line V—V of Figure VI showing a second embodiment of the drum illustrated in Figures III and IV.

Figure VI is a vertical sectional view taken along the line VI—VI of Figure V.

Figure VII is an electrical wiring diagram of a circuit used in controlling the feeding of metered charges to the furnace shown in Figure I while the horizontally disposed furnace tube is rotating.

Figure VIII is an electrical wiring diagram of a circuit used in controlling the feeding of metered charges to the furnace shown in Figure I while the horizontally disposed furnace tube is stopped.

Figure IX is a diagrammatic view of the furnace tube as seen from the line IX—IX of Figure I showing a cam used in stopping the tube during the feeding of a metered charge. Also, the cam may be on a shaft outside the furnace.

Figure X is a diagrammatic view of lever mechanism which may be substituted for the lever mechanism shown in Figure III.

These specific drawings and the specific description that

follows merely disclose and illustrate the invention, and are not intended to impose limitations upon the claims.

Apparatus for automatically feeding relatively small size articles to equipment requiring accurately metered charges includes lever mechanism, a load receiver carried by the lever mechanism and adapted to rotate for discharging articles contained therein, and circuit means controlled by the lever mechanism for signalling when the load receiver contains a specified load.

In the apparatus disclosed in the drawings, articles to be heat treated are heated while being advanced in a horizontal direction along a helical passageway within a rotatable conveyor tube 1 (Figure I) extending longitudinally in a heating chamber 2 defined by a refractory lining within a substantially gas tight metal casing 3. The helical passageway is formed by a helical rib 4 in the conveyor tube 1. During the heat treating process, the conveyor tube 1 is rotated back and forth, whereby the articles to be heat treated are moved back and forth with a net advance. The heated articles are discharged from the conveyor tube 1 through a ring of holes in the tube at a point above a chute 5 which extends through the bottom wall of the heating chamber and into a quench tank (not shown).

At its discharge end, the tube 1 is supported by a stub shaft 6 which is supported on an underlying roller bearing 7 mounted in an opening in the adjacent end wall of the heating chamber 2, the exterior side of the opening being sealed substantially gas tight by a collar 8 mounted on the shaft. A worm wheel 9 is keyed on the stub shaft 6 to oscillate the conveyor tube 1 and the wheel is driven by a power driven worm 10.

The charge or article receiving end of the conveyor tube 1 extends through an opening in the front wall of the heating chamber 2 and is supported for free axial movement due to thermal expansion on roller bearings 11 mounted on a supporting stand 12. A gas tight seal is formed about the projecting end of the tube 1 by a box-like casing 13 extending from the front end wall of the heating chamber. The article receiving end of the conveyor tube 1 closely surrounds but does not touch a stationary tube 14, shown in enlarged detail in Figure II, extending through an opening in the front wall of the casing 13. The front end of the conveyor tube 1 has a surface turning on a bearing 15 mounted on the tube 14 to form a gas tight seal. The bearing 15 is slidably mounted on the tube 14 for axial movement to accommodate thermal expansion and contraction of the conveyor tube 1. The exterior side of the opening in the casing 13 surrounding the tube 14 is sealed substantially gas tight by a collar 16 mounted on the tube.

Article transfer mechanism of any preferred kind such as an ordinary vibrator 17, driven by a motor 18 suitably mounted on a frame 19, extends through the stationary tube 14 and into the front end of the conveyor tube 1. Asbestos fire cloth 20 provides a flexible and substantially gas tight seal around the vibrator 17 adjacent the front wall of the casing 13. Since gas of controlled composition is used to envelop the articles being heated in the conveyor tube 1, a hinged flap valve 21 (Figure II) is provided to reduce the effective discharge area when the valve is pushed open by the downcoming articles being fed into the furnace.

Accurately metered charges are fed automatically into the furnace at controlled rates and in regular cycles, the particular rate, cycle and amount of the charge depending on such varied factors as the type of article, weight charged per hour and the furnace cycle. The apparatus for feeding includes a load receiver or metering drum 22 carried on lever mechanism having one arm of a lever 23 fulcrumed at 24 on a frame stand 25. The other arm of

the lever 24 carries, and is counterbalanced at least in part by, a motor 26 and a gear reducer 27 turning a drive shaft 28 journaled in a pillow block 29 also carried by the arm of the lever. Work, later to be charged into the furnace, is fed into the drum 22 either manually or by any preferred type of loading device such as an ordinary vibrator 30 (Figure II), driven by a suitably mounted motor 31, until a predetermined weight is reached as set by a poise 32 on the lever 23. The loading device or vibrator 30 should have a relatively narrow discharge chute to minimize the number of articles that could over-balance when the motor 31 is stopped and drop into the drum 22 as excess weight. When the drum 22 contains a specified load, the drum and its lever arm move downwardly and allow opening of a limit switch 33 which either operates a signal warning the operator manually feeding work into the drum 22 or shuts off current to the motor 31 of the vibrator 30.

The metering drum 22 is mounted for rotation on four flanged rollers 34 rotatably mounted in brackets 35 fixed to one arm of the lever 23. The drum 22 is rotated to discharge the specified load of articles contained therein into the vibrator 17 for transfer into the furnace. Rotation of the drum 22 is caused by the turning of a chain 36 extending in a looped path around a gear 37 on one end of the drum and around a drive gear 38 on the shaft 28. As specifically disclosed, the load receiver 22 is shown in the form of a drum rotatable about a generally horizontal axis, as indicated by the arrow in Figure III. However, the load receiver 22 could be in other forms such as a bucket or hopper rotatable about a generally horizontal axis either generally parallel or perpendicular to the axis of rotation of the drum 22.

In addition to delivering a measured load from the drum 22 according to the adjustable weight setting of the poise 32 on the lever 23, another feature of the feeding apparatus is in the way which said measured load is delivered without jamming the vibrator 17 which is especially susceptible to such jamming at the flap valve 21 when irregularly shaped articles are being fed into the furnace. The actual time cycle during which the load is delivered from the drum 22 may be controlled by the speed of rotation of the drum and by the length of time that the drum is permitted to rotate.

To prevent jamming of the vibrator 17, a plurality of vanes 39 are mounted on the inner periphery of the drum 22 for depositing articles contained in the drum, during rotation of the drum, in limited numbers at one time onto a stationary discharge chute 40 extending into the drum. When the drum 22 is rotated, articles in the drum are picked up in limited numbers by the vanes 39, directed toward the chute 40, and dropped onto a surface 41 of the chute having an arcuate shape to discourage the hanging up of irregularly shaped articles. When the discharge end of the chute 40 is high above the vibrator 17, a baffle plate 42 is provided to guide articles discharged from the drum 22 onto the vibrator 17.

A second embodiment of the means for depositing articles contained in the drum in limited numbers at one time onto the discharge chute during rotation of the drum is shown in Figures V and VI. This modification is especially useful in avoiding possible harmful dropping of the articles onto the discharge chute. A plurality of permanent magnets 43 are mounted in spaced apart relationship on a non-magnetic drum 22*a*, the holding power of which magnets are adjusted by shimming away from the drum, and hold articles in the drum against its inner surface. When the drum 22*a*, which may be made of ferrous metal, is rotated on rollers 34*a* clockwise as indicated by the arrow in Figure V, a stationary stripper plate 44 scrapes the articles from the inner periphery of the drum into a stationary discharge chute 40*a*.

The conveyor tube 1 oscillates at a constant rate with a net advance. The advance on each complete oscillating cycle is controlled by an adjustable clock-timing of the advance and the reverse of the motor driving the worm 10 (Figure I). As the heated articles move in a horizontal direction along the helical passageway within the conveyor tube 1, that flight or space between a spiral of the helical rib 4 adjacent the article receiving end of the conveyor tube 1 becomes empty and must be regularly refilled to maintain an efficient continuous heat treating process. In order to provide a feeding cycle which will deliver the measured load from the metering drum 22 in a cycle resulting in uniform loading of the furnace, the feeding apparatus is provided with either an electrical control circuit as shown in Figure VII or a circuit as shown in Figure VIII, the use of either circuit affording the choice of a variety of metered loads to the furnace.

When used on a rotating retort furnace of the type shown in Figure I, except for time required for loading the metering drum 22, the furnace tube 1 may be charged continuously, or it may be charged only on the forward rotation of the conveyor tube 1, or only when the conveyor tube is stopped. If the volume of work loaded per flight in the tube 1 is more than can be handled in the metering drum at one time, several charges may be made per flight through the proper setting of the electrical controls. The electrical controls include a two-phase timer 45 (Figure VII) having "Off" indicia for drum loading and "On" indicia for furnace loading. The "Off" indicia are used in controlling the vibrator 30 for loading the metering drum 22. If the drum is manually loaded the timer is used for signalling the operator. It is set for not less than the maximum time allowed for filling the metering drum 22. The "On" indicia are used in controlling the metering drum 22 and the vibrator 17 which operate together. The timer is set for the time allotted for feeding the articles into the furnace which will vary with the type of articles, pounds charged per hour, furnace cycle, etc. The limit switch 33 normally stops the motor 31 driving the vibrator 30 or signals the operator manually loading the drum 22 when the weight set on the scale beam is in the drum. However, if sufficient weight is not in the drum 22 at the end of the period set on the "Off" indicia on the timer 45, the timer will stop the loading and the articles in the drum will feed into the furnace retort or tube 1 by means of the vibrator 17 to maintain the proper cycle. In other words, the first timer setting, the "Off" setting, permits automatic transfer of specified amounts of articles from work handling apparatus into the rotatable metering drum 22. The second timer setting, the "On" setting, regulates the feeding cycle to the furnace of the drum 22 and the vibrating transfer mechanism 17 that operate as a single unit.

Referring to Figure VII, when the feeding apparatus is to be operated, current flows through a lead 46 to energize a timer motor 47 and then flows to the other side of the line. The current from the lead 46 also flows through a lead 48, "Off" timer contacts 49, push button contacts 50, and through the contacts of the limit switch 33 controlled by the lever 23 to energize the motor 31 driving the vibrator 30. If the drum 22 is being manually loaded a signal light or bell to warn the operator may be substituted for the motor 31. The push button contacts 50 are opened when the loading device is permanently shut off in order to clear the furnace. Thus, both the "Off" timer contacts 49 and the contacts of the limit switch 33 control loading of the drum 22, i.e., the motor 31 driving the vibrator 30 feeding articles into the drum 22 is stopped either by the opening of the contacts of the limit switch 33 operated by the lever 23 or by the opening of the "Off" timer contacts 49.

After the "Off" timer contacts 49 which are set for not less than the maximum time allowed for filling the drum 22 open, the "On" timer contacts 51 close and current flows through a lead 52, upper push button contacts 53 and through relay contacts 54 closed on forward rotation of the conveyor tube 1 to energize both the motor 18 driv-

ing the vibrator 17 and the motor 26 rotating the metering drum 22. When the contacts 53 and 54 are closed, as indicated in Figure VII, unloading of the drum 22 resulting in loading of the conveyor tube 1 takes place only during forward rotation of the conveyor tube 1. However, the relay contacts 54 may be bypassed by moving the push button controlling the upper contacts 53 permitting current to flow through the now closed lower contacts 55 of the push button. This results in continuous charging of the furnace tube 1, except for the time required for loading the metering drum 22.

An example cycle for automatically feeding articles into the conveyor tube 1 is as follows: The conveyor tube 1 may be rotated forward 180 degrees then back 165 degrees forty-eight times or cycles per hour. Since 15 degrees of forward rotation are gained per cycle, this results in two complete 360 degree revolutions per hour causing a demand for the loading of a flight in the conveyor tube 1 every one-half hour so that each article to be heat treated receives the same through time. The timer 45 could then be set for three minutes "On" (contacts 51 closed) and twenty-seven minutes "Off" (contacts 49 closed) to give an optimum load every one-half hour per flight. During the "Off" time of the timer 45, the metering drum 22 loads until the contacts of the limit switch 33 controlled by the lever 23 open when the drum 22 contains a specified load stopping the motor 31 driving the vibrator 30. Then, during the "On" time of the timer 45, the furnace feed starts, i.e., the motor 18 driving the vibrator 17 and the motor 26 rotating the drum 22 start and continue to run until shut off by the timer 45.

In addition to being charged continuously, except for time required for loading the metering drum 22, or to being charged on the forward rotation of the conveyor tube 1, the conveyor tube may be charged when it is stopped. Referring to Figures VIII and IX, a timer 45*a* having three sets of contacts 56, 57 and 58 operates when current flows through a lead 46*a* and through the contacts of a limit switch 59, closed when moved to the right, as viewed in Figure IX, by a cam 60 attached to the periphery of the oscillating conveyor tube 1 and wide enough to form an angle 61 greater than the angle of forward rotation of the tube less the angle of backward rotation, to energize a timer motor 47*a*. Energization of the timer motor 47*a* closes timer contacts 56 and 57 and opens timer contacts 58 during the first timing period. Closing of the timer contacts 57 bypasses the contacts of the limit switch 59. Closing of the timer contacts 56 energizes a motor 18*a* driving a vibrator corresponding to the vibrator 17 and energizes a motor 26*a* rotating a metering drum corresponding to the metering drum 22 feeding articles into the conveyor tube 1 which tube is stopped, since the now open timer contacts 58 prevent current from flowing to a conveyor tube drive motor 62. During the second timing period, the timer contacts 56 open shutting off current to the motors 18*a* and 26*a*, the timer contacts 57 remain closed continuing the bypassing of the contacts of the limit switch 59, and the timer contacts 58 close energizing both the conveyor tube drive motor 62 and a motor 31*a* driving a vibrator corresponding to the vibrator 30. Energization of the motor 62 starts oscillation of the conveyor tube 1 and operation of the vibrator loads a drum corresponding to the metering drum 22 until current is shut off to the motor 31*a* by the opening of the contacts of a limit switch 33*a* controlled by a lever 23*a*.

Counterclockwise rotation of the conveyor tube 1, as viewed in Figure IX, causes the cam 60 to open the limit switch 59. The timer contacts 56 remain open, the timer contacts 57 remain closed, and the timer contacts 58 remain closed during resetting of the timer 45*a*. When timed out, timer contacts 56 remain open, timer contacts 57 open, and timer contacts 58 remain closed. Opening of the contacts of the limit switch 59 and the opening of the timer contacts 57 cuts off current to the timer motor 47*a*, current was already cut off to the motors 18*a* and 26*a* by the opening of the timer contacts 56, and current continues to flow through the closed timed out timer contacts 58 keeping the conveyor tube drive motor 62 energized. The continued energization of the drive motor 62 keeps the conveyor tube 1 rotating back and forth until the cam 60 again moves the limit switch 59 to the right closing the limit switch 59 and energizing the timer motor 47*a* to repeat the foregoing cycle.

The foregoing described lever mechanism including the balancing type lever 23 is satisfactory for most installations even though variations in the positioning of the articles in the drum 22 changes the leverage and may cause some variations in the weight of the measured loads fed into the drum. In cases where it is desired to have no change in the leverage due to variation of the positioning of the articles in the drum, a form of lever mechanism shown in Figure X may be substituted for the lever mechanism shown in Figure III.

The lever mechanism shown in Figure X includes a lever 63 fulcrumed upon a bearing-supporting bracket 64 and having two load pivots 65, one for each corner at the left hand end of a platform 66. Each of the load pivots 65 directly carries a platform support 67. Platform supports 68 are hung from parallel links 69 depending from one arm of an equal arm lever 70 which is fulcrumed upon a bearing-supporting bracket 71. The other arm of the lever 70 supports a second pair of parallel links 72 pivotally connected to the lever 63. Loads placed upon the platform 66 cause the right hand end of the platform to move downwardly, as viewed in Figure X, causing in turn an upward movement of the right hand end of the lever 63, as indicated by the arrow in Figure X. The platform 66 is fixed against sidewise movement by means of the load pivots 65 and pivots 73 cooperating with the bearing in the bracket 64 and arcuate movement of the platform 66 is accommodated by the parallel links 69 and 72.

A metering drum 22*b* is mounted for rotation on four rollers 34*b* rotatably mounted in brackets 35*b* fixed to the platform 66. The drum 22*b* is rotated to discharge a specified load of articles contained therein by means of a turning chain 36*b* extending in a looped path around a gear on one end of the drum and around a drive gear on a shaft turned by a gear reducer 27*b* also fixed to the platform 66. Articles, later to be charged into the furnace, are fed into the drum 22*b* until a predetermined weight is reached as set by a poise 32*b* on the lever 63. When the drum 22*b* contains a specified load, the end of the lever 63 above a limit switch 33*b* moves upwardly and allows the limit switch to open.

The embodiments of the invention herein shown and described are to be regarded as illustrative only and it is to be understood that the invention is susceptible to variation, modification, and change within the spirit and scope of the subjoined claims.

What is claimed as new is:

1. In automatic feeding and heat treating apparatus, in combination, automatically operable means for supplying articles of relatively small size to be heat treated, a device for dividing such articles into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive articles from said means for supplying articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means activated upon loading into said drum a lot of articles to a predetermined weight of articles for interrupting the operation of said means for supplying articles to said drum, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such

articles out of such drum, a vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said vibratory conveyor.

2. In automatic feeding and heat treating apparatus, in combination, automatically operable means for supplying articles of relatively small size to be heat treated, weighing mechanism having a load receiver to receive articles from said means for supplying articles, said load receiver consisting of a drum revoluble upon a horizontal axis and having axial openings in opposite sides, adjustable load counterbalancing means operatively connected to said load receiver for selecting a predetermined weight, means activated upon loading of said load receiver with a lot of such articles to said predetermined weight for interrupting the operation of said means for supplying articles, means for successively discharging portions of such lot from said load receiver, conveyor mechanism to receive articles so discharged and a heat treating furnace into which said articles are fed by said conveyor mechanism.

3. In automatic feeding and heat treating apparatus, in combination, a vibratory conveyor for supplying articles of relatively small size to be heat treated, a device for dividing such articles into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive articles from said means for supplying articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means activated upon loading into said drum a lot of articles to a predetermined weight of articles for interrupting the operation of said vibratory conveyor, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such articles out of such drum, a second vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said second vibratory conveyor.

4. In automatic feeding and heat treating apparatus, in combination, automatically operable means for supplying articles of relatively small size to be heat treated, a device for dividing such articles into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive articles from said means for supplying articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means activated upon loading into said drum a lot of articles to a predetermined weight of articles for interrupting the operation of said means for supplying articles to said drum, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such articles out of such drum, a vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said vibratory conveyor, said furnace having a conveyor tube for moving articles therethrough.

5. In automatic feeding and heat treating apparatus, in combination, automatically operable means for supplying articles of relatively small size to be heat treated, a device for dividing such articles into lots of predetermined and uniform weight, said device comprising weighing mechanism having a drum revoluble upon a horizontal axis and having an opening in its side to receive articles from said means for supplying articles, adjustable load counterbalancing means operatively connected to said drum for selecting paid predetermined weight, means activated upon loading of said drum with a lot of such articles to said predetermined weight for interrupting the operation of said means for supplying articles, means for successively discharging portions of such lot from said drum, conveyor mechanism to receive articles so discharged and a heat treating furnace into which said articles are fed by said conveyor mechanism, said furnace having a conveyor tube for moving articles therethrough.

6. In automatic feeding and heat treating apparatus, in combination, a vibratory conveyor for supplying articles of relatively small size to be heat treated, a device for dividing such articles into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive articles from said means for supplying articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means activated upon loading into said drum a lot of articles to a predetermined weight of articles for interrupting the operation of said vibratory conveyor, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such articles out of such drum, a second vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said second vibratory conveyor, said furnace having a conveyor tube for moving articles therethrough.

7. In automatic feeding and heat treating apparatus, in combination, a device for dividing articles of relatively small size to be heat treated into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive articles from said means for supplying articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means activated upon loading into said drum a lot of articles to a predetermined weight of articles to transmit a signal for interrupting the supplying of articles to said drum, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such articles out of such drum, a vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said vibratory conveyor.

8. In automatic feeding and heat treating apparatus, in combination, a device for dividing articles to be heat treated into lots of predetermined and uniform weight, said device comprising weighing mechanism having a drum revoluble upon a horizontal axis and having an opening in one side thereof to receive articles of relatively small size to be heat treated, adjustable load counterbalancing means operatively connected to said drum, means activated upon loading of said drum with a lot of such articles to said predetermined weight to transmit a signal for interrupting the supplying of articles to said weighing mechanism, a series of baffles within said drum for successively discharging portions of such lot from said drum, conveyor mechanism to receive articles so discharged and a heat treating furnace into which said articles are fed by said conveyor mechanism.

9. In automatic feeding and heat treating apparatus, in combination, a device for dividing articles of relatively small size to be heat treated into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a drum revoluble upon a horizontal axis, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, means for periodically interrupting the operation of said means for supplying articles to said drum, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation of said drum to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped and to take such articles out of such drum,

a conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said conveyor.

10. In automatic feeding and heat treating apparatus, in combination, a device for dividing articles of relatively small size to be heat treated into lots of uniform weight, said device comprising automatic lot weighing mechanism having a load receiver in the form of a revoluble drum arranged to receive such articles, lever mechanism supporting said drum, load counterbalancing means connected to said lever mechanism, a timer, means activated after a predetermined interval measured by said timer or activated upon loading into said drum a lot of articles to a predetermined weight of articles prior to the expiration of such predetermined interval to signal the interruption of supply of such articles to said load receiver, means for thereupon rotating said drum, a series of baffles within said drum acting upon rotation thereof to carry upwardly and then successively dump portions of such lot, a chute so located as to receive articles so dumped by said baffles and to take such articles out of such drum, a vibratory conveyor receiving articles from said chute, and a heat treating furnace into which such articles are fed by said vibratory conveyor.

11. In automatic feeding and heat treating apparatus, in combination, a vibratory conveyor for supplying articles of relatively small size to be heat treated, weighing mechanism having a load receiver to receive articles from said vibratory conveyor, load counterbalancing means operatively connected to said load receiver, a timer, means activated after a predetermined interval measured by said timer or activated upon loading of said load receiver with a lot of such articles to a predetermined weight prior to the expiration of such interval for interrupting the operation of said means for supplying articles, means for successively discharging portions of such lot from said load receiver, conveyor mechanism to receive articles so discharged and a heat treating furnace into which said articles are fed by said conveyor mechanism.

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