

E. BRÖKING.
 APPARATUS FOR HARDENING KNIFE BLADES.
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974,465.

Patented Nov. 1, 1910.

Fig. 1.

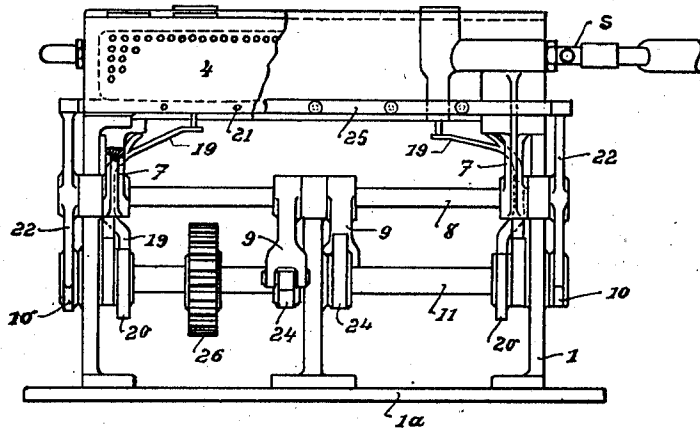


Fig. 3.

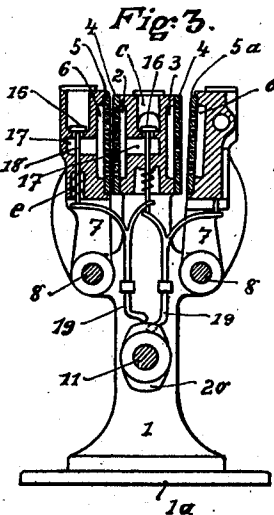


Fig. 2.

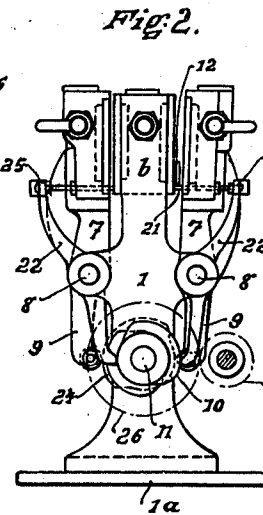


Fig. 4.

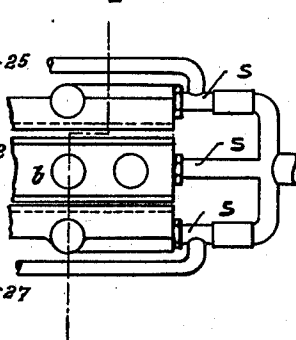
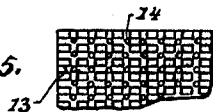


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

EWALD BRÖKING, OF GEVELSBERG, GERMANY.

APPARATUS FOR HARDENING KNIFE-BLADES.

974,465.

Specification of Letters Patent.

Patented Nov. 1, 1910.

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To all whom it may concern:

Be it known that I, EWALD BRÖKING, residing at Gevelsberg, Westphalia, Germany, a subject of the Emperor of Germany, have
5 invented new and useful Improvements in Apparatus for Hardening Knife-Blades, of which the following is a specification.

My invention relates to an improved apparatus by which large knife blades or the
10 like articles are hardened, the apparatus consisting of two sets of pressure plates that are automatically opened and closed and adapted to receive a knife blade while hot and which is pressed by the said plates, and
15 at the same time cooled by water that is forced through the plates, the latter being for this purpose perforated and provided with a plurality of grooves.

On the accompanying drawing Figure 1
20 is a side elevation of the apparatus, Fig. 2 is an end view, Fig. 3 is a vertical sectional view, Fig. 4 is a plan view of one end of the machine, Fig. 5 is a detail of one of the pressure plates.

25 The apparatus consists of the standards 1, mounted on a bed plate 1^a in which is journaled a shaft 11 which is driven by gears 26, 27. The head *b* of said standard is provided on opposite sides with chambers 2 and 3
30 which are closed by plates 4 shown in detail in Fig. 5. Said plates are made of steel and are perforated or provided with numerous holes 14 and with grooves 13 that are arranged in longitudinal or vertical direction or in both. Opposite each plate 4 is
35 arranged a similar plate 5, 5^a, respectively, which form part of the chambered members 6, the said members being mounted on arms 7 secured on shafts 8. From these shafts
40 project downwardly the arms 9 that are in contact with cams 10 on the main shaft 11, it being understood that in operation the cams 10 will cause the plates 5, 5^a to open and close alternately. When opened, the
45 plates are enabled to receive a knife blade 12 as shown in Fig. 2 which is firmly pressed by the closed plates. When introduced between the plates the blades are caught by pins 21 which may be shifted to and fro and
50 for this purpose are in connection with a bar 25. Said bar is engaged by a lever 22 mounted on shaft 8 and operated by cams 24. The pins 21, are moved inwardly and outwardly supporting the blade 12 or releasing it so that it can drop down after the
55 plates have been opened. Now in order to

harden the blades a stream of water is forced through the pressure plates. For this purpose channels 17 are provided with-
in the chambers 2, 3 and 6, having com- 60
partments *c* that are in connection with the said channels 17, and the chambers 2, 3 and 6. 15 are valves arranged in the compartments which are closed by springs *e*, the
spindles of said valves being operated by 65
bars 19 on which act the cams 20 as shown in Fig. 3. By said means water which is admitted into the apparatus under pressure through the pipes *s* is forced through the
plates and directed onto the surfaces of the 70
blade which is hardened, and being pressed at the same time by the plates, such blade leaves the apparatus straight and without
curves.

The apparatus described may be also used 75
with one pair of plates only and the blades introduced therein by hand or automatically and the hardened blades may fall on transporting bands and carried away for further
treating. 80

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. An apparatus for hardening steel comprising in combination, relatively movable pressure elements for engaging the steel to be hardened, means for actuating one of said elements to engage and release the steel, movable means for holding the steel between 85
said elements, and subsequently releasing it, and means for applying cooling medium to the steel while engaged by said elements. 90

2. An apparatus for hardening steel comprising in combination, relatively movable chambered pressure elements provided with perforated pressure surfaces, means for pressing the steel therebetween while hot, means for applying a cooling medium through said chambered elements to the steel 100
to cool the same, and means for holding the steel in position prior to engagement by said pressure elements and releasing the steel subsequent to release by said pressure elements. 105

3. An apparatus for hardening steel comprising in combination, relatively movable pressure elements for engaging the steel while hot, and means for holding the steel in position prior to engagement by said elements and releasing the steel when the same 110
is released by said elements.

4. An apparatus for hardening steel comprising in combination, a central element provided with a plurality of pressure plates on opposite sides thereof, vertically disposed
 5 pivoted elements movable against the pressure plates of said central element and having pressure plates cooperating with the plates of said central elements to compress the steel while hot, and means for applying a
 10 cooling medium to the steel while compressed.

5. An apparatus for hardening steel comprising in combination, relatively movable pressure elements for engaging the steel
 15 while hot, and automatically acting movable elements for holding the steel between said elements prior to engagement thereby and releasing the steel subsequently to release by said elements.

20 6. An apparatus for hardening steel comprising in combination, relatively movable pressure elements for engaging the steel while hot, reciprocating members for holding the steel between said elements prior to
 25 engagement of the steel thereby, and means for actuating said members.

7. An apparatus for hardening steel comprising in combination, a hollow stationary element provided with a grooved perforated
 30 pressure plate, a valve in said element for controlling the passage of a cooling medium therethrough to said plate, a hollow pivot-

ally mounted element provided with a grooved and perforated pressure plate, a valve in said pivoted element for controlling
 35 passage of a cooling medium therethrough, and means on said stationary element for operating said valves.

8. A machine for hardening steel comprising in combination, a stationary frame
 40 provided with a pressure element, a cooperating movable pressure element mounted on said frame, a shaft on said frame provided with a cam, and an arm engaging said cam for operating said movable element to en-
 45 gage the steel between the same and said first named element.

9. A machine for hardening steel comprising in combination, a stationary frame
 50 provided with a pressure element, a valve for said element for controlling passage of a cooling medium, a second element movably mounted on said frame and cooperating with
 55 said first named element and provided with a valve for controlling passage of a cooling medium, a shaft on said frame provided with a cam, an arm engaging said cam for operating said movable element, and cams on said shaft for operating said valve.

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Witnesses:

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