April 16, 1957 L. W. SNAPE 2,788,540

APPARATUS FOR DEGREASING STRIP METAL STOCK

Filed June 3, 1952 2 Sheets-Sheet 1

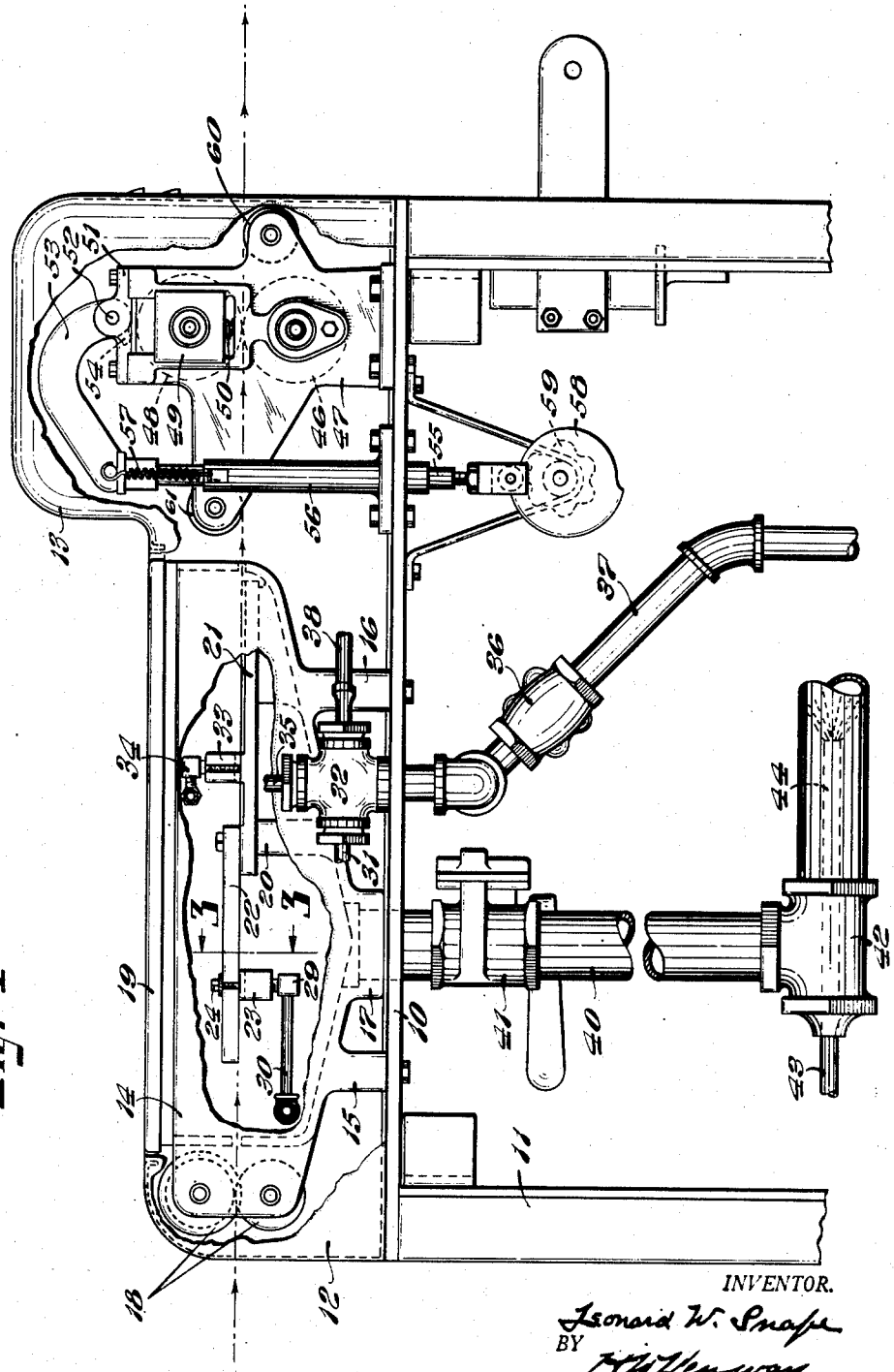


Fig. 1

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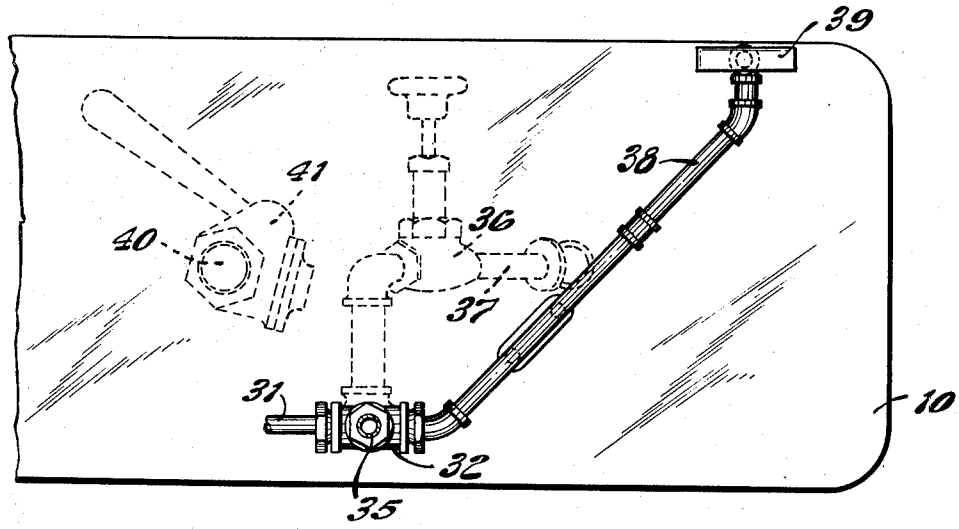


Fig. 2

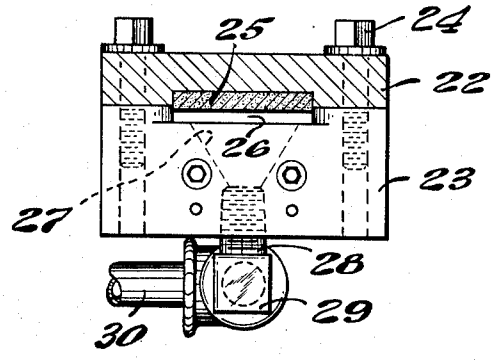


Fig. 3

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APPARATUS FOR DEGREASING STRIP METAL STOCK

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Application June 3, 1952, Serial No. 291,497

4 Claims. (Cl. 15—306)

This invention comprises a new and improved apparatus for degreasing metal strip of ribbon stock preparatory for further treatment. One important field of use for the apparatus is in degreasing thin steel stock for safety razor blades to prepare it for hardening, marking or other operations which are rendered more or less uncertain by the presence of an interrupted or continuous film of grease on the stock.

For uniform and accurate quality control of such operations, it has been found essential that the ribbon stock must be completely degreased and cleaned. Heretofore this has been attempted by using active organic solvent liquids or vapors but such expedients have not proved entirely adequate and have involved considerable difficulty in handling and confining the solvent as well as in avoiding danger or discomfort to the operator. These difficulties are entirely obviated by the employment of my new and improved apparatus, and moreover complete degreasing of the stock may be achieved at less expense and at a higher rate of speed than heretofore.

The invention is based on my discovery that satisfactory degreasing of metal ribbon stock may be achieved by continuously feeding the stock through a closed housing, and while thus enclosed and properly supported over a substantial area, directing blasts or currents of steam against the exposed face of the ribbon. This action is greatly facilitated by providing means for the prompt removal of the spent steam from the area or areas of its application to the stock. Accordingly, an important feature of my improved apparatus comprises a closed housing containing steam nozzles directed toward the surface of the metal ribbon, together with exhaust connections for maintaining the housing under partial vacuum. This not only insures prompt removal of the spent steam from the area of stock under treatment, but increases the velocity of the blast and so augments its effectiveness.

Going more into detail, the apparatus of my invention includes a housing having inlet and exit slots at opposite sides which determine the path through the housing of the strip stock to be treated, together with steam outlets directed against one or both faces of the stock and exhaust connections for maintaining a partial vacuum in the housing; preferably and as herein shown, each steam nozzle is associated with a flat strip-supporting bar across the surface of which the strip stock is directed and which serves to support the stock in the area subjected to the steam blast.

As an optional feature, the apparatus of my invention includes also an outer casing designed to enclose the housing above-mentioned and to provide an insulating jacket therefor. Within this outer casing is located strip feeding means effective to draw the strip stock through the inner housing. One satisfactory strip feeding means comprises a pair of feed rolls driven from outside the casing and being provided also with controlling mechanism so that the rolls may be separated whenever it is desired to interrupt the feed of the stock or to facilitate threading new stock through the apparatus.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a view of the apparatus in elevation with portions broken away;

Fig. 2 is a fragmentary plan view showing certain of the steam and exhaust connections and

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

The illustrated apparatus includes a flat bed plate **10** supported at convenient height by legs **11**. The bed plate **10** supports an elongated cover or outer casing **12** which is rectangular in outline and provided at its right-hand end as shown in Fig. 1 with a dome **13** and louvers for ventilation. Within the outer casing **12** and substantially insulated by it is located an elongated inner housing **14** having a lower wall provided with legs **15** and **16** which are bolted to the bed plate **10**. This lower wall converges downwardly from both ends to a boss **17**, in which is formed the exhaust connection of the housing. The housing **14** is substantially insulated from external conditions by the still air enclosed between it and the outer casing **12**.

The left-hand or inlet end of the housing **14** is forked to provide bearings for a pair of guide rolls **18** which register with an inlet slot in the housing that is aligned with a corresponding outlet slot in its right-hand wall. The casing **12** is provided with slits in line with the inlet and outlet slits of the housing and with a removable cover **19** that may be temporarily secured in place by any convenient clamping means, not herein shown.

Within the housing **14** is provided an upright bracket **20** to which are bolted in longitudinally overlapping relation a lower guide bar **21** and an upper guide bar **22**. These two guide bars are offset vertically so that the upper face of the guide bar **21** lies substantially in a common plane with the lower face of the upper guide bar **22**. Secured to the lower face of the upper guide bar **22** is a block or gate member **23**, as best shown in Fig. 3. The bar **22** is slotted in its opposite edges to receive clamping bolts **24** which are threaded into the block **23**, the construction being such that when one of the bolts is unscrewed, the other may be disengaged by transverse movement with respect to the bar **22**. The bar **22** is channelled to receive a hardened and ground wear-piece **25** of nitralloy or the like, and this wear-piece supplies the actual overlying, strip-supporting surface across which the ribbon stock is fed through the housing. The block or gate member **23** is cut away to form a slot **26** or strip passage adjacent to the wear-piece **25**, and it is recessed to form a steam nozzle **27** diverging upwardly from a nipple **28** threaded into the bottom of the block. The nipple **28** is threaded at its lower end into a right angle fitting **29**, to which is connected a steam pipe **30**, and this leads through suitable connections to a steam pipe **31** and to a cross fitting **32** located outside the inner housing **14** but inside the outer casing.

A similar block or gate member **33** is bolted to the upper face of the guide bar **21**. It is provided with a downwardly directed divergent steam nozzle and connected through the fitting **34** and the pipe **35** to the cross fitting **32** above-mentioned. Through the cross fitting **32**, live steam is supplied to both of the nozzles above-described and for this purpose its downwardly directed outlet is connected to a valve **36** and a steam-supplied pipe **37**, all located beneath the bed plate **10**. Each guide bar and gate member is made up as a self-contained unit presenting an extended frame and hardened strip-supporting surface with a steam nozzle arranged to direct steam against the exposed face of the strip while supported in flat condition over an extended area.

The right-hand outlet of the cross fitting **32** is connected by a steam pipe **38** to a gauge **39** located in an opening or window formed in the outer casing **13**. The location of the gauge **39** is shown in Fig. 2, and with the assistance of this gauge, the operator may observe the pressure of steam being supplied to the nozzles in the gate members **23** and **33**.

The exhaust connection to the housing **14** in the boss **17** comprises a downwardly extending pipe **40** provided with a shut-off valve **41** and leading into a T **42**. The T **42** discharges through a horizontal pipe **44** in which is contained a small waterpipe **43** having a separate nozzle. The spray formed in this manner within the pipe **44** acts as a condenser that immediately condenses all exhaust steam from the housing **14** and maintains a substantial vacuum therein while the apparatus is in operation. The effect of this is to remove immediately spent steam as it is deflected from the surface of the ribbon stock in the areas opposite to the steam nozzles and to keep the interior of the housing substantially dry at all times.

Within the dome portion **13** of the outer casing is located a pair of feed rolls, of which the lower roll **46** is journaled in an upright frame **47**, and the top roll **48** is journaled in boxes **49** vertically movable in the frame **47** and maintained always under spring pressure. A spring **50** is located under each of the journal boxes **49**, and these tend at all times to lift the upper roll and interrupt the feeding operation when permitted to do so. The frame **47** is shaped with vertical guides for the journal boxes **49** and is provided at both sides with cap plates **51** in which is journaled a transverse shaft **52**. Upon this shaft is mounted cam lever **53**, provided with a cam projection **54** arranged to engage a filler plate above each of the journal boxes **49**. The cam lever **53** is connected to a vertical operating rod **55** movable in a tubular stand **56** bolted to the bed plate **10**. A pair of springs **57** maintain the free end of the cam lever **53** at all times in contact with the head of the operating rod **55**. At its lower end this rod rests upon a cam **58** fast to a transverse shaft journaled in a yoke beneath the bed plate **10**, and having at its outer end an operating handle **59**.

The cam **58** is so shaped that the cam lever **53** is normally rocked in a counter-clockwise direction to the limit of its movement, and the cam projection **54**, therefore, yieldingly holds the rolls **46** and **48** in operative stock feeding position. When, however, it is desired to interrupt the stock feeding operation, the handle **59** may be turned, lifting the operating rod **55** to swing the cam lever **53** in a clockwise direction and relieve the journal boxes **49** of pressure. The feed rolls are always free to separate against the spring tension of the springs **57** to permit the passage of a weld or other irregularity in the strip stock under treatment. It will be noticed that the feed rolls and their operative mechanism are totally enclosed within the outer casing **13**, while, at the same time being under remote control of the handle **59** which is located outside the casing.

In order further to insure accurate control of the strip stock in passing through the apparatus, guide rolls **60** and **61** are journaled in opposite sides of the frame **47** with their effective upper and lower surfaces substantially in the plane of the strip-supporting faces of the guide bars **21** and **22**.

The apparatus above-described may be successfully

operated when steam is supplied to the nozzles at a gauge pressure of 60 to 100 lbs. gauge pressure, and when a vacuum of approximately 4" of water is maintained in the housing **14**. If the condenser herein shown is not adequate for that purpose, the exhaust pipe **44** may be connected to the exhaust system of the factory in which the apparatus is installed. Under these conditions ribbon steel stock as thin as .004" may be degreased at high speed without any deformation of the stock. Experience indicates that 55 lbs. steam pressure is critical for degreasing razor blade stock. Below that pressure the operation of the apparatus is not entirely satisfactory. The steam pressure of 60 lbs. is entirely adequate and little advantage is gained by employing higher pressures at a strip feed of 56 ft. per minute.

Having thus disclosed my invention and described in detail an illustrative embodiment thereof, I claim as new and desire to secure by Letters Patent:

1. Apparatus for degreasing ribbon steel, comprising an inner closed housing having inlet and outlet slots in opposite walls for the passage of the ribbon, an outer casing enclosing the housing and insulated by air therefrom, rolls mounted inside the casing and outside the housing for feeding the ribbon through the housing, means for directing a blast of steam at 55 to 100 lbs. gauge pressure at the ribbon within the housing, and means for maintaining a partial vacuum in the housing to increase the velocity of the steam blast and remove spent steam from about the ribbon.

2. Apparatus for degreasing ribbon steel as described in claim 1, further characterized by a pair of connected bars offset longitudinally and vertically for respectively supporting the steel ribbon by engaging its opposite surfaces in adjacent areas, and an enclosed steam nozzle located opposite to each supported are of the ribbon and forming part of the means for directing the steam blast thereat.

3. In apparatus of the character described in claim 1, a self-contained unit comprising an elongated strip-supporting bar, and a block fastened to the bar, notched to provide therewith an intermediate strip passage and having an enclosed steam outlet forming a part of the means for directing a high velocity blast of steam into said passage and at the steel ribbon therein.

4. In apparatus of the character described in claim 1, a unit comprising an elongated bar presenting a hardened strip-supporting face, and a block fastened to the bar and slotted to span said hardened face and to present a strip passage thereon, said block having an enclosed steam nozzle opening into its slot and forming a part of the means for directing steam in a blast of high velocity against a strip supported over an extended area by said hardened face.

References Cited in the file of this patent

UNITED STATES PATENTS

392,082	Turner	Oct. 30, 1888
1,886,581	Pitts	Nov. 8, 1932
2,003,397	Smith, Jr.	June 4, 1935
2,008,187	Pitts	July 16, 1935
2,095,697	Hammer	Oct. 12, 1937
2,232,805	Ruedebush	Feb. 25, 1941
2,255,859	Quigley	Sept. 16, 1941
2,380,550	Reed	July 31, 1945
2,640,003	Steenberg	May 26, 1953