

Feb. 3, 1925.

G. S. McFARLAND

1,525,192

TEMPERING MACHINE

Filed Dec. 30, 1920

2 Sheets-Sheet 1

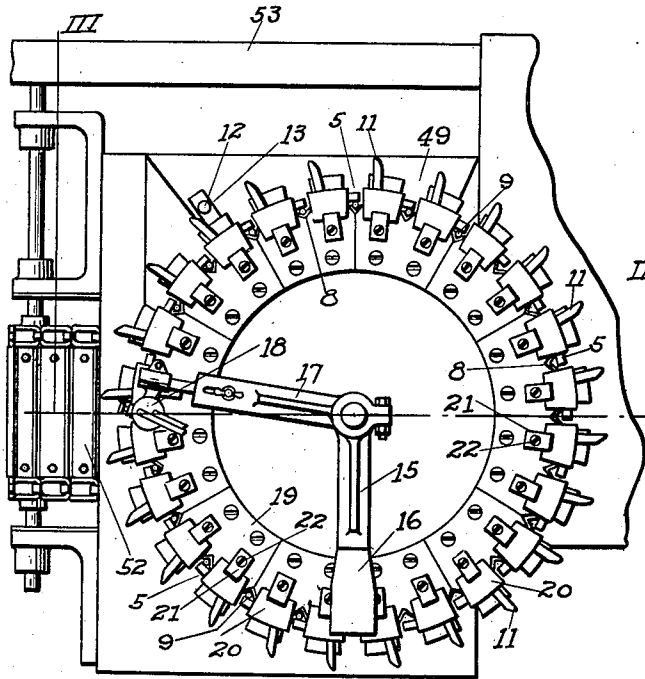


Fig. 1

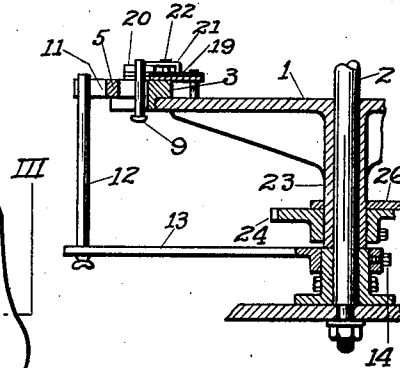


Fig. 4

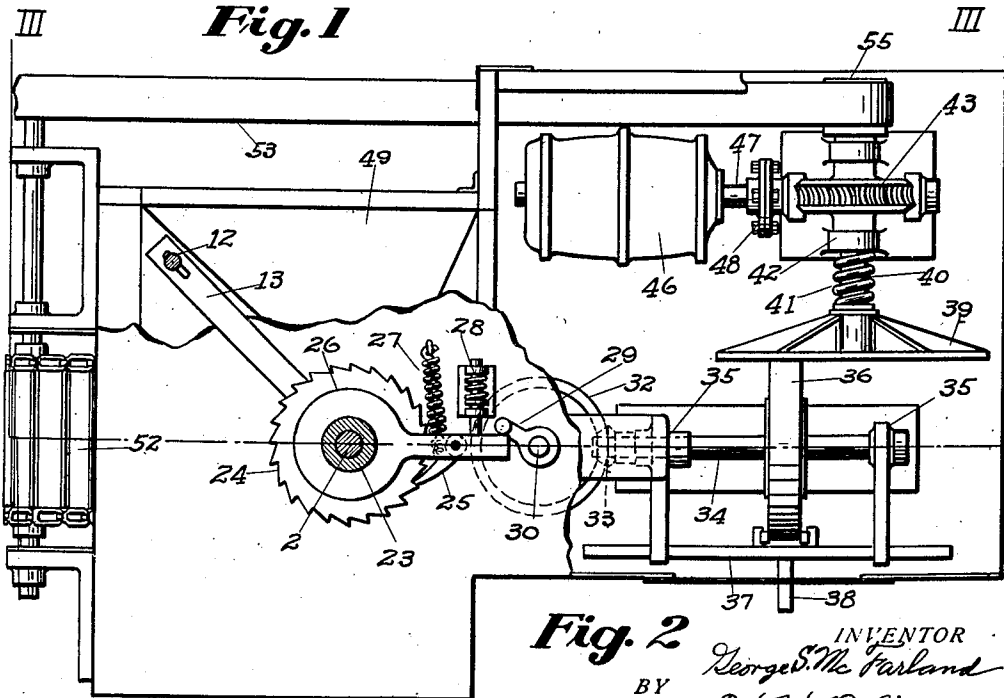


Fig. 2

INVENTOR
George S. McFarland
BY
J. H. Bliss
ATTORNEY

Feb. 3, 1925.

1,525,192

G. S. McFARLAND

TEMPERING MACHINE

Filed Dec. 30, 1920

2 Sheets-Sheet 2

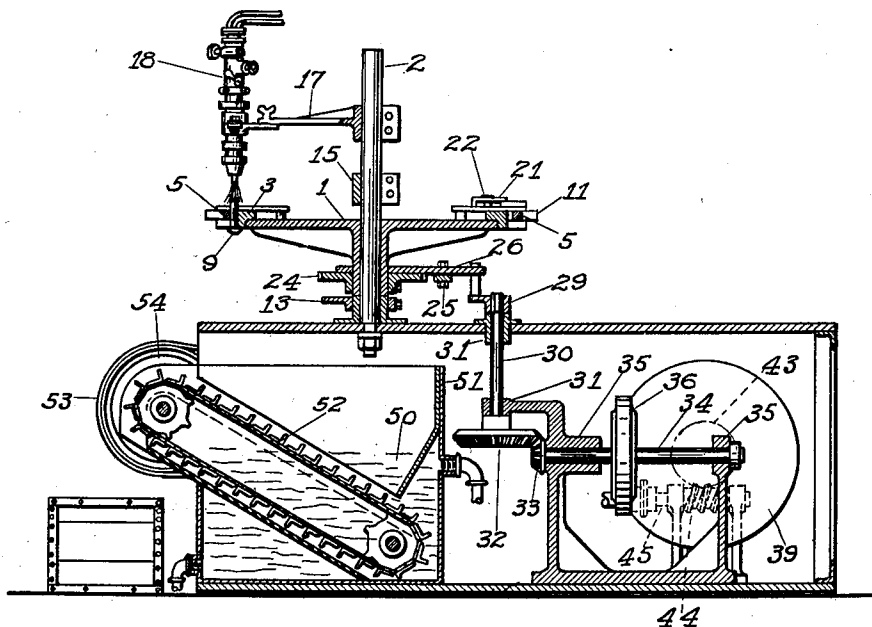


Fig. 3

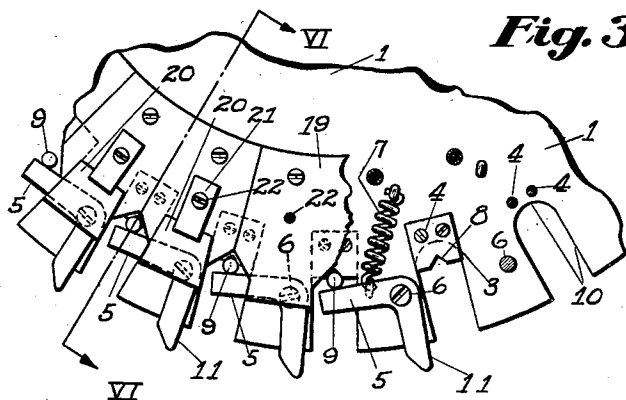


Fig. 5

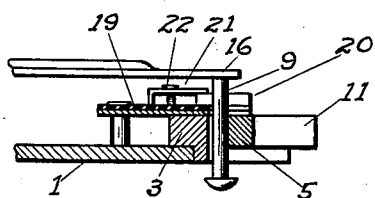


Fig. 6

WITNESSES.
R. D. Nichols
Dudley C. Fisher

INVENTOR
George S. McFarland
BY
J. H. Bliss
ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE S. McFARLAND, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

TEMPERING MACHINE.

Application filed December 30, 1920. Serial No. 434,170.

To all whom it may concern:

Be it known that I, GEORGE S. McFARLAND, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Tempering Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to certain new and useful improvements in tempering machines, and particularly to machines adapted to the local heat treatment of metallic objects such as chain pintles, rivets, and the like.

In the manufacture of chains for the transmission of power, and similar purposes, it has been found desirable that the pintles which join the longitudinal members of the chain together shall be sufficiently hard to withstand the wear incident to such service, while the end portions of these pintles must be sufficiently malleable to permit the formation of rivet heads by which the parts of the chain are held in working relation. Heretofore great difficulty has been experienced in satisfactorily annealing the end portions of such pins, and all of the devices for accomplishing this purpose with which I am familiar possess certain inherent defects which it is the intention of this invention to overcome.

The especial object of this invention is to provide automatically acting devices whereby a selected portion of each of a succession of previously hardened chain pintles may be exposed to the heating effect of a high temperature flame for a predetermined period of time, and then cooled in a manner to produce the desired local malleability without destroying the wear resisting qualities of the remainder of the pindle.

The devices by which I attain this object are fully set forth in the following specification and illustrated in the accompanying drawings of which—

Fig. 1 is a plan view of the preferred embodiment of my invention.

Fig. 2 is a plan view of the machine illustrated in Fig. 1, the upper portions

being broken away to reveal the driving mechanism.

Fig. 3 is a vertical section taken along the lines III—III of Fig. 1.

Fig. 4 is a fragmentary sectional view showing the arrangement of the tripping mechanism.

Fig. 5 is a fragmentary view showing the pin gripping devices on an enlarged scale.

Fig. 6 is a fragmentary sectional view taken along the line VI—VI of Fig. 5.

Like numerals refer to similar parts in the several figures.

My improved annealing machine consists essentially of a carrier having a plurality of equally spaced pin gripping devices each adapted to seize a suitably positioned chain pindle, or similar article, and carry it through a predetermined path at a predetermined rate of travel. Positioned within this path of travel is a jet of high temperature flame arranged to heat the exposed portion of said chain pindle, and at the end of this path is provided automatic tripping devices for releasing said pintles to allow them to fall into a suitably positioned quenching bath. The movements of the carrier and the relative position of the flame and the tripping devices are subject to such adjustment that the local heating of the articles under treatment and their subsequent cooling necessary to attain the desired characteristics of hardness and malleability may be accurately attained.

As shown in the drawings, the carrier comprises a disk 1 mounted for rotation upon a fixed vertical shaft 2 and provided upon its periphery with equally spaced gripping devices adapted to engage the chain pintles, or other articles, which are to be tempered. The gripping devices consist of the metallic blocks 3 which are secured to the disk 1 by any suitable means such as the machine screws 4, and the gripping fingers 5 which are pivoted upon the pivot bolts 6, and are held in opposed relation to the blocks 3 by the tension springs 7. In the outer face of each of the blocks 3 is formed a notch 8 adapted to receive the

chain pintle 9, or other article to be tempered, and to co-operate with the finger 5 to hold it securely in preferred position. A notch 10 formed in the disk 1 affords sufficient working clearance about these parts. Formed integral with the gripping fingers 5 are outwardly extending tripping fingers 11 adapted to engage the tripping pin 12 to rotate the fingers 5 away from the blocks 3 to release the pintles 9. The tripping pin 12 is adjustably attached to the outer end of a radially extending arm 13 mounted for rotation about the vertical shaft 2, and adapted to be secured in any preferred position of angular adjustment by a set screw 14. Supported upon the shaft 2 and adjustable both longitudinally and rotatively thereon is an arm 15 the outer end of which is expanded horizontally to form a gauge 16 adapted to engage the end of the pintle 9 to determine its vertical position relative to the clamping finger 5. A similarly mounted arm 17 carries at its outer end an oxyacetylene gas burner 18 arranged to direct its flame downwardly into the path traversed by the pintle 9 as the carrier revolves. Means is provided on the arm 17 for adjusting the position of the burner 18 both radially and vertically to control its relation with the path of the pintle 9. Attached to the carrier disk 1 are sheets of asbestos board 19 arranged to shield the gripping devices from the injurious effect of the flame, and at the points of immediate contact with the flame these asbestos boards are protected against the erosive effect of the flames by blocks 20 composed of hard gas carbon or other suitable refractory material, which are held in place by the metallic clips 21 and machine screws 22.

Attached to the hub 23 of the disk 1 is a ratchet wheel 24 adapted to be engaged by the pawl 25 which is pivotally mounted upon a ratchet lever 26. The ratchet lever 26 is adapted to rotate about the shaft 2 and is held in retracted position by the tension spring 27 which serves the double purpose of retracting the lever and holding the pawl in contact with the ratchet wheel. A resilient stop 28 is provided for limiting the rearward movement of the ratchet lever 26 and a crank 29 attached to a vertical crank shaft 30 is adapted to engage the outer end of the ratchet lever 26 to move it forwardly.

The vertical crank shaft 30 is supported in journal bearings 31 of the main frame of the machine, and to its lower end is attached a bevel gear 32 which meshes with the bevel pinion 33 attached to the horizontal shaft 34. The shaft 34 is journaled in suitable bearings 35 of the main frame, and upon this shaft is keyed a friction wheel 36 adapted to longitudinal adjustment

along the shaft 34 under the control of the guide bar 37. The guide bar 37 is provided with a handle 38 convenient to the hand of the operator by which said bar may be longitudinally shifted to adjust the wheel 36 upon the shaft 34. A friction disk 39 mounted upon the transverse driving shaft 40 is held in forced engagement with the friction wheel 36 by a compression spring 41 which abuts against the journal bearing 42 of said transverse shaft 40. Mounted upon the transverse driving shaft 40 is a worm gear wheel 43 which engages a suitable worm 44 mounted upon a shaft 45 which is adapted to be driven from any preferred source of power. For purposes of illustration I have shown an electric motor 46 the armature shaft 47 of which is directly connected with the shaft 45 by a suitable shaft coupling 48.

By the devices just described the crank shaft 30 may be rotated to actuate the ratchet lever 26 to drive the carrier disk, and by the adjustment of the friction wheel 36 longitudinally of the shaft 34, its speed of rotation may be varied within wide limits to vary the speed of rotation of the carrier disk 1.

Beneath the carrier disk 1, in position to receive the pintles 9 as they are released from the gripping devices upon the carrier, is a hopper 49 the inclined bottom of which directs the falling pintles into a quenching bath 50 contained within a tank 51. A conveyor 52 which may be of any preferred construction is arranged to withdraw the quenched pintles from this bath and deposit them in a suitably positioned receptacle for removal from the machine. An endless belt 53 arranged to travel around the pulley 54 of the head shaft of the conveyor and the pulley 55 of the transverse driving shaft 40 supplies the power for the actuation of the conveyor.

In the operation of the machine the operator grasps the finger 11 with one hand and by it rotates the finger 5 away from the block 3. With the other hand he inserts a pintle 9, bringing its upper end into contact with the gauge 16, and then releases the finger 5 to engage the pintle. By the oscillation of the ratchet lever 26 the carrier disk is rotated with a step by step motion and the duration of period of rest is controlled by the speed of rotation of the crank shaft 29. The burner 18 is so adjusted that its flame will impinge upon the end of the pintle during the period of rest, and the relative position of the tripping pin 12 is adjusted to allow the desired period of gradual cooling of the pintle before quenching. By the adjustment of the speed of the shaft 30 and of the position of the tripping pin 12 the machine may be adapted to the treatment of pintles of various sizes and the heating

and cooling may be effected with the degree of accuracy essential to the successful manufacture of such material.

What I claim is—

5 1. In a method of tempering metallic articles consisting of causing a succession of said articles to travel along a predetermined path with a regularly intermittent motion, successively exposing a selected portion of each article to the heating effect of a high temperature flame during a period of rest, and quenching said article after a predetermined interval of cooling.

10 2. The new and improved method of tempering metallic articles which consists in moving said articles in succession along a predetermined path with an intermittent motion, exposing, during a predetermined period of rest, a portion of each article to a high temperature flame, shielding the other portions of the article from such flame, cooling the article for a predetermined period, and finally quenching said article.

15 3. A tempering machine comprising automatic devices for causing a succession of metallic articles to travel along a predetermined path with a regularly intermittent motion, successively exposing a selected portion of each article to the heating effect of a jet of high temperature flame during a period of rest, and quenching said article after a predetermined interval of cooling.

20 4. In a tempering machine, the combination of means for moving metallic articles in succession along a predetermined path with a regularly intermittent motion, means for imposing a flame of high temperature upon a portion of each article while at rest, means for shielding the other portions of each article from the action of such flame, and means automatically to release such article after a predetermined length of travel from the heating point.

25 5. In a tempering machine, the combination of means for moving metallic articles in succession along a predetermined path, with a regularly intermittent motion, means for imposing a flame of high temperature upon a portion of each article while at rest, means for shielding the other portions of each article from the action of such flame, means automatically to release each article after a predetermined length of travel from the heating point, and quenching means to receive said released article.

30 6. In a tempering machine, the combination of means for moving metallic articles in succession along a predetermined path with a regularly intermittent motion, means for varying the speed of movement of said article, means for imposing a flame of high temperature upon a portion of each article while at rest, and means in adjustable relation to said flame automatically to release

each article after a predetermined length of travel from the heating point.

7. In a tempering machine, the combination of means for moving metallic articles in succession along a predetermined path with a regularly intermittent motion, means for varying the speed of movement of said articles, means for imposing a flame of high temperature upon a portion of each article while at rest, means for shielding other portions of each article from the action of such flame, and means in adjustable relation to said flame automatically to release each article after a predetermined length of travel from the heating point.

8. In a tempering machine, the combination with means to intermittently move a succession of articles to be tempered along a predetermined path of travel, of a jet of high temperature flame positioned in said path of travel and arranged to contact successively with a selected portion of each of said articles during a period of rest, and means in adjustable relation with said flame to discharge said articles into a suitable quenching bath.

9. In a tempering machine, the combination with means to intermittently move a succession of articles to be tempered along a predetermined path of travel including a jet of high temperature flame arranged to contact successively with said articles during a period of rest, means to protect a selected portion of each article from the heating effect of said flame, and means in adjustable relation with said flame to discharge said articles into a suitable quenching bath.

10. In a tempering machine, the combination of an endless carrier adapted to intermittently move a succession of articles to be tempered along a predetermined path, a high temperature flame adapted to contact successively with said articles during a period of rest, and means in adjusted relation to said flame to discharge said articles after a predetermined movement from said flames into a suitable quenching bath.

11. In a tempering machine, the combination with an endless carrier adapted to intermittent motion along a predetermined path, gripping devices in spaced relation on said carrier and adapted to support a succession of articles to be tempered during the tempering operation, a jet of high temperature flame positioned in the path of travel and arranged to contact successively with said articles during a period of rest, and means to automatically release said articles from said gripping devices.

12. In a tempering machine, the combination with an endless carrier adapted to intermittent movement along a predetermined path of travel, a plurality of gripping devices mounted in spaced relation upon

said carrier and adapted to support a succession of articles to be tempered during the tempering operation, a jet of high temperature flame positioned in said path of travel and arranged to contact successively with said articles during a period of rest, and automatically acting means in adjustable relation with said flame to release said article from said gripping devices.

13. In a tempering machine, the combination of an intermittently moving carrier adapted to support an article to be tempered during the tempering operation, a high temperature flame positioned in the path of travel of said carrier and arranged to contact with said article during a period of rest, and automatically acting means in adjusted relation to said flame to release said article from said carrier after a predetermined movement from said flame.

14. In a tempering machine, the combination with an intermittently moving carrier adapted to support an article to be tempered during the tempering operation, a jet of high temperature flame positioned in the path of travel of said carrier and arranged to contact with said article, means to shield a selected portion of said article from the heating effect of the flame, and automatically acting means in adjustable relation with said flame to release said article from said carrier.

15. In a tempering machine, the combination with a disk adapted to revolve about its axis, an abutment attached to said disk, a finger pivotally mounted upon said disk and resiliently held in opposed relation to said abutment to support the article to be tempered during the tempering operation, means to intermittently move the disk about its axis, a jet of high temperature flame arranged to contact with the article to be tempered during a period of rest, and automatically acting means to rotate said finger away from said abutment to release said articles.

16. In a tempering machine, the combination with a disk adapted to revolve about its axis, an abutment attached to said disk, a finger pivotally mounted upon said disk and resiliently held in opposed relation to said abutment to support the article to be tempered during the tempering operation, means to intermittently move the disk about its axis, a jet of high temperature flame arranged to contact with the article to be tempered during a period of rest, and automatically acting means in adjustable relation with said flame to rotate said finger away from said abutment to release said article.

17. In a tempering machine, the combination with a disk adapted to revolve about its axis, an abutment attached to said disk, a finger pivotally mounted upon said disk and resiliently held in opposed relation to

said abutment to support the article to be tempered during the tempering operation, means to intermittently move the disk about its axis, means to optionally control the periods of said movement, a jet of high temperature flame arranged to contact with the article to be tempered during a period of rest, and automatically acting means in adjustable relation with said flame to rotate said finger away from said abutment to release said article.

18. In a tempering machine, the combination with a disk adapted to revolve about its axis, an abutment attached to said disk, a finger pivotally mounted upon said disk and resiliently held in opposed relation to said abutment to support the article to be tempered during the tempering operation, means to intermittently move the disk about its axis, means to optionally control the periods of said movement, a jet of high temperature flame arranged to contact with the article to be tempered during a period of rest, means to shield a selected portion of said article from the heating effect of said flame, and automatically acting means in adjustable relation with said flame to rotate said finger away from said abutment to release said article.

19. In a tempering machine, the combination with a disk adapted to revolve about a vertical axis, a plurality of carriers mounted in spaced relation upon the periphery of said disk and adapted to support the articles to be tempered during the tempering operation, means to intermittently move said disk about its axis, a high temperature flame arranged to contact with the articles carried by said carriers during a period of rest, and automatically acting means to release said articles from said carrier.

20. In a tempering machine, the combination with a disk adapted to revolve about a vertical axis, a plurality of carriers mounted in spaced relation upon the periphery of said disk and adapted to support the articles to be tempered during the tempering operation, means to intermittently move said disk about its axis at an optionally controlled rate of travel, a high temperature flame arranged to contact with the articles carried by said carrier during a period of rest, and automatically acting means to release said articles from said carrier.

21. In a tempering machine, the combination with a disk adapted to revolve about a vertical axis, of a plurality of carriers mounted in spaced relation upon the periphery of said disk and adapted to support the articles to be tempered during the tempering operation, means to intermittently move said disk about its axis, a high temperature flame arranged to contact with the articles carried by said carrier during a

period of rest, means to shield a selected portion of said articles from the heating effect of said flame, and automatically acting means to release said article from said carrier.

22. In a tempering machine, the combination of a disk arranged to revolve about its axis, a plurality of carriers arranged in spaced relation upon the disk and adapted to support the articles to be tempered during the tempering operation, a ratchet wheel connected to said disk, a ratchet lever having a pawl adapted to engage said ratchet wheel, means to oscillate said lever to cause the regularly intermittent rotation of the disk, a jet of high temperature flame adapted to contact with the article to be tempered during a period of rest, and automatically acting means to release said article from said holder.

23. In a tempering machine, the combination of a disk adapted to revolve about its axis, a plurality of carriers arranged in spaced relation upon said disk and adapted to support the article to be tempered during the tempering operation, a ratchet wheel

connected with said disk, a ratchet lever having a pawl adapted to engage said ratchet wheel, means to oscillate said lever to cause the regularly intermittent rotation of the disk, means to optionally control the intervals of oscillation of said lever, a jet of high temperature flame adapted to contact with the articles to be tempered during the period of rest, and automatically acting means to release said articles from said carrier.

24. In a tempering machine, the combination of a carrier adapted to intermittent movement along a predetermined path of travel, means upon said carrier to support the articles to be tempered during the tempering operation, means effective during a period of rest to heat a selected portion of each of said articles, and automatically acting means in adjustable relation with said heating means to discharge said articles from said carrier after a predetermined movement from said flame.

In testimony whereof, I affix my signature.

GEORGE S. McFARLAND.