March 29, 1932. W. M. ARCK 1,851,077

COOLER

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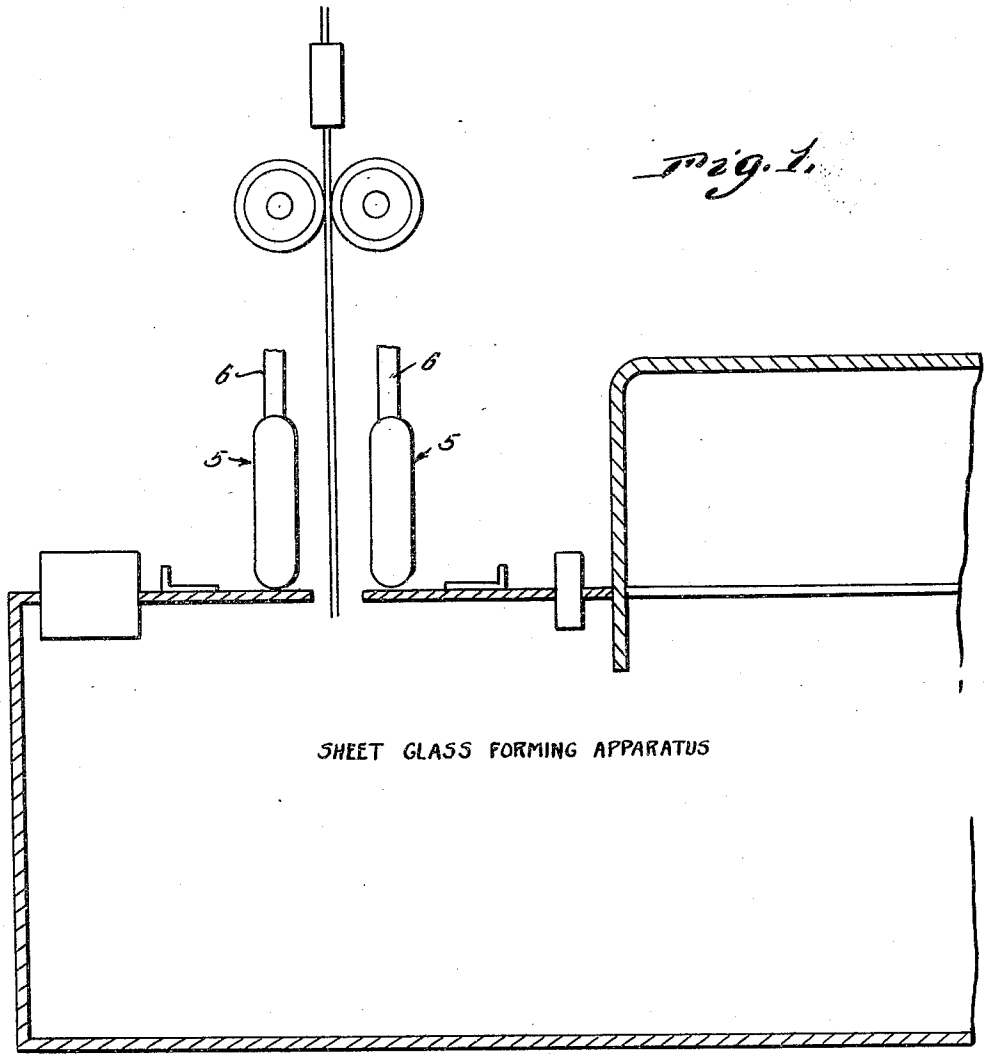
Fig. 1.



SHEET GLASS FORMING APPARATUS

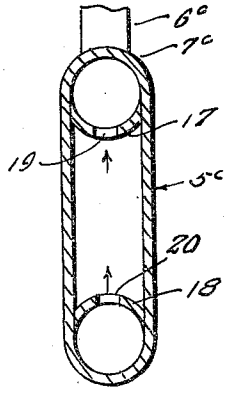


Fig. 10.

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Fig. 2.

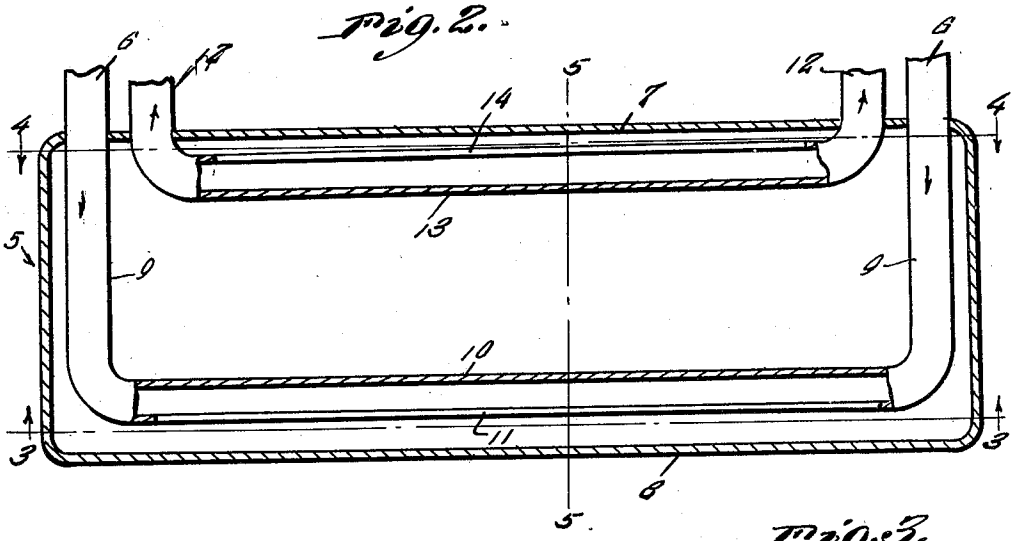
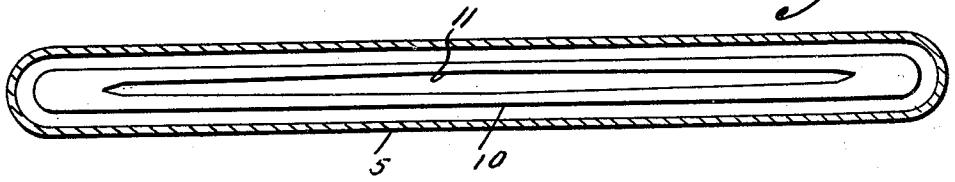


Fig. 3.



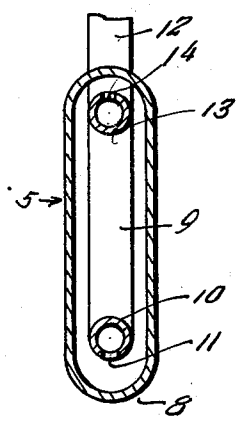


Fig. 5.

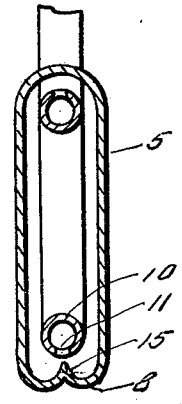


Fig. 9.

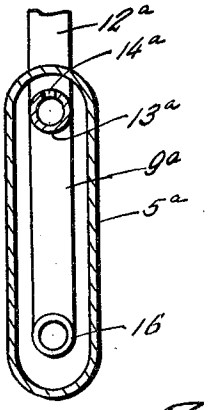


Fig. 7.

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COOLER

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Fig. 6.

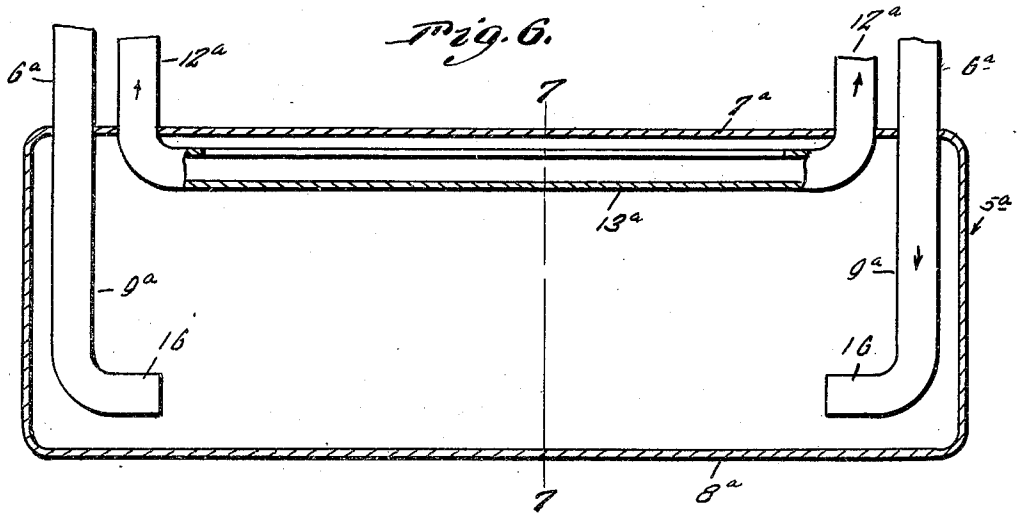
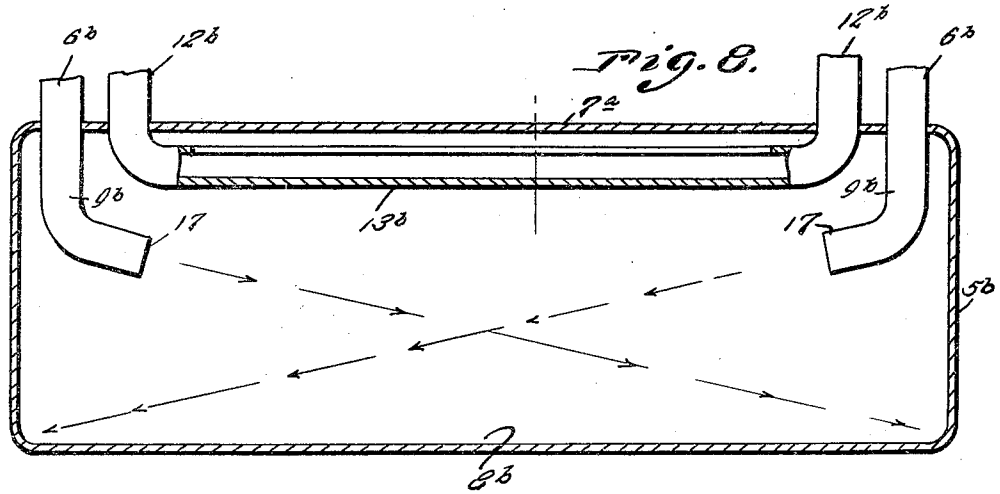


Fig. 8.



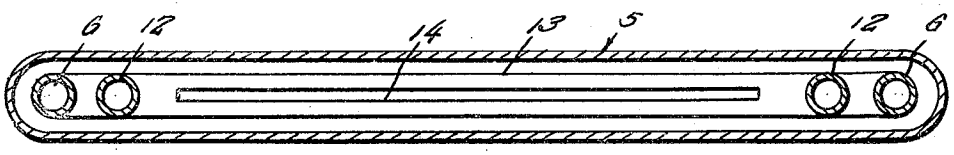


Fig. 4.

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Patented Mar. 29, 1932 1,851,077

UNITED STATES PATENT OFFICE

WILLIAM M. ARCK, OF MOUNT VERNON, OHIO

COOLER

Application filed July 28, 1931. Serial No. 553,625.

This invention relates generally to coolers for use in glass sheet manufacture, in conjunction with the sheet forming apparatus, to prevent the formation of cold lines in the manufacture of the sheets, and the principal object of the invention is to provide a cooler of the type described wherein a new and novel principle is embodied, and whereby the efficiency of cooling apparatus of this kind is enhanced, the operation and maintenance of the same is reduced in cost, and superior work is rendered possible, with consequent economic advantages.

It is also an object of this invention to provide a cooler of the type described which is very cheap to manufacture and install and which is composed of no moving parts and which is simple and durable in construction, and is adapted to be positioned and installed in various types of glass sheet manufacturing machines.

These and other objects of the invention, its nature and its combination and arrangement of parts will be readily understood by any one acquainted with the art to which this invention relates upon consulting the following description of the drawings in which:—

Figure 1 is a sectional view through a glass sheet making machine showing the positioning of a pair of the coolers of the invention with respect thereto.

Fig. 2 is a longitudinal vertical section through one tvpe of the coolers of my invention.

Fig. 3 is a horizontal sectional view taken approximately on the line 3—3 and looking upwardly in Fig. 2, and

Fig. 4 is a horizontal sectional view taken approximately on the line 4—4 of Fig. 2, looking downwardly.

Fig. 5 is a transverse vertical sectional view taken approximately on the line 5—5 of Fig. 2, and

Fig. 6 is a longitudinal vertical sectional view of a modification of Fig. 2.

Fig. 7 is a transverse vertical sectional view taken approximately on the line 7—7 of Fig. 6.

Fig. 8 is a longitudinal vertical sectional view through a further modification of Fig. 2.

Fig. 9 is a transverse vertical sectional view through a still further modification similar to that shown in Fig. 2.

Fig. 10 is a sectional view similar to Fig. 9, in a still further modification.

The casing 5 of the device of the invention is a closed casing of a height approximately three times the dimension of its width, and of generally elongated form. It is adapted to be usually placed on its lower edge as seen in Fig. 1, and properly spaced closely with the work. The principal function of the device is to present the greatest cooling effect possible in the compass provided, and arrangement is made to convey cold water or artifically cooled air or other fluid under pressure into the casing 5 so that it strikes against the bottom, and presents the greatest cooling effect at the bottom edge, and the water or air is expelled on at the top of the casing, the point at which the warmest water or air will be present during the circulation of water through the interior.

In order to accomplish the circulation of water or air according to this plan, there is provided an arrangement of a pair of inlet pipes 6 entering the top wall of the casing, which for convenience is preferably formed curvate in the cross section, as is the bottom wall 8, the top wall being designated by the numeral 7. In the form of device shown in Fig. 2, the inlet pipes 6 have portions 9 projecting vertically from the casing, and a horizontal portion 10 is formed integral with the lower ends of the vertical portions 9 and as near the bottom wall 8 as is consistent with the effect desired.

The bottom side of the horizontal portion 10 is provided with an elongated slot 11 of symmetrical proportions and are so formed as to provide that as equal pressures of water or air are delivered through the upright portions 9 of the pipes 6, equal pressures of water or air will be expelled thru the slot 11 against the bottom wall 8 of the casing, so as to cool the bottom wall of the casing equally throughout its entire length.

Outlet pipes 12 are projected through the top wall 7 of the casing and between the inlet pipes 6 and the inner ends of the pipes 12 have a horizontal pipe 13 placed as close to the upper wall 7 as may be conveniently done. A slot 14 is placed the length of the upward side of the horizontal pipe 13, and so proportioned as to properly withdraw the water or air from the casing 5 at the highest point of the casing, where the water or air is warmest.

It is essential for the successful operation of the forms of the device shown in the drawings, that the pressure in each inlet pipe 6 be equalized, so as to equalize the impinging of the cooling water or air against every point of the lower wall 8 so as to equally cool the same throughout its length to prevent cold lines in the finished glass sheet.

The maintenance of equal pressures will insure absolutely the even cooling desired in this type of work.

Referring to Fig. 9, a modification of Fig. 2 is shown in which the entire structure is identical with that shown in Figs. 2 and 5 and also in Fig. 3, but there is an addition to the lower wall 8 in the form of a ridge or longitudinal projection 15 which is alined with the slots 11 in the horizontal pipe of the inlet conduits.

Reference to Fig. 6 will show a modification in which the outlet conduit is identical with that of the form shown in Fig. 2, the casing 5*a* being identical in formation. The inlet pipes 6*a* with their vertical portions 9*a* also extend to a point near the lower wall 8*a*, but instead of having a horizontal pipe like that of 10 in Fig. 2, the portions 9*a* terminate in elbows 16, and horizontally directed, so that the incoming water or air is not directly impinged against the bottom wall 8*a*, but, since equal pressures of water or air are coming into the pipes 6*a*, there will be produced an equal distribution of pressure against the bottom wall 8*a* as the result of the coming of the streams from the elbows 16.

Referring to Fig. 8, the outlet conduit 13*b* is the same as the outlet conduits of the forms already described, and the casing 5*b* is also identical with the structure, as is the placement of the inlet pipes 6*b*. In this form, however, the vertical portions 9*b* depending from the inlet pipes 6*b* do not extend downwardly as far as they do in the forms of the invention already described, but they stop short at a point just under the conduit 13*b* where they are provided with downwardly and angularly directed nozzles 17, so as to impinge a diagonal stream of water or air against opposite corners of the lower part of the casing 5*b*.

The resultant of equal pressures of water or air coming through the pipes 6*b* in this form causes to impinge equally along the bottom wall 8*b* the cooling water or air. Referring to Fig. 10, there is disclosed a still further form of the invention in which the casing 5*c* is provided with the inlet and discharge pipes 6*c* and 12*c* arranged as in the other forms of the invention, but they are welded to the top wall 7*c* and do not project into the casing, but simply are communicated therewith.

The inlet pipes 6*c* project to the bottom of the casing as in the forms shown in Figs. 6 and 2. In the form shown in Fig. 10 longitudinally halved pipes are welded in the upper and lower part of the casing 5*c* as indicated 17 and 18 and they are provided with facing slots 19 and 20. The inlet pipes 6*c* go to the casing in the manner described and communicate with the lower pipe 18.

It is believed that the above is sufficient description and explanation to enable any one acquainted with the art to which this invention relates to make and use forms of the device of the invention, and therefore, further description will not be given.

Since various forms of manufacture and assembly, as well as certain variations in structure and materials is possible within the concept of the invention, it is to be definitely understood that I do not desire to limit the application of this invention to the particular modifications set out herein to illustrate the principles thereof, and any change or changes may be made in material and structure and arrangement of parts consistent with the spirit and scope of the invention.

Having thus described my invention, what I claim as new is:—

1. A cooler of the type described comprising an elongated, narrow, closed casing taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid under pressure against the lower wall of the casing throughout its length, and outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing.

2. A cooler of the type described comprising an elongated, narrow closed casing, taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing, through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid

under pressure against the lower wall of the casing throughout its length, outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing, said fluid distributing means comprising a horizontal tubular formation formed with an opening in one side thereof.

3. A cooler of the type described comprising an elongated, narrow closed casing, taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing, through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid under pressure against the lower wall of the casing throughout its length, outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing, said fluid distributing means comprising a horizontal tubular formation formed with an opening in one side thereof, and said outlet means comprising a horizontal tubular formation having an opening in one side thereof.

4. A cooler of the type described comprising an elongated, narrow, closed casing taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid under pressure against the lower wall of the casing throughout its length, outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing, said fluid distributing means comprising inwardly directed nozzles on the lower portions of the said downward extensions of the inlet pipes.

5. A cooler of the type described comprising an elongated, narrow, closed casing, taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing, through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid under pressure against the lower part of the casing throughout its length, outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing, said fluid distributing means comprising a horizontal tubular formation formed with an opening in one side thereof, said outlet means comprising a horizontal tubular formation having an opening in one side thereof, said tubular formations being constructed integral with the walls of the casing.

6. A cooler of the type described comprising an elongated, narrow, closed casing, taller than it is wide, a pair of fluid pressure inlet pipes connected to and having communication with the interior of the casing through the top wall of the casing, a vertical downward extension on each of said inlet pipes within the casing, a pair of outlet pipes also connected to and having communication through the top wall of the casing, the lower portions of said inlet pipes having fluid distributing means to evenly distribute fluid under pressure against the lower part of the casing throughout its length, outlet means close to the top wall in the interior of the casing connected with said outlet pipes for discharging the fluid contents of the casing, said fluid distributing means comprising a horizontal tubular formation formed with an opening in one side thereof, said tubular formations being spaced close to the top and bottom walls of the casing.

In testimony whereof I affix my signature.

WILLIAM M. ARCK.