Oct. 8, 1940. C. E. PECK 2,217,452

CONTROLLED COOLING IN A HEAT TREATING PROCESS

Filed Aug. 13, 1937 4 Sheets-Sheet 1

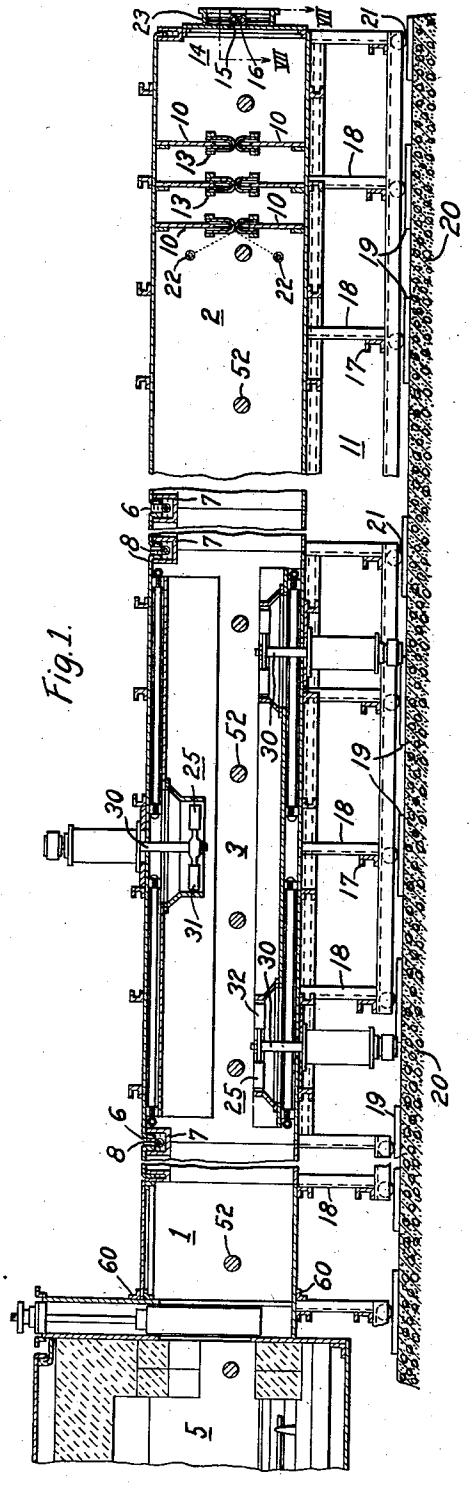


Fig. 1.

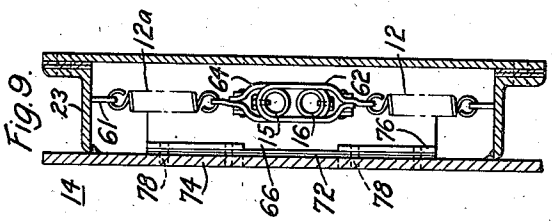


Fig. 9.

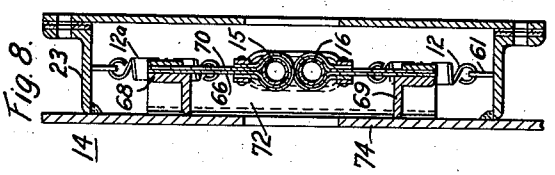


Fig. 8.

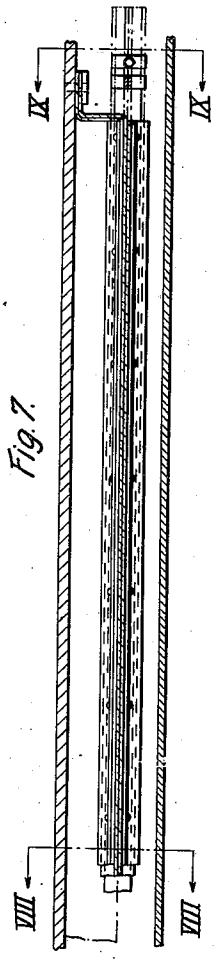


Fig. 7.

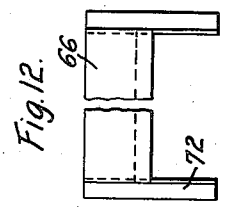


Fig. 12.

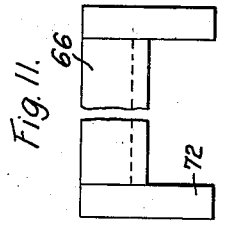


Fig. 11.

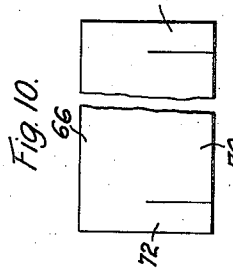


Fig. 10.

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CONTROLLED COOLING IN A HEAT TREATING PROCESS

Filed Aug. 13, 1937 4 Sheets-Sheet 2

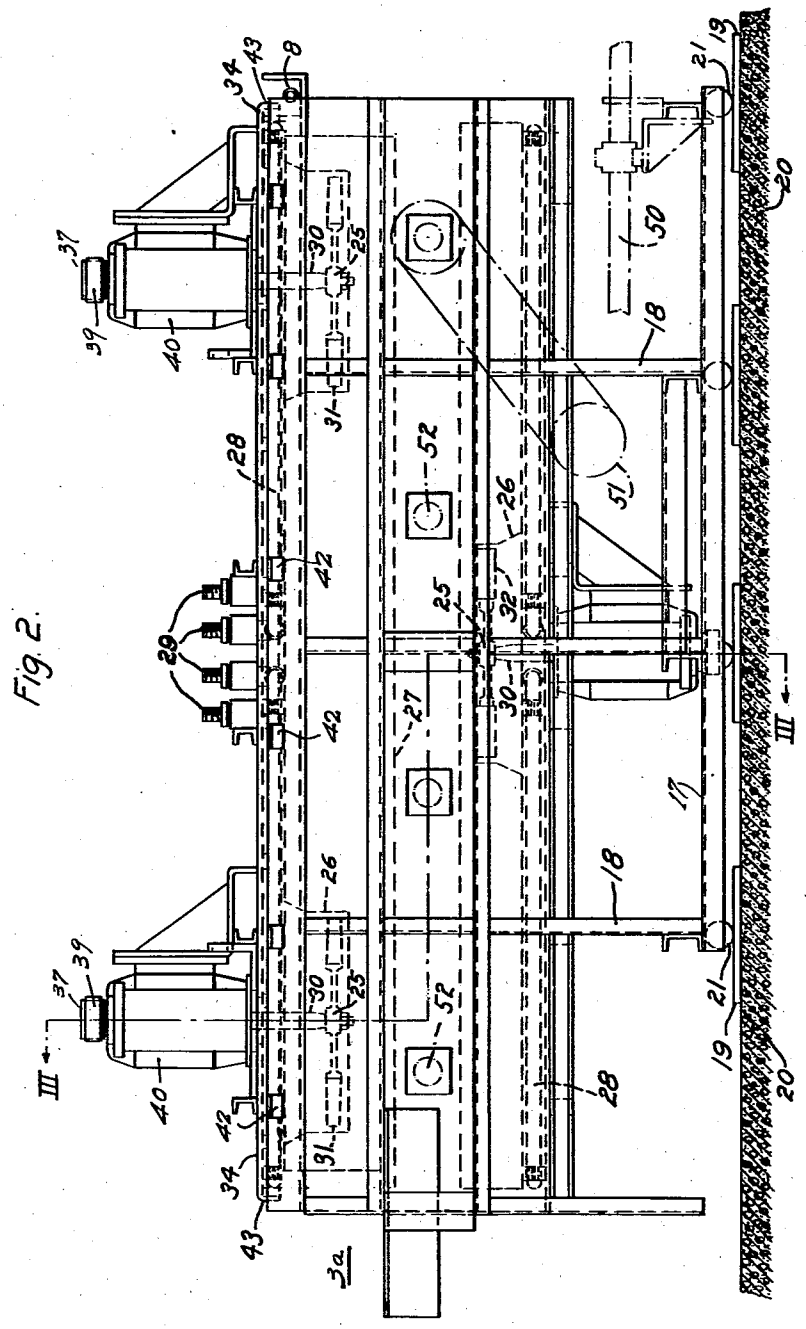


Fig. 2.

WITNESSES:
Wm. B. Sellers
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CONTROLLED COOLING IN A HEAT TREATING PROCESS

Filed Aug. 13, 1937 4 Sheets-Sheet 3.

Fig. 3.

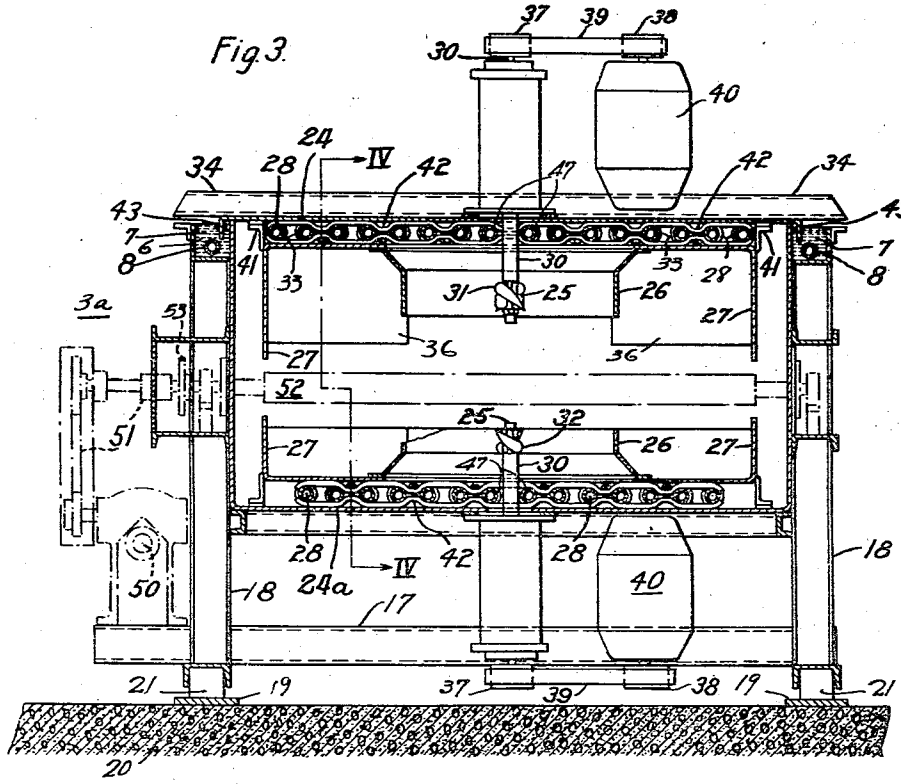


Fig. 4.

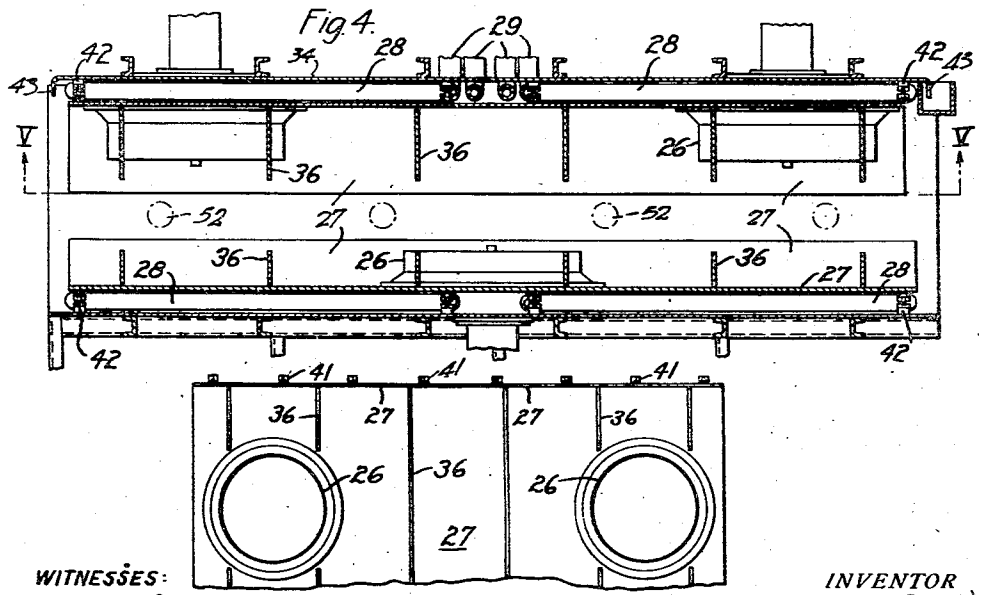


Fig. 5.

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CONTROLLED COOLING IN A HEAT TREATING PROCESS

Filed Aug. 13, 1937 4 Sheets-Sheet 4

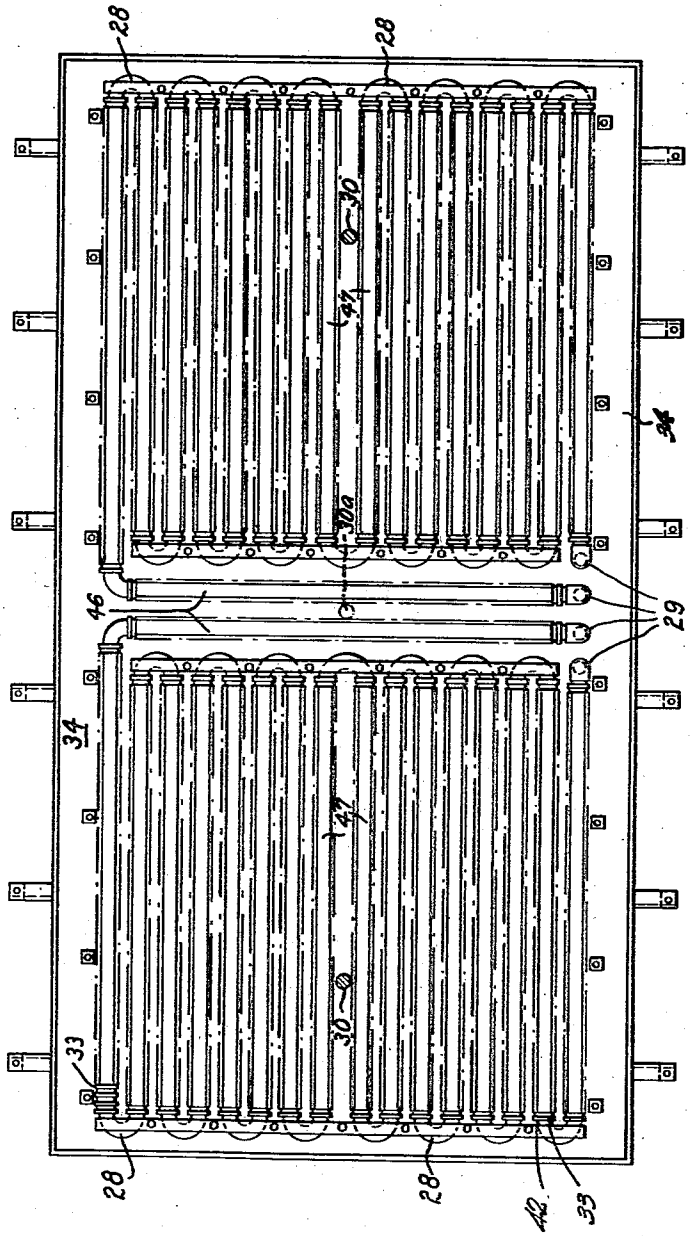


Fig. 6.

WITNESSES:
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Patented Oct. 8, 1940 2,217,452

UNITED STATES PATENT OFFICE

2,217,452

CONTROLLED COOLING IN A HEAT TREATING PROCESS

Clarence E. Peck, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application August 13, 1937, Serial No. 158,923

15 Claims. (Cl. 62—102)

This application is a continuation-in-part of my application Serial No. 113,196, filed November 28, 1936.

My invention relates to industrial furnaces and more particularly to a cooling structure for cooling continuous sheets or the like, and controlled cooling in a heat treating process.

In the process of heat treating, particularly in the case of normalizing sheet steel and the like, the type of grain structure obtained depends upon the rate of cooling of the steel after it has reached the normalizing temperature. This grain structure will be very fine for a rapid rate of cooling and will correspondingly increase in size with a decrease in the rate of cooling. It is, therefore, obvious that an operator may obtain any desired grain structure by merely adjusting the rate of cooling to correspond with the desired grain structure. Accordingly, it is an object of my invention to provide a method of and means for cooling, and controlling and regulating the rate of cooling the hot material as it passes through the cooling structure.

Likewise, in the process of heat treating it becomes necessary to regulate the atmosphere in which the material is placed. By utilizing a protective atmosphere the accumulation of scale upon the material is eliminated, whereupon the surface remains unchanged during the process, thus eliminating the necessity of pickling. It is, therefore, a further object of my invention to provide means for maintaining the presence of a protective atmosphere within the cooling structure and for preventing excessive escape of such atmosphere.

A further object of my invention is to provide means whereby the cooled sheet or the like may be delivered to the open air without permitting such air to enter into the cooling structure to contaminate the protective atmosphere therein.

A further object of my invention is to provide means for circulating the protective atmosphere within the cooling structure whereby the atmosphere may absorb and conduct the heat away from the moving sheets or the like.

A further object of my invention is to provide means for absorbing the conducted and convected heat from the circulating atmosphere and for conducting such absorbed heat out of the cooling structure.

A further object of my invention is to provide means for creating a high velocity of atmosphere with respect to the charge and for preventing any tendency of hot and cold gases to stratify with respect to the charge.

A further object of my invention is to provide means for sealing the various sections of the cooling structure to prevent any appreciable amount of the protective atmosphere from escaping therefrom and for maintaining the sealing medium at a satisfactory low temperature.

A further object of my invention is to provide means for sealing an entrance to such structure while a charge is being passed through such opening.

Other objects of my invention will either be pointed out specifically in the course of the following description of one form of a system embodying my invention, or will be apparent from such description.

In practicing my invention, I provide a continuous cooling structure with means for attaching it to furnaces or similar structures, a plurality of rolls for conveying the charge through the structure, a plurality of fans located either on the top or the bottom or both, to circulate the protective gas which is within the structure and to absorb the heat from the charge as it passes therethrough, a plurality of baffles to direct the flow of the atmosphere within the structure, and a plurality of pipes for absorbing the heat from the atmosphere, a heat absorbing medium circulating through such pipes to absorb the heat thereof and conduct it to the outside of said cooling structure.

I also provide a plurality of curtaining devices located upon the last section for preventing the protective atmosphere from leaving, or the air from entering the structure as the charge is delivered therefrom.

In the accompanying sheets of drawings:

Figure 1 is a fragmentary elevational view of the complete cooling structure with a sectional view of an intermediate section and the end sections,

Fig. 2 is a side elevational view of an intermediate section,

Fig. 3 is a sectional view taken along line III—III of the intermediate section shown in Fig. 2,

Fig. 4 is a sectional view taken along line IV—IV of Fig. 3,

Fig. 5 is an exaggerated view showing the relationship between the fan guards and the baffles as taken along line V—V of Fig. 4,

Fig. 6 is a plan view of the cooling pipes as attached to the top cover.

Fig. 7 is a sectional view taken along line VII—VII of Fig. 1,

Figs. 8 and 9 are sectional views taken along

lines VIII—VIII and IX—IX, respectively, of Fig. 7, and

Figs. 10, 11 and 12 are elevational views of the curtain as attached to the exterior curtaining device.

Referring to Fig. 1, I show a continuous cooling structure 11 composed of a plurality of end sections 1 and 2 and one or more intermediate sections 3. The end or adapter section 1 may be constructed in any suitable manner so that the cooling structure 11 may be attached to any desirable heating or normalizing furnace or structure 5 without losing the protective atmosphere therein. However, it is preferred that the adapter section 1 be attached to the furnace by means of a flange 60. The flange 60 is rigidly attached to section 1, preferably by welding, and may be rigidly attached to the furnace 5, either permanently or removably, to form a gas-tight junction between the cooling structure 11 and the furnace 5.

The end section 2 has located thereon a plurality of curtaining devices 13 and 14 which prevent the protective gas atmosphere within the cooling furnace from escaping to the air or the air from entering therein. An intermediate section 3 is shown, which is similar in construction to the other sections which are partially shown. A plurality of fans 25 may be located within the intermediate section 3. The exact location of these fans may differ in each succeeding section, namely; the first section may have two fans located upon the top and one upon the bottom of the structure, the next having one fan located upon the top and two upon the bottom, and each succeeding pair of sections may follow this sequence.

A plurality of rolls 52 are located within the furnace in such a manner as to convey a continuous sheet of steel or the like through the cooling structure from the normalizing furnace 5 out through the curtaining device 14 to the outside of the structure. These rolls 52 are driven in any suitable manner, such as by the sprocket and chain mechanisms 51 (Fig. 2), which may be operated by a suitable drive shaft 50 which is driven by any primary power source. This chain and sprocket gearing device may be located at one point upon each section, driving one roll therein. The balance of the rolls may be driven by a suitable chain and sprocket device 53 located upon the side of the cooling structure and actuated from the operatively associated chain and sprocket mechanism 51.

The cooling structure proper is contractibly and expandibly mounted upon flash-plates 19 by means of an under-structure 17 and 18 and suitable rollers 21. The flash-plates 19 are permanently embedded upon a suitable foundation 20. By mounting the continuous cooling structure 11 upon the foundation 20 in such a flexible manner, the danger of rupturing said structure due to the expansion and contraction thereof is overcome.

Referring to Fig. 2 and Fig. 3, I show another intermediate section 3a. This section is similar in construction to section 3 shown in Fig. 1, except that in the section 3 one fan 25 with blades 31 is placed upon the top and two fans having blades 32 are located upon the bottom thereof, while in this section 3a, as shown in Fig. 2, two fans 25 are located upon the top and one upon the bottom.

Located within the sections 3 and 3a, as shown in Figs. 3, 4 and 5, are a plurality of rolls 52, a plurality of baffles 26 and 27, a plurality of cooling pipes 28 and their necessary fittings 29 and the fan structures 25. The baffles 27 have a main or horizontal portion substantially parallel to the top and bottom walls 24 and 24a, respectively, of the sections 3 or 3a and side portions which are substantially parallel to the side walls of the structure or perpendicular to the planes of the top and bottom walls of said sections. The cooling pipes 28 are in four sections, two sections thereof upon the bottom of section 3a and two sections upon the underside of the removable top 34 of section 3a. These pipes 28 are located within a space between the main or horizontal portion of baffles 27 and the top or bottom walls of the section 3 or 3a in such a manner as to permit the free circulation of the atmosphere through such space and about the cooling pipes. Baffles 26 are circular in shape and may completely circumscribe the fans 25 and may be attached to the top and bottom baffles 27 in any desirable manner. By locating the fans within the baffles 26, it is possible to force the atmosphere within the cooling structure through a predescribed orbit.

As illustrated in Fig. 3, the baffles 27 are attached to the top 34 by means of small angular brackets 41 and are spaced therefrom so that the cooling pipes 28 may be inserted within the space between baffle 27 and the top 34 or bottom 35. The fans 25 are attached to a shaft 30 having attached at the other end thereof a pulley 37 which may be operatively associated with a driving motor 40 by means of a belt 39 and a pulley 38. Each fan is, accordingly, operated as a separate unit, this permitting the operator to adjust the speed thereof to any desirable value.

Additional baffles 36 may be placed within the sections of the cooling structure, as shown in Figs. 3, 4 and 5, in such a manner as to divide the sections longitudinally into small zones. The baffles 36 may be attached to the baffles 27 in any suitable manner. These baffles 36 may extend substantially vertically downwardly and upwardly from the main or horizontal portions of baffles 27, located at the top and bottom of said sections, to within approximately 3 inches of the plane of the charge, substantially as shown in Figs. 3, 4 and 5. By having the baffles 36 extending substantially vertically from the horizontal portions of baffles 27, and dividing the sections 3 or 3a longitudinally into small zones, such baffles 36 will be substantially perpendicular to top, bottom, and side walls of the sections 3 or 3a, as well as the side portions of the baffle 27.

Accordingly, the baffles 36, may act as guards for the fans, by preventing the charge from buckling up or deforming in such a manner as to hit them, as well as directing the flow of atmosphere within the cooling structure. These baffles 36 extend transversely across the whole section where there are no fans. However, at such points where the fans are located, the baffles 36 extend between the vertical portions of the baffle 27 and the baffles 26 which enclose the fans.

The cooling pipes 28 are grouped in a manner substantially as shown in Fig. 6, and are attached to the bottom or the top of the respective sections by means of a plurality of brackets 42. A series of fins 33 may be attached to the cooling coils 28 in any desired manner to aid the coils in absorbing the heat from the circulating atmosphere. The exact position of the coils 28 upon the top and bottom depends upon this fin construction, as well as the volume of gas de-

sired to be passed over and through this cooling coil and fin construction. These cooling coils then absorb the heat from the charge by convection from the protective gas atmosphere which is circulated through the cooling coils and over the charge. By convection I mean the phenomenon of heat transfer from the charge to the protective gas atmosphere, the movement of heated atmosphere which conveys such heat from the charge to the cooling coils 28, and the absorption thereof by such coils. In addition the cooling coils 28 absorb heat from the charge by means of direct radiation of heat from the charge to the baffles 27, conduction of heat through the baffles, and radiation of such heat from the baffles 27 to the cooling coils.

It is preferred that the cooling coils 28 be made in small sections, each section of which is attached by means of suitable fittings 29 to the outside of the cooling structure. This then makes it possible to have a different rate of cooling throughout the various portions of the cooling structure, by regulating the rate of flow of the cooling medium through the corresponding cooling section located therein.

As shown in Fig. 6, the distance between the centers of the pipes 47 adjacent to the two fan shafts 30 is greater than the the distance between the pipes in the balance of the cooling coil, and the distance between the centers of pipes 46 is either equal to or greater than the distance between pipes 47. This particular type of structure may then be used when there are either one or two fans located upon that particular side of the cooling structure. This may be shown by the two fan shafts 30 located one on each side of the cooling coils between pipes 47 and by the dotted circle 30a which illustrates the position of a single fan shaft 30 when the cooling coils are located upon the reverse side of said structure. It is, therefore, obvious that the same construction of cooling pipes is interchangeable between the top or bottom portions of each section and is interchangeable between alternating sections of the cooling structure regardless of the number of fans located upon that particular section.

It will be observed that the tops 34 of each section are removable, as shown in Figs. 1, 2, 3 and 4. These removable top sections 34 have overhanging lip portions 43 which are inserted within troughs 7 located about each section of the cooling structure. These lips 43 extend down within the troughs 7 and within a suitable sealing medium 6 which is located within the troughs 7. This sealing medium 6 may be of any material desired though it is preferred, due to the high temperatures within the cooling structure, to use a liquid seal such as water, oil, glycerin, etc. Because the sealing trough 7 and the sealing medium 6 may attain a temperature which would vaporize or boil off such sealing medium 6, a cooling coil or pipe 8 is located within the trough 7. Any desirable cooling medium, such as water, is then circulated within this cooling pipe 8, which is immersed in the liquid seal. The presence of such a seal between the top and the cooling structure enables the top to be removable, as well as effecting a gas seal which prevents the protective gas atmosphere from escaping from within the cooling structure.

It will be observed that the baffle structures 36, 26 and 27, the fans 25 with their operatively associated motors 40 and the driving mechanisms 30, 37, 38 and 39, cooling coils 28 with their fittings 29, being attached to the top section 34, may be lifted out of the cooling structure by removing the top section 34. This then makes it possible for the cooling structure to be cleaned or repaired whenever desired without altering or removing any portion of the main cooling structure. The lower baffles 36, 26, 27, fans 25 and cooling coils 28 with their brackets 42 being permanently attached to the main cooling structure, may be repaired and maintained while the top section 34 and its associated parts is removed therefrom. It is, therefore, obvious that due to the liquid seal and removable top structure, the cooling structure may be serviced with a minimum amount of effort and time, without altering or changing any predetermined settings.

By using the liquid seals, as heretofore described, it is possible to maintain within the cooling structure a protective gas atmosphere, preferably partially combusted or cracked hydrocarbon gas which is non-oxidizing. This gas may be injected into the cooling structure at any of several desired positions throughout the length of the cooling structure, preferably through the top. It is preferred that the pressure of said protective gas atmosphere be sufficiently greater than the atmospheric pressure, so that if there should be any slight apertures within the cooling structure, the greater pressure of the protective atmosphere would then prohibit the entrance of outside air into the cooling structure.

The protective gas atmosphere may also be injected into the cooling structure by means of the pipes 22 which have a plurality of small holes drilled and located therein in such a manner as to direct the gas upon the entrance to the first curtaining device 13. This atmospheric curtain will then aid in preventing any air from leaking through said curtaining device by maintaining the pressure on the inner side thereof at a substantially greater value than the air on the outside of said cooling structure.

The operation of the fans which induce a high velocity and turbulent action within the circulating atmosphere causes a small pressure difference between the outside atmosphere located at the curtaining devices and the gas within the cooling structure proper. This small pressure difference may be sufficient to draw air in from the outside. Accordingly, the pressure of the gas used for the gas curtain must be greater than the difference in pressure caused by the fans at the inside of the opening of the curtaining device 13, so as to prevent the air from creeping in and contaminating the atmosphere. This increased gas pressure will then produce a tendency for the atmosphere to force its way out through the plurality of curtaining devices 13 and 14 and further prevent the creeping in of the air.

The plurality of curtaining devices 13 may be made in any suitable manner; however, it is preferred that they be composed of a plurality of asbestos sheets, which are doubled back to form a U with the free ends thereof anchored within the frame 10 of each curtaining device 13. These sheets of asbestos are formed in such a manner and located in such a position that their line of contact is in the plane of the charge. Accordingly, as the sheet steel or the like travels through the cooling structure from one end to the other, it readily enters and proceeds through the plurality of curtaining devices 13 forcing the plurality of sheet asbestos guards 9 apart and forming a good line contact therewith. This then produces a good seal which prohibits the protective atmosphere from leaving and the air from

entering the working portions of the cooling structure while the charge is passing through the curtaining devices 13.

The exterior curtaining device 14, which may be attached to the cooling structure by means of the front wall 74 in any suitable manner, shown in Figs. 1, 7, 8 and 9, may comprise a housing 23 and a plurality of rolls 15 and 16, resiliently mounted within such housing. The top roll 15 is biased downwardly by means of spring 12 while the bottom roll 16 is biased upwardly by spring 12a. The springs 12 and 12a are rigidly attached to the housing 23 by means of tabs 61 and are preferably under tension. The elongated continuous yoke members 62 and 64 connect the rolls 15 and 16 with the springs 12 and 12a, respectively, and act as guides for keeping the rolls in line, one on top of the other. The rolls 15 and 16 may be made of any desirable material, though it is preferred that they be covered with sheet asbestos. As a charge of sheet steel or the like proceeds through the preliminary curtaining devices 13 to the exterior curtaining device 14, it contacts and rides between the resiliently mounted rolls 15 and 16. The rolls 15 and 16, due to the biasing effect of the springs 12 and 12a, ride upon the charge, forming a line contact therewith, and a further seal against the entrance of the air into the cooling structure between such rolls and the charge.

Asbestos curtains 66 prevent gas leakage and the entrance of air around the ends of the rolls 15 and 16 or over and under such rolls. The curtains 66 are formed by two sheets of asbestos as shown in Figs. 10, 11 and 12. The top sheet is attached to an angular support 68 and the bottom central portion 70 thereof is folded around the roll 15, as shown in Figs. 8 and 11, and then attached to the angular support 68. The bottom sheet is wrapped around the roll 16 and attached to support 69 in a similar manner. The side flaps 72 of the respective sheets are sewed together, and then rigidly attached to the front wall 74 of the housing 23 by means of plate 76 and rivets 78. It is obvious that the curtains thus prevent the passage of air or gas about the ends and around the top or bottom of rolls 15 and 16.

Due to the operation of the fans, the protective gas atmosphere is circulated in various circular orbits, the planes of which are at approximately right angles to the longitudinal axis of the cooling structure. The atmosphere is forced either downwardly or upwardly depending upon whether or not it will be above or below the charge until it strikes the charge whereupon it spreads out in all directions.

A large portion of the atmosphere proceeds along the longitudinal axis upon the surface of the charge and in so doing encounters the vertical baffles 36, which longitudinally divide the cooling structure into small zones. These baffles perform a dual function in respect to the protective gas atmosphere by increasing the relative velocity of the atmosphere with respect to the charge and by acting to stir the atmosphere and introduce a turbulent effect therein which eliminates any tendency for hot and cold gases to stratify with respect to the charge.

Because of the vacuum between the vertical side baffles 27 and the side walls of the cooling structure, that portion of the atmosphere which does not travel longitudinally along the charge is drawn directly to the side and upwardly or downwardly toward the fan and the cooling coils. That portion of the atmosphere which progresses longitudinally along the charge is then drawn to the side along an arcual path except when being interrupted in its travel by the presence of the baffles 36. After the gas is drawn upwardly or downwardly along the side of the cooling structure, it encounters and proceeds through the cooling coils located upon the top and bottom between the horizontal portions of baffles 27 and the top and bottom walls 24 and 24a, which absorb the heat that has been convected or conducted from the charge by the circulating atmosphere. The cooled atmosphere is then drawn through the fan and again blown upon the moving charge to continue its travel and conduction of heat therefrom.

In the operation of the continuous cooling structure 11, the charge of continuous sheet steel or the like is delivered from any preheating or normalizing furnace 5 into the end section 1, where it rides upon and is propelled by the plurality of rolls 52. As the charge progresses through the cooling structure, it enters the intermediate sections 3 where, due to the circulation of the contained protective gas atmosphere which absorbs and conducts the heat from the charge, it is progressively cooled from the preheated or normalizing temperature of approximately 1700° F. to a non-oxidizing temperature of approximately 300° F. The time required for this change of temperature in the charge may be of any desired value depending upon the velocity of such charge through the cooling structure, the velocity of the circulating atmosphere and the rate of flow of the cooling medium within the cooling coils.

Then as the charge leaves the last of the cooling sections, it proceeds on into the last section where it encounters and traverses the plurality of various curtaining devices. These curtaining devices act as filters which permit a small amount of the protective gas atmosphere to leave the cooling structure, but prevent the admission or creeping in of the air which would contaminate the non-oxidizing protective atmosphere within the cooling structure.

It is, therefore, obvious that by means of regulating the rate of flow of the gas and the rate of flow of the cooling medium within the cooling coils, I am able to cool and to variably control the rate of cooling of a charge of continuous sheets or the like as the charge progresses through the cooling structure and while enveloped by a protective gas atmosphere. By so regulating the rate of cooling the charge, the length of time a particular portion thereof is within the cooling structure is also a variable factor which may be regulated at the will of the operator.

It is also obvious that I have provided a highly desirable and efficient means of absorbing the heat from the charge and of conducting such heat out of the cooling structure and at the same time reducing the necessary volume of the protective gas required by circulating it within the structure.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and the appended claims.

I claim as my invention:

1. A cooling structure for cooling continuous sheets and the like having therein a protective

gas atmosphere, comprising the combination of a casing having a pair of top and bottom walls, with means for moving said sheets through said casing, means comprising fans located within the casing for circulating the atmosphere therein whereby said atmosphere may absorb and conduct the heat from the moving sheets, means comprising substantially U-shaped baffles, each having intermediate portions located substantially parallel to and at a short distance from one of the walls of said pair of walls, and baffles transverse to said walls located substantially perpendicular to said intermediate portions of the U-shaped baffles for directing the circulation of the atmosphere upon said moving sheets, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

2. A cooling structure for cooling continuous sheets and the like having therein a protective gas atmosphere, comprising the combination of a casing having a pair of top and bottom walls, with means for moving said sheets through said casing, means comprising fans located within the casing for circulating the atmosphere therein whereby said atmosphere may absorb and conduct the heat from the moving sheets, means comprising substantially U-shaped baffles, respectively having intermediate portions located substantially parallel to and at a short distance from one of the walls of said pair of walls, and baffles transverse to said walls located substantially perpendicular to said intermediate portions of the U-shaped baffles for directing the circulation of the atmosphere upon said moving sheets, means comprising pipes located within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from said pipes and out of the casing.

3. A cooling structure for cooling continuous sheets and the like having therein a protective gas atmosphere, comprising the combination of a casing having a pair of top and bottom walls, with means for moving said sheets through said casing, means comprising fans located within the casing for circulating the atmosphere therein whereby said atmosphere may absorb and conduct the heat from the moving sheets, means comprising substantially U-shaped baffles, respectively having intermediate portions located substantially parallel to and at a short distance from one of the walls of said pair of walls, and baffles transverse to said walls located substantially perpendicular to said intermediate portions of the U-shaped baffles for directing the circulation of the atmosphere upon said moving sheets, means comprising pipes located between said intermediate portions and the said walls for absorbing heat from said atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

4. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere; said structure comprising the combination of a casing having a top and a bottom wall, with means for moving such sheets longitudinally through said casing, means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising a baffle having an intermediate portion located a short distance from one of said walls and forming a space therewith, said intermediate portion extending in the general direction of the movement of the sheets, spaced baffles disposed transverse to said direction and depending from said baffle in proximity to but spaced slightly from the path in which said sheets move, cooling means including pipes in the said space for absorbing heat from the atmosphere and conveying it outside the casing.

5. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a pair of walls including a top and a bottom wall, and having side walls, with means for moving said sheets longitudinally through said casing, means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising a baffle having an intermediate portion located a short distance from one of said pair of walls, said intermediate portion extending in the general direction of the movement of said sheets, said baffle also having leg portions depending vertically from a pair of opposite edges of said intermediate portion, and extending toward and in proximity to the path in which said sheets move but spaced slightly therefrom, said leg portions being spaced from the adjacent walls of said side walls, and means for absorbing heat from the atmosphere within said casing, and for conducting such absorbed heat out of the casing.

6. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a pair of walls comprising a top and a bottom wall, and having ends, with means for moving said sheets longitudinally through said casing, means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising a baffle having an intermediate portion located a short distance from one of said pair of walls, said intermediate portion extending in the general direction of the movement of said sheets, said baffle also having leg portions depending from a pair of opposite edges of said intermediate portion, and extending toward and in proximity to the path in which said sheets move, said baffle terminating short of the said ends, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from said absorbing means and out of the casing.

7. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere said structure comprising the combination of a casing having a pair of walls including a top and a bottom wall, and having side walls and ends, with means for moving said sheets longitudinally through said casing, means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising a baffle having an intermediate portion located a short distance from one of said pair of walls, said intermediate portion extending in the general direction of the movement of said sheets, said baffle also having leg portions depending from a pair of opposite edges of said intermediate portion, and extending toward and in proximity to the path in which said sheets move but spaced slightly therefrom, said leg portions being spaced from said side walls, said baffle terminating short of the said ends, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from said absorbing means and out of the casing.

8. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a top and a bottom wall, with means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising substantially U-shaped baffles, respectively having their intermediate portions substantially parallel to and a short distance from said walls, and their side portions vertically directed toward the center of the casing, means within the casing for absorbing heat from the atmosphere, and for conducting such absorbed heat out of the casing.

9. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a top and a bottom wall, with means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising substantially U-shaped baffles, respectively having their intermediate portions substantially parallel to and a short distance from said walls, means to move said sheets longitudinally through said casing between said intermediate portions, said baffles having side portions extending toward and in proximity to the path in which said sheets move but spaced slightly therefrom, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

10. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a top and a bottom wall, and having ends, with means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising substantially U-shaped baffles, respectively having their intermediate portions substantially parallel to and a short distance from said pair of walls, means to move said sheets longitudinally through said casing between said intermediate portions, said baffles having portions extending toward and in proximity to the paths in which said sheets move but spaced slightly therefrom, said baffles terminating short of said ends, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

11. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a pair of walls comprising a top and a bottom wall, and having side walls, with means for moving said sheets longitudinally through said casing, means for circulating the atmosphere within said casing whereby said atmosphere may absorb and conduct away heat from the moving sheets, means for directing the flow of atmosphere within the casing, comprising substantially U-shaped baffles respectively having their intermediate portions located substantially parallel to and a short distance from said pair of walls, said baffles having their side portions extending toward and in proximity to but spaced from the path in which said sheets move, and spaced from said side walls, means within the casing for absorbing heat from the atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

12. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a top and a bottom wall, and having side walls, with means for moving said sheets longitudinally through said casing, circulating means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the caisng, comprising substantially U-shaped baffles, respectively having their intermediate portions substantially parallel to and a short distance from the saip top and bottom walls, said intermediate portions having apertures, said circulating means comprising air propelling means in said apertures, said baffles also having leg portions depending from a pair of opposite edges of said intermediate portions and extending towards and in proximity to the path in which said sheets move but spaced slightly therefrom, said leg portions being spaced from said side walls, means within the casing for absorbing heat from said atmosphere, and means for conducting such absorbed heat away from the absorbing means and out of the casing.

13. A cooling structure for cooling continuous sheets and the like while enveloped by a protective atmosphere, said structure comprising the combination of a casing having a top and a bottom wall, and having side walls, with means for moving said sheets longitudinally through said casing, circulating means for circulating the atmosphere within the casing, means for directing the flow of atmosphere within the casing, comprising substantially U-shaped baffles having their intermediate portions substantially parallel to and a short distance from the said top and bottom walls, said intermediate portions having apertures, said circulating means comprising air propelling means forcing air through said apertures, said baffles also having leg portions depending from a pair of opposite edges of said intermediate portions and extending towards and in proximity to the path in which said sheets move but spaced slightly therefrom, said leg portions being spaced from said side walls, means including fluid-carrying pipes in the spaces between the said intermediate portions and said top and bottom walls, said pipes having fluid inlet and fluid outlet means outside the casing.

14. The structure of claim 12 including spaced baffles extending between said leg portions.

15. A cooling structure for cooling continuous sheets and the like, comprising, a walled casing having a removable top wall section, a baffle supported from and in spaced relation to said top wall section, cooling means comprising pipes supported on said baffle, and having pipe inlet and pipe outlet means extending through said top wall section, means supported by said top wall section for circulating atmosphere in said casing, and including an air propelling means in an aperture in said baffle, said baffle including depending baffles for directing the flow of atmosphere within said casing in orbital paths passing through said cooling pipes.

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