

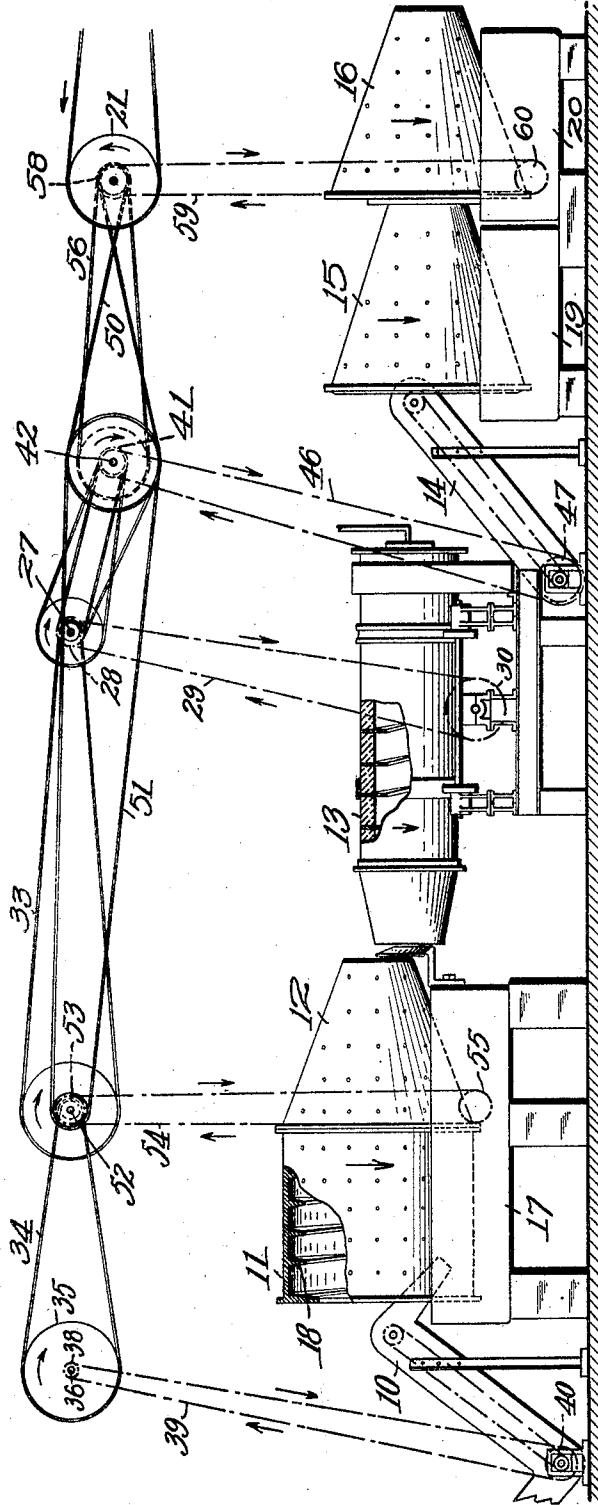
W. H. NEEDHAM.
MECHANISM FOR TREATING METAL ARTICLES.
APPLICATION FILED OCT. 20, 1919.

1,383,418.

Patented July 5, 1921.

3 SHEETS—SHEET 1.

Fig. 1.



Witness
C. F. Mason.

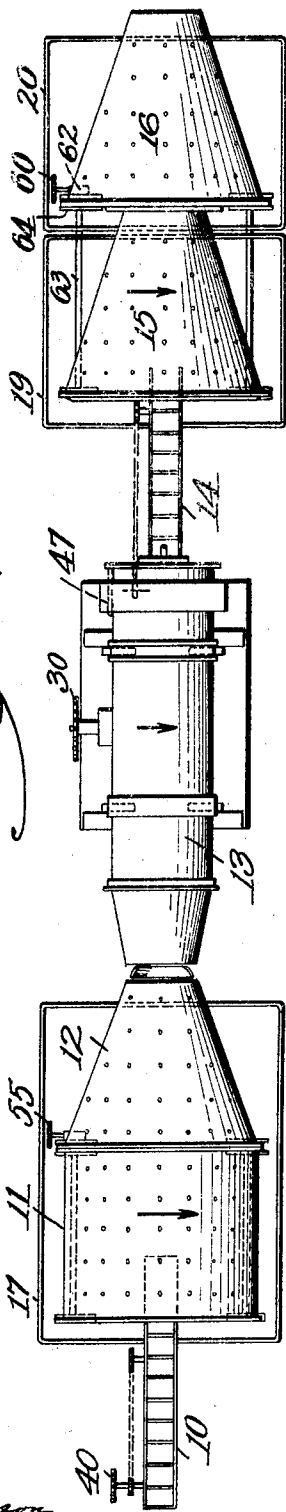
Inventor
W. H. Needham
By *attn: Messrs*
Southgate
& Southgate

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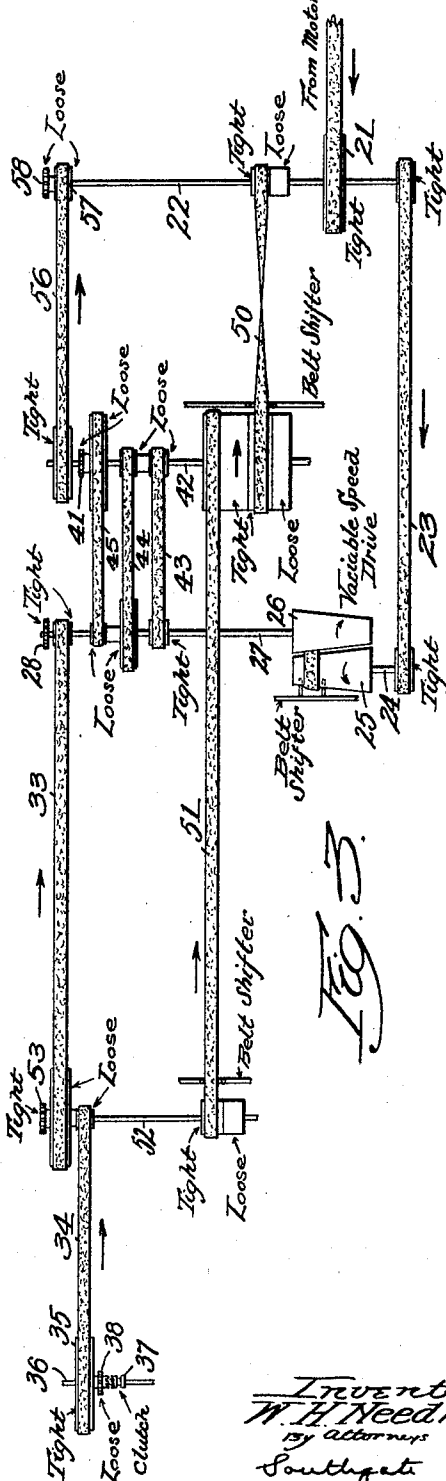
3 SHEETS—SHEET 2.

FIG. 2.



Witness
G. F. Mason.

FIG. 3.



Inventor
W. H. Needham
by Attorneys
Southgate
& Southgate

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3 SHEETS—SHEET 3.

Fig. 5.

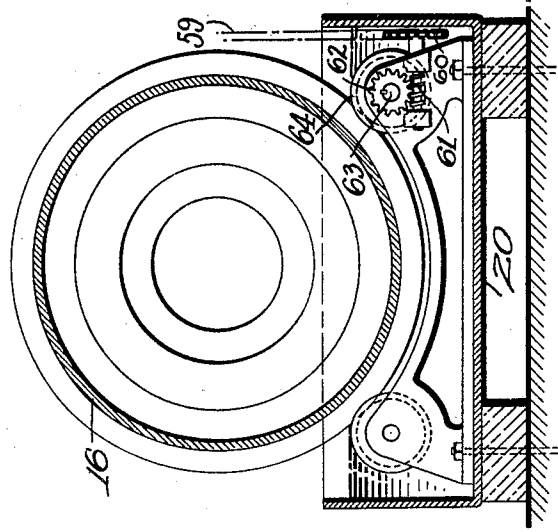
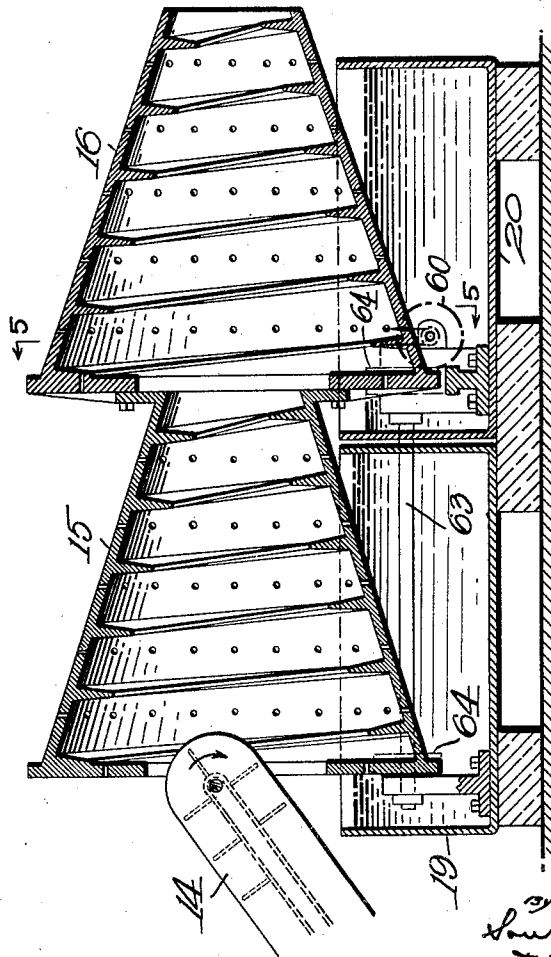


Fig. 4.



Witness
C. F. Mason.

Inventor
W. H. Needham
by attorneys
Southgate
& Southgate

UNITED STATES PATENT OFFICE.

WILLIAM H. NEEDHAM, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO BOSTON
PRESSED METAL COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MAINE.

MECHANISM FOR TREATING METAL ARTICLES.

1,383,418.

Specification of Letters Patent.

Patented July 5, 1921.

Application filed October 20, 1919. Serial No. 332,059.

To all whom it may concern:

Be it known that I, WILLIAM H. NEEDHAM, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Mechanism for Treating Metal Articles, of which the following is a specification.

This invention relates to a mechanism for treating metal articles and is particularly adapted to treating sheet metal stampings of relatively small size.

It is the general object of my invention to provide mechanism in which such articles may be subjected to a succession of operations, including one or more of the steps of cleaning, heating, cooling, and oiling, and in which the articles may be advanced for successive operations thereon without intermediate handling.

Another object of my invention is to provide feeding means for such mechanism, driven in definite speed relation to the operation of the heating furnace. My invention also relates to the provision of a variable speed drive for said furnace.

Another important feature of my invention relates to the provision of a novel rotary conical receptacle in which articles may be washed, oiled, or otherwise treated, and by which they may be thereafter elevated, drained and discharged at substantially the elevation at which they entered said receptacle.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings, in which—

Figure 1 is a side elevation of my improved mechanism;

Fig. 2 is a plan view thereof;

Fig. 3 is a diagrammatic view of the driving connections for said mechanism;

Fig. 4 is a longitudinal sectional elevation through two of the conical receptacles, and

Fig. 5 is a transverse elevation taken along the line 5—5 in Fig. 6.

Referring to the drawings, it will be seen that my improved mechanism comprises a conveyer 10, a rotary washer 11 having a conical discharge portion 12, a rotary heater or furnace 13, a conveyer 14 positioned to

receive articles discharged from said heater, and a pair of conical receptacles 15 and 16 for further treatment of the metal articles which are finally discharged from the receptacle 16.

The washer 11 rotates in a tank 17, preferably containing a solution of soda or other alkali for removing the oil and grease from the metal stampings. The washer 11 (Fig. 1) is provided with an internal helical flange 18 by which articles placed in the washer are progressively advanced toward the right to the conical discharge portion 12, which is provided with a spirally arranged internal flange, of the same construction as shown in Fig. 4, by which the metal articles are raised from the solution to a position permitting drainage and by which they are eventually discharged from the smaller open end of the receptacle.

When thus discharged they are received in a feed chamber at the end of the rotary heater or furnace 13 to which they are fed and through which they are advanced by a similar internal helical flange. Upon reaching the right hand end of the furnace they are discharged through an opening in the wall of the furnace and are then taken by the conveyer 14 to the receptacle 15, positioned above a tank 19 containing a solution by which the heated articles may be cooled without hardening.

The spiral flange in the receptacle 15 then raises and drains the articles and delivers them to the receptacle 16, positioned above a tank 20, preferably containing oil with which the articles are coated, thus preparing them for the next drawing or pressing operation. The articles are then raised, drained and finally discharged from the mechanism.

It will be noticed that the washer 11 and the conical receptacles 12, 15 and 16 are all provided with perforated side walls through which the various solutions find ingress and egress.

Considerable variation is found in the length of time required to heat different metal articles and this length of time is conveniently controlled by varying the speed of rotation of the furnace 13. It is desirable also that the rate of feed of the articles to the furnace should be definitely related to the speed at which the furnace is operated.

For this purpose I provide mechanism for driving the conveyer 10 in fixed speed relation to the rotation of the furnace 13. One form of such driving mechanism is shown in Fig. 3, which will now be described.

The power is delivered to a pulley 21 tight on a shaft 22 by a motor or other prime mover (not shown). A belt 23 connects the shaft 22 to a short shaft 24 to which is secured a cone pulley 25 cooperating with a similar cone pulley 26 to provide a variable speed drive for a shaft 27. A sprocket 28 fast on the shaft 27 is connected by a chain 29 (Fig. 1) to a sprocket 30 having a worm and worm gear connection to a shaft to which are secured rollers which support and drive the rotary furnace 13. The worm and worm gear connection is similar to that shown in the lower right hand portion of Fig. 5.

The shaft 27 is connected by successive belts 33 and 34 to a pulley 35 fast on a shaft 36 having a clutch 37 adapted to engage a loose sprocket 38 which is connected by a chain 39 (Fig. 1) to a sprocket 40 (Fig. 2) through which the conveyer 10 is driven.

It will thus appear that the furnace 13 and conveyer 10 are both driven directly from the shaft 27 and that any variation in the speed of rotation of the furnace is accompanied by a corresponding variation in the speed of the conveyer 10.

Slow travel of the conveyer 14 is desirable, so that the metal articles discharged from the furnace may be somewhat reduced in temperature before they are cooled in the receptacle 15 and tank 19. In order to secure such slow travel, a sprocket 41 loose on a shaft 42 is driven from the shaft 27 through a succession of belts 43, 44 and 45, the speed being reduced through the driving of large pulleys from small pulleys.

The sprocket 41 is connected by a chain 46 to a sprocket 47 connected to drive the conveyer 14. As the conveyer 14 thus receives its drive from the shaft 27, it is clear that the conveyer 14 is also driven in definite speed relation to the furnace 13, although this relation is not quite so important as in the case of the conveyer 10.

The washer 11 and receptacles 15 and 16 are driven independently from the first shaft 22. This drive includes a cross belt 50 connecting the shaft 22 to the shaft 42 which in turn is connected by a belt 51 to a shaft 52 to which is secured a sprocket 53, connected by a chain 54 (Fig. 1) to a sprocket 55 actuating a worm and worm gear drive for the washer 11.

The shaft 42 is also connected by a belt 56 to a pulley 57, loose on the shaft 22 but connected to a sprocket 58 which in turn is connected by a chain 59 (Fig. 1) to a sprocket 60 (Fig. 5). The sprocket 60 is mounted on

a worm shaft and drives a worm 61 engaging a worm gear 62 on a shaft 63, on which are mounted rollers 64 supporting and driving the receptacles 15 and 16. As has been previously stated, similar worm and worm gear connections are provided for the washer 11, and for the furnace 13.

Suitable loose pulleys, belt shifters, and clutches are provided as shown, so that different parts of the mechanism may be started or stopped independently of the operation of other parts.

Having thus described my invention, the advantages thereof will be clearly evident. From the point at which the articles are deposited on the conveyer 10 to the point at which they are discharged from the receptacle 16, the entire operation of the mechanism is automatic, and the capacity of the mechanism under such automatic operation is remarkable. The mechanism shown in the drawing has been found capable of handling from 1500 to 2200 lbs. of sheet metal stampings in an hour, even although each stamping requires from twelve to thirty minutes in which to pass through the apparatus, both time and capacity of course varying with the speed of rotation of the furnace 13. The saving of time and labor by the use of the machine is obviously very large.

Having thus described my invention and fully illustrated one embodiment thereof, it will be evident that changes and modifications can be made therein by those skilled in the art within the spirit and scope of my invention as set forth in the claims, and I do not wish to be otherwise limited to the details herein disclosed. In particular it will be evident that the driving mechanism as shown is merely illustrative and may be widely varied to meet specific conditions.

What I claim is:—

1. A mechanism for treating metal articles, comprising a rotary furnace, means to clean and deliver articles to said furnace, and means to receive, cool, oil and deliver articles from said furnace, the operation of the entire mechanism being continuous and automatic.

2. A mechanism for treating metal articles having, in combination, successive devices effective to clean, heat and oil metal articles, and automatic means to feed said articles and to progressively advance said articles through said successive devices, the rate of feed being definitely related to the speed of operation of the heating device.

3. A mechanism for treating metal articles having in combination, a rotary furnace, a conveyer controlling the feed of articles thereto, a variable speed drive for said furnace, and connections from said drive to said conveyer, driving said conveyer in fixed relation to the speed of said furnace.

4. A mechanism for treating metal articles, having, in combination, a rotary furnace, a rotary receptacle effective to deliver articles to said furnace, a feeding device for
5 said receptacle, a variable speed drive for said furnace, and means to drive said feeding device in fixed speed relation to the rate of rotation of said furnace.

5. A mechanism for treating metal articles having, in combination, a rotary heating furnace, means to drive said furnace at
10 variable speeds, a device to clean, drain, and deliver metal articles to said furnace, and feeding means for said cleaning device operable in definite speed relation to the speed
15 of rotation of said rotary furnace.

6. In a mechanism for treating metal articles, in combination, a rotatable conical receptacle having its axis disposed substantially horizontally, and means to rotate said
20

receptacle, said receptacle having a spiral internal flange by which articles deposited in said receptacle are gradually elevated and advanced for discharge from the small end of said receptacle.

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7. In a mechanism for treating metal articles, in combination, a tank having a liquid therein, a receptacle horizontally disposed above said tank, and means to rotate said receptacle, said receptacle having a perforated
30 conical side wall and having a portion of the lower side thereof immersed in said liquid and a portion raised above said liquid for draining said articles, and said receptacle
35 having also an internal spiral flange effective to progressively elevate and discharge articles placed in said receptacle.

In testimony whereof I have hereunto affixed my signature.

WILLIAM H. NEEDHAM.