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C. C. HILL.
CONDENSING OR COOLING APPARATUS.

(Application filed Oct. 23, 1901.)

(No Model.)

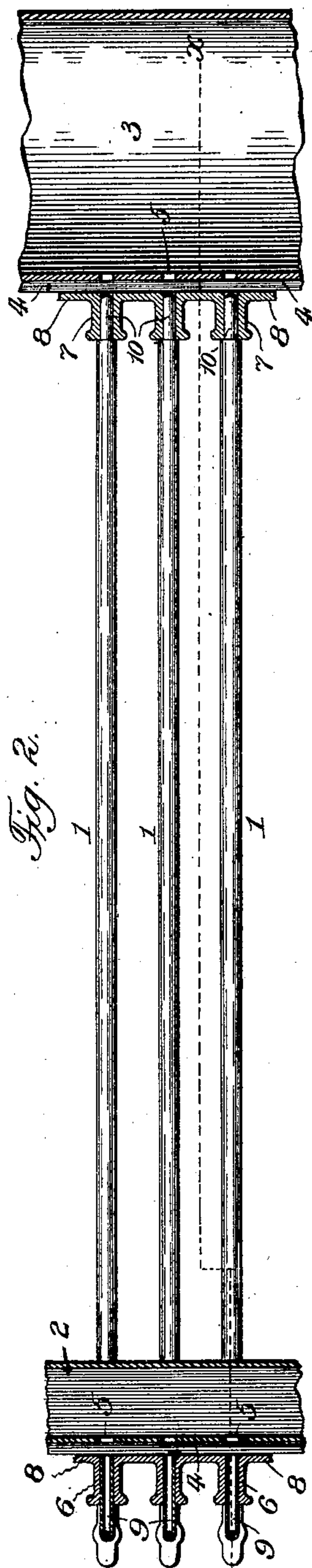


Fig. 2.

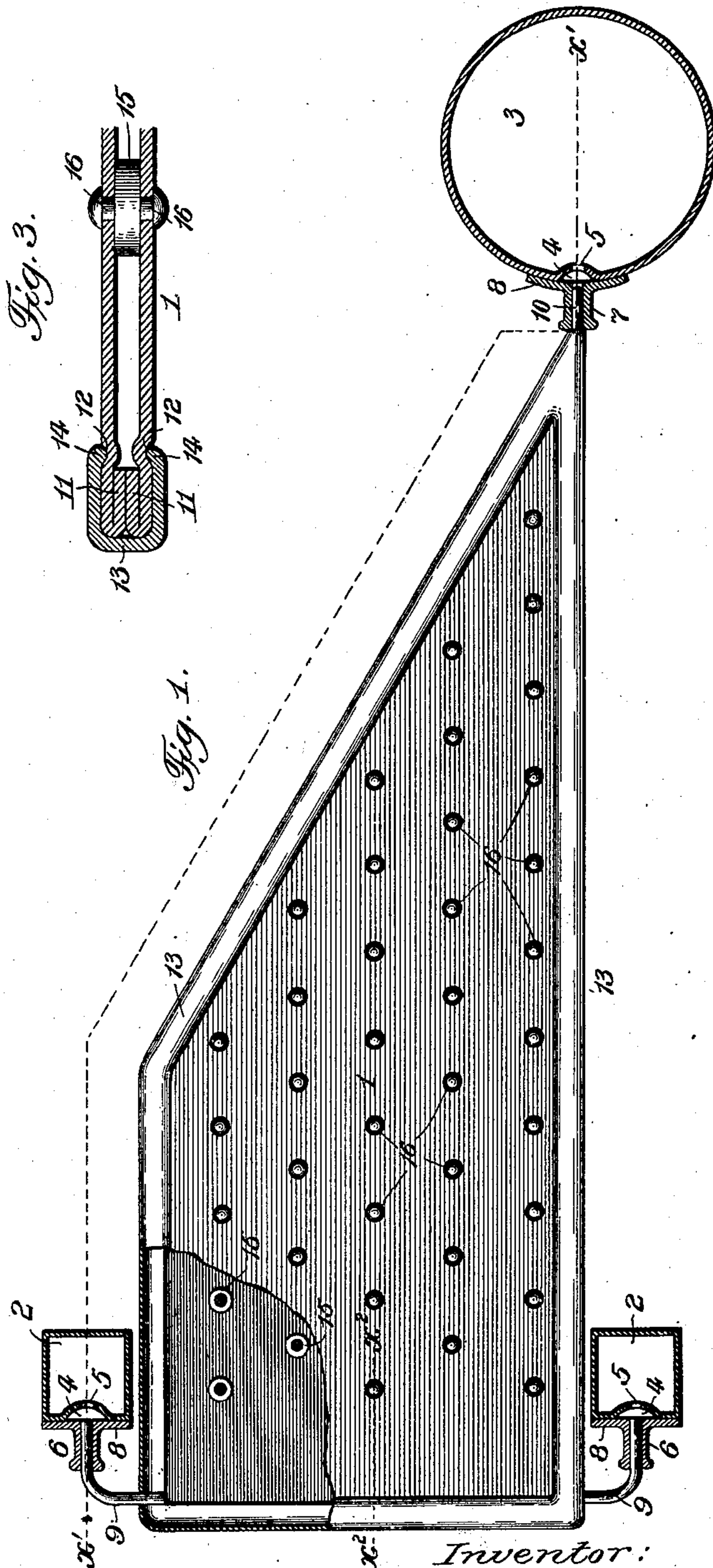


Fig. 1.

Fig. 3.

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CONDENSING OR COOLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,712, dated September 9, 1902.

Application filed October 23, 1901. Serial No. 79,683. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN C. HILL, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Condensing or Cooling Apparatus, of which the following is a specification.

This invention relates to condensing and cooling apparatus for steam and gases, and more especially to the type of such condensing apparatus intended for use on motor-vehicles and like portable machines.

The present improvement has for its object to provide a simple, efficient, and durable construction and arrangement of the component parts of a sectional condenser or cooler in which the liability to rapid wear and a consequent leakage of the joints and connections of the condenser-sections due to the continued jarring and jolting of the parts when used on motor-vehicles and the like is reduced to a minimum and with which great lightness can be attained and the ready removal and replacement of a disabled condenser-section effected in a rapid and convenient manner, all as will hereinafter more fully appear and be more particularly pointed out in the claims.

In the accompanying drawings, illustrative of the present invention, Figure 1 is a vertical sectional elevation at line xx , Fig. 2, of a motor-vehicle condenser embodying the present invention; Fig. 2, a fragmentary sectional plan view of the same at line $x'x'$, Fig. 1; Fig. 3, an enlarged detail section at line x^2x^2 , Fig. 1.

Similar numerals of reference indicate like parts in the different views.

Referring to the drawings, 1 represents a series of condenser or cooler sections arranged in parallel and separated relation and each of which sections will in the present improvement preferably consist of a pair of parallel plates having a separated relation and secured together at their marginal edges by a suitable connecting binder-cap and at points intermediate of the surface of such plates by a series of stay-rivets, as hereinafter more fully described.

2 is an inlet or supply head or manifold connected in any usual and suitable manner

with the exhaust pipe or passage of a motor-engine or other like source of vapor to be cooled or condensed. Such supply-head 2 is arranged transversely of the series of condenser-sections 1 and provided with individual necks for connection with such condenser-sections. In the preferred arrangement of the present invention, as illustrated in Fig. 1 of the drawings, a counterpart or duplicate arrangement of the aforesaid supply-heads 2 will preferably be employed and arranged, respectively, at the upper and lower forward ends of the condenser-sections with a view to attain a more effective distribution of the steam, vapor, or gases into the series of condenser-sections and at the same time afford a very effective detachable connection and support for the condenser-sections in accordance with one part of the present invention.

3 is the outlet or discharge head or manifold, connected in any usual and suitable manner to the feed-water or other like receiver for the condensed or cooled vapor coming from the condenser. Such outlet-head is also arranged transversely of the series of condenser-sections 1 and provided with individual necks for connection with such condenser-sections.

In the present invention the inlet and outlet heads 2 and 3 aforesaid will be formed with longitudinal channels or depressions 4, in the sunken walls of which are formed openings or orifices 5, preferably in line with the series of condenser-sections, as shown.

6 and 7 are the individual connecting-necks of the respective inlet and outlet heads 2 and 3 and which connecting-necks have in the present invention a flexible formation which is attained in any usual and suitable manner, preferably by being formed of a flexible material, such as vulcanized rubber, and provided with an attaching-base 8, adapted to bridge over the longitudinal channel or depression 4 of the particular inlet or outlet head to which attachment is made, and attached in any suitable manner to the respective margins of such depression. In the preferred construction of the aforesaid connecting-necks and attaching-base, as illustrated in Figs. 1 and 2, the base 8 will be in the form of a single elongated member carrying the

series of integrally-formed connecting-necks. With such construction a limited independent movement is afforded between the condenser-sections and the aforesaid inlet and outlet heads, which have a fixed attachment to the motor-vehicle body to prevent in a very effective manner a transmission of the usual jarring and jolting movements of the motor-vehicle to such condenser-sections and the consequent rapid wear of the joints and connections of such sections which would occur in a rigid connection between the condenser-sections and the inlet and outlet heads carried on the motor-vehicle body.

9 and 10 are a series of inlet and outlet tubular pipe extensions on the respective condenser-sections 1 and adapted to engage in a detachable manner the series of connecting-necks 6 and 7 in the assemblage of the condenser parts together. As so constructed any single condenser-section which may become leaky or otherwise disabled can be removed in a rapid and convenient manner and either replaced by a perfect condenser-section or the connecting-necks therefor plugged in any suitable manner to in either case permit of an immediate and continued use of the condenser.

In the type of condenser illustrated in Fig. 1 of the drawings and which is intended for use in the forward or dash portion of motor-vehicles the series of condenser-sections have an approximately triangular shape and arranged intermediate of the respective upper and lower inlet-heads 2 and connected thereto by angular pipe extensions 9, the horizontal portions of which are adapted to enter and engage the horizontally-arranged necks 6 of the heads 2 aforesaid. Such condenser-sections are arranged immediately forward of the outlet-head 3 and connected thereto by the horizontal pipe extensions 10, adapted to enter and engage the horizontally-arranged necks 7 of the head 3 aforesaid. As so arranged the condenser-sections are capable of a ready disengagement and reengagement in a horizontal direction for repair and other like operations in a convenient and easy manner.

In the construction illustrated in the drawings the pair of side plates composing the condenser-sections are connected together in the following manner:

11 represents marginal folds on the opposing faces of said plates, the combined thickness of which folds constitutes the extent of separation between said plates.

12 represents depressions formed in the respective side plates near the respective margins of the same and immediately adjacent to the inner edges of the folds 11 aforesaid.

13 is a connecting cap-piece or binder having a U or channel shape in cross-section and which is adapted to embrace the margins or borders of the aforesaid plates to hold the same in fixed and connected relation and insure a steam-tight joint around the margin of

the condenser-section, and to such end the said cap-piece or binder will be formed of a ductile metal adapted for forcible compression upon the outside of the respective plates composing the condenser-section to bind the same together in a tight and substantial manner.

14 represents inturned lips on the cap-piece or binder 13, adapted to fit the depressions 12 in the side plates of the condenser-section, and which lips are preferably formed in the operation of forcibly compressing the cap-piece or binder 13 in place upon said side plates.

15 represents the series of stay-rivets of the present invention and which are formed with an enlarged central portion corresponding in length with the distance between the side plates of the condenser-section and fitting between the same to prevent a collapse of the same in use. Such stay-rivets are also formed with reduced extensions 16 at opposite ends of the enlarged central portion adapted to pass through orifices in the side plates and be riveted or headed upon the outside of said plates to hold the same in proper separated relation against pressure within the condenser-section.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A condensing or cooling apparatus, comprising in combination, inlet and outlet heads, and a condensing or cooling chamber yieldingly connected to said heads by flexible connections which are adapted to permit of a ready detachment of said chamber from said head, substantially as set forth.

2. A condensing or cooling apparatus comprising in combination, inlet and outlet heads, and a series of condenser-sections yieldingly connected to said heads by flexible connections which are adapted to permit of a ready detachment of said chamber from said head, substantially as set forth.

3. A condensing or cooling apparatus, comprising in combination, inlet and outlet heads, and a condensing or cooling chamber yieldingly connected to said heads by flexible connections which are adapted to permit of a ready detachment of said chamber from said head, the same comprising flexible nipples and tubular necks on the respective parts, substantially as set forth.

4. A condensing or cooling apparatus, comprising in combination, inlet and outlet heads, and a series of condenser-sections yieldingly connected to said heads by flexible connections which are adapted to permit of a ready detachment of said chamber from said head, the same comprising flexible nipples and tubular necks on the respective parts, substantially as set forth.

5. A condensing or cooling apparatus, comprising in combination, inlet and outlet heads, a series of condenser-sections, a series of flexible nipples secured to the inlet and outlet heads, and a series of tubular necks attached

to the condenser-sections and adapted for engagement with the flexible nipples which are adapted to afford individual yielding connections between said chambers and heads, and permit of a ready and individual detachment of the parts, substantially as set forth.

6. A condensing or cooling apparatus, comprising in combination, inlet and outlet heads, a series of condenser-sections, a series of flexible nipples having enlarged and integrally-formed bases common to a series of such nipples and secured to the inlet and outlet heads, and a series of tubular necks attached to the condenser-sections and adapted for engagement with the flexible nipples which are adapted to afford individual yielding connections between said chambers and heads, and permit of a ready and individual detachment of the parts, substantially as set forth.

7. A condensing or cooling apparatus comprising in combination, inlet and outlet heads formed with longitudinal depressions in their sides and with orifices in the sunken walls of such depressions, a series of condenser-sections, a series of flexible nipples secured to the inlet and outlet heads, and a series of tubular necks attached to the condenser-sections and adapted for engagement with the flexible nipples, which are adapted to afford individual yielding connections between said chambers and heads, and permit of a ready and individual detachment of the parts, substantially as set forth.

8. A condensing or cooling apparatus comprising in combination, inlet and outlet heads formed with longitudinal depressions in their sides and with orifices in the sunken walls of such depressions, a series of condenser-sections, a series of flexible nipples having enlarged and integrally-formed bases common to a series of such nipples and secured to the respective inlet and outlet heads outside the longitudinal depressions aforesaid, and a series of tubular necks attached to the condenser-sections and adapted for engagement with the flexible nipples, substantially as set forth.

9. A condensing or cooling apparatus, comprising in combination, upper and lower inlet-heads, an outlet-head arranged to the rear of the lower inlet-head, and a series of condenser-sections arranged between the upper and lower inlet-heads and forward of the outlet-head and connected to said heads by flexible connections, substantially as set forth.

10. A condensing or cooling apparatus, comprising in combination, upper and lower inlet-heads, an outlet-head arranged to the rear of the lower inlet-head, and a series of condenser-sections arranged between the upper and lower inlet-heads and forward of the outlet-head, and connected to said heads by flexible connections, the same comprising flexible nipples and tubular necks on the respective parts, substantially as set forth.

11. A condensing or cooling apparatus, comprising in combination, upper and lower in-

let-heads, an outlet-head arranged to the rear of the lower inlet-head, a series of condenser-sections arranged between the upper and lower inlet-heads and forward of the outlet-head, a series of flexible nipples secured to the inlet and outlet heads, and a series of tubular necks attached to the condenser-sections and adapted for engagement with the flexible nipples, substantially as set forth.

12. A condensing or cooling apparatus, comprising in combination, upper and lower inlet-heads, an outlet-head arranged to the rear of the lower inlet-head, a series of condenser-sections arranged between the upper and lower inlet-heads and forward of the outlet-head, a series of flexible nipples having enlarged and integrally-formed bases common to a series of such nipples and secured to the inlet and outlet heads, and a series of tubular necks attached to the condenser-sections and adapted for engagement with the flexible nipples, substantially as set forth.

13. A condensing or cooling apparatus, comprising in combination, upper and lower inlet-heads, an outlet-head arranged to the rear of the lower inlet-head, a series of condenser-sections arranged between the upper and lower inlet-heads and forward of the outlet-head, a series of flexible nipples secured to the inlet and outlet heads, and a series of tubular necks attached to the condenser-sections and having horizontal extensions adapted for engagement with the flexible nipples, substantially as set forth.

14. In a cooling or condensing apparatus of the character herein described, a condenser-section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, and means for securing the margins of the plates together, substantially as set forth.

15. In a cooling or condensing apparatus of the character herein described, a condenser-section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, and a binding cap-piece embracing the margins of the plates and securing the same together, substantially as set forth.

16. In a cooling or condensing apparatus of the character herein described, a condenser-section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, said plates having a depression adjacent to said folds, and a binding cap-piece embracing the margins of the plates and provided with intumed lips engaging the depressions aforesaid, substantially as set forth.

17. In a cooling or condensing apparatus of the character herein described, a condenser-section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, means for securing the mar-

gins of the plates together, and a series of stay-rivets arranged between the plates and provided with an enlarged central body portion and reduced rivet extensions at opposite ends, substantially as set forth.

18. In a cooling or condensing apparatus of the character herein described, a condenser-section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, a binding cap-piece embracing the margins of the plates and securing the same together, and a series of stay-rivets arranged between the plates and provided with an enlarged central body portion and reduced rivet extensions at opposite ends, substantially as set forth.

19. In a cooling or condensing apparatus of the character herein described, a condenser-

section comprising two parallel plates, marginal folds on the opposing faces of such plates adapted to maintain the plates in separated relation, said plates having a depression adjacent to said folds, a binding cap-piece embracing the margins of the plates and provided with inturned lips engaging the depressions aforesaid, and a series of stay-rivets arranged between the plates and provided with an enlarged central body portion and reduced rivet extensions at opposite ends, substantially as set forth.

Signed at Chicago, Illinois, this 15th day of October, 1901.

CHRISTIAN C. HILL.

Witnesses:

ROBERT BURNS,
HENRY A. NOTT.