

**Nov. 18, 1924.**

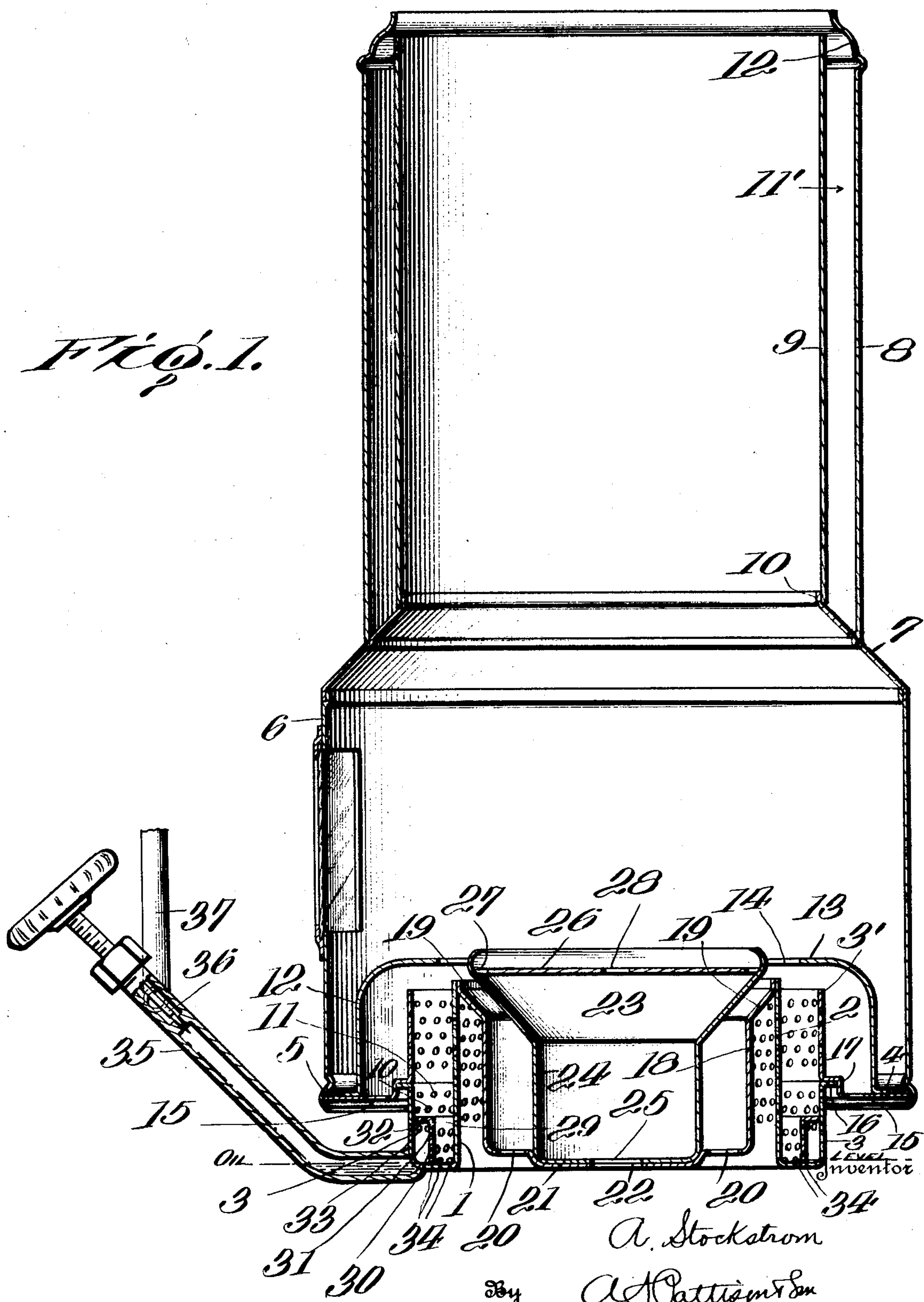
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## A. STOCKSTROM

WICKLESS OIL BURNER

Filed Jan. 18, 1924

2 Sheets-Sheet 1



A. Stockstrom

By *A. Patterson & Son*

Attorneys

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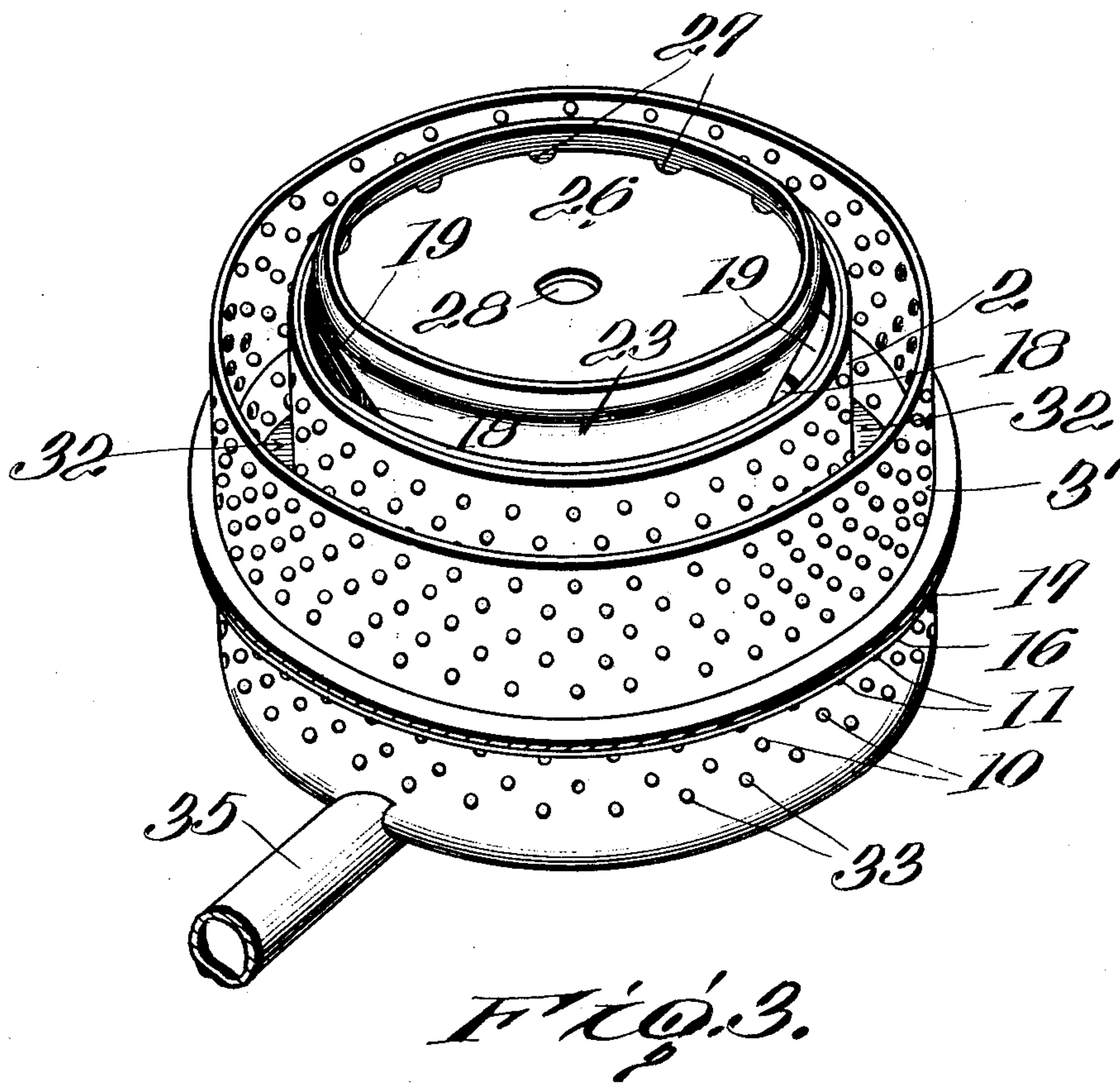
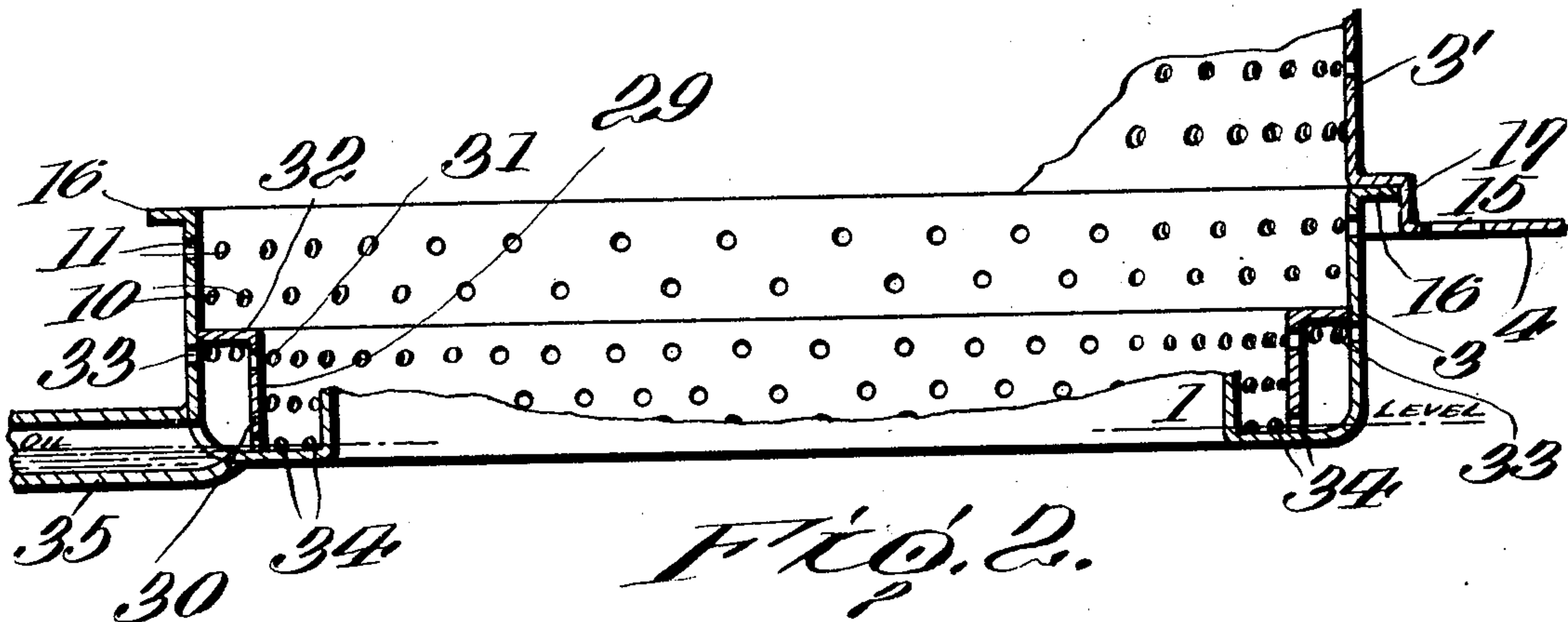
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2 Sheets-Sheet 2



Inventor

A. Stockstrom

By A. J. Patterson

Attorney



## UNITED STATES PATENT OFFICE.

ARTHUR STOCKSTROM, OF ST. LOUIS, MISSOURI, ASSIGNOR TO AMERICAN STOVE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF NEW JERSEY.

## WICKLESS OIL BURNER.

Application filed January 18, 1924. Serial No. 686,989.

*To all whom it may concern:*

Be it known that I, ARTHUR STOCKSTROM, a citizen of the United States, residing at St. Louis, and State of Missouri, have invented certain new and useful Improvements in Wickless Oil Burners, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in wickless oil burners and it has special relation to an improved construction for burning gasoline, though other forms of oil may be utilized in it.

Heretofore it has been common to provide wickless oil burners with long perforated combustion sections which form combined chimneys, in which the vaporized gasoline or other oil travelled, air mixing with the vapors throughout the length of the long combustion sections. The foregoing type of burners have been known and have been used for upward of twenty or more years. In the state of the wickless oil burner art it has been necessary to utilize long combustion sections in order to obtain complete combustion of the vapors generated from the oil.

For a long time I have been working upon a construction of oil burners whereby I could accomplish complete combustion close to the trough instead of utilizing the long perforated combustion sections heretofore used.

I have discovered that I can accomplish a complete combustion from relatively near the top of the trough by combining with the trough a high surrounding chimney. I have discovered that by the combination of a trough with short perforated extended walls, of a surrounding vertical chimney, I am enabled to accomplish a complete combustion of the vapors at the top of the short perforated extension of these walls.

So far as I am aware I am the first to accomplish complete combustion of the generated vapors at or near the top of the short extension of the trough, and by this many advantages follow.

It follows from the foregoing statements that the primary object of my present improvement is to provide a wickless burner which will accomplish the complete combustion of the vapor generated from the oil

at or near the top of the short extended walls of the trough.

Further objects of the invention will appear from the following description and illustration.

In the accompanying drawings Figure 1 is a vertical sectional view of my present improvement.

Figure 2 is an enlarged sectional view through the trough, the near wall of the trough broken away to show the annular ring placed in the trough, said ring being substantially an inverted L-shape in section.

Figure 3 is an enlarged separate top perspective view of the improved bowl with its extended perforated walls, the surrounding chimney being omitted.

Referring now to the drawings:

1 is the trough which has a short perforated inner wall 2 and a short upwardly extending vertical wall 3', these walls being in line with the walls of the trough 1. It will be observed that the height, or depth of the combined trough and upwardly extending walls is in my preferred form less than half the diameter of the trough. In order to embody my present improvement the depth of the trough and its combined perforated upwardly extending walls must be such as to accomplish complete combustion at or near the upper end of these relatively short extending walls. While the proportion of vertical height as compared to the width of the trough above described and herein shown is preferred, I desire it to be understood that the height of these perforated walls may be varied so long as the complete combustion is accomplished at a point near the upper end of the trough.

In the construction herein shown part 3' of the outer extended wall 3 is preferably a separate part, and in the construction here shown has an outwardly extending annular flange 4 to which the lower end 5 of chimney 6 is attached. The form of chimney here shown is preferably contracted at 7 for the purpose of better accomplishing the draft required. This chimney has an outer wall 8 which has its lower end attached to the contracted portion 7 at about midway its length, and an inner wall 9 is attached to the upper extension 10, the said walls extending



upward parallel, and forming a space 11 between them. Preferably the lower end of the space 11 is closed while the upper end 12 is open. The object of this double wall construction is to prevent the loss of heat which is due to radiation and conduction.

The annular member 12' has its lower end attached to the flange 4 near the lower end of the chimney 6, and this member 12 extends upward parallel with the extended perforated wall 3' substantially to its upper end, and then curves inward as shown at 13 to a point as shown substantially over the center of the space between the inner wall 2 and the outer wall 3'. This construction forms an air space 14 operating in a manner to be presently explained. The annular member 12' and its curved portion 13 may be aptly termed as a flame deflector. Formed in the flange 4 between the member 12' and the extended wall 3' are large openings 15, and the upper end of the vertical extension of the trough 1 has an outward extending surrounding annular flange 16 upon which the inner end of the flange 4 rests. Preferably the inner end of the flange 4 is made L-shape as shown at 17, which causes the flange 4 to fit upon and to be properly held in position upon the said trough.

Preferably the inner perforated extension wall 2 is made integral with the inner wall of the trough, and within this inner wall I locate an air shield 18 which extends upward and has its upper portion 19 enlarged outward to fit the upper end of the inner wall 2. The vertical portion of the air shield 18 is imperforate and has at its bottom a plurality of large air inlet openings 20 the said shield preferably extending across the trough as shown at 21 and is provided with a central air passage 22. It will be observed from this description that the air shield 18 has a wall which is substantially cup shape in form. Located in the center of this cup-shaped member 18 is a member having its upwardly extending portion 23 substantially cone shaped and its lower portion 24 cup shaped, the bottom of the cup having an opening 25 which corresponds with the opening 22 in the bottom of the air shield 18. Within the upper end of the cone shaped member 23 is a disk 26, and this disk 26 has small openings 27 at its edge and an opening 28 at its center.

Special attention is directed to a member 29 which rests in the trough 1. This member in cross section is substantially an inverted L, and the vertical wall 30 of this member is provided with small openings 31, the horizontal portion 32 extending outward substantially against the outer wall of the trough. The upper end of the outer wall of the trough is provided with a plurality of small air inlet openings 33, while

the lower extremity of the vertical portion 30 is provided with oil openings 34.

The gasoline or oil is fed to the trough through a pipe 35, its feeding being controlled by the well known needle valve 36, by means of which the burner is controlled by feeding the quantity of oil that is vaporized in the trough, to prevent over feeding of the oil, and to cut down the flame by cutting down the oil supply.

I will give the operation of the burner, the operation being taken from a burner which has been in operation for a long period of time. The operation of burners is sometimes difficult, though what is apparent to the eye of course is well known to the inventor. The oil is fed through the pipe 35 from an inverted reservoir (not shown) through a pipe 37, and its flow controlled by the needle valve 36. To light the burner the chimney is lifted or removed by a handle (not shown) attached to it. When the chimney is removed the outer extended perforated wall 3' is removed with it, which leaves the trough exposed for lighting purposes. The vapor from the oil having been lighted, the chimney is replaced on the trough, and then the operation begins. I have found that I can obtain sufficient heat in the trough to vaporize sufficient oil or gasoline to provide a flame by means of the short upwardly extending perforated walls 2 and 3 of the trough. The object of these extended perforated walls is primarily to provide sufficient heat for the generation of the vapor of the oil, some air of course being admitted through the openings of the wall to carry on sufficient combustion to provide the necessary heat for generation of the vapor of the oil. In the construction the inner wall 2 becomes quite hot and the heat from both walls is conducted to the trough causing the generation of the vapor. The said vapor rising between the walls escapes from their upper ends and at this point the chimney causes a sufficient upward draft to cause air to be drawn through the openings 15 which air is deflected inward over the vapor and is mixed therewith immediately over the short perforated extensions, and at the same time the chimney causes sufficient draft to cause an upward flow of air through the openings 20, the cone shaped portion 23 diverting the said air outward so that the inwardly diverted air from the shield 13 and the outwardly diverted air caused by the cone portion 23 meet substantially at the upper ends of the extended perforated tubes and causes the air to be forced into and commingle with the vapor in such a manner as to cause complete combustion at that point, the said complete combustion continuing upward in the chimney 6. At the same time air is being drawn through the openings in the inner tube between it and the member



18, and all of the air in this space is forced inward through the said openings by the fact that the upper end of the space is closed by the outwardly extending portion 19. I desire it to be understood that the draft of the chimney is considerable and that there is an upward pull in the space between the perforated extensions 2 and 3 which pulls the air through the inner extension and the outer extension, the greater pull being through the inner extension. The upward pull between these perforated walls also acts upon the openings 31 in the vertical portion of the member 29, and also through the openings 33 in the outer wall of the trough. In this way I combine air with the vapor that is being generated in the trough, and the combined air and vapor is drawn in through the openings 33 and 31 and combines with the vapor that is generated between the inner wall of the trough and the vertical portion 30 of the member 39.

I have found that a burner of the above construction operates essentially different from the elongated perforated walls of other forms of burners. I have found that in this type of burner the flame is very sensitive to downward drafts caused in any manner. That is to say that a downward draft will cause the flame in the short extended walls 2 and 3 to be converted into a white flame burning at the center, and it is the object of the member 29 to prevent such occurring. I find it necessary to maintain a flame in the lower portion of the perforated wall substantially at the row of openings 10. These drafts cause the flame at the part 10 to be extinguished and it is necessary for the maintenance of the blue flame and to prevent a blue flame being converted into a white flame, that the member 29 be provided. Without an intercepting member 29 located in the trough, I find that if the flame burning at the lower openings 10 or 11 is extinguished then the white flame results, but with this intercepting member, while the flame or burning may be momentarily intercepted by these drafts, they are immediately caused to ignite, whereas without this member 29 the white flame will continue to burn.

While I have described the invention adapted for burning gasoline it will be understood that kerosene or coal oil might be used, but in that event it would be necessary to first initially heat the trough which could be done in many well known ways, one being by first providing the trough with a small amount of gasoline for that purpose.

The object of the openings in the plate 26 of the cone 23 is to prevent the formation of a partial vacuum over it by providing air passages. These air passages of course also provide air for the interior of the flame above where the complete combustion is ac-

complished in the manner before described.

Attention is directed to the fact that the lower end of the chimney 6 is sufficiently larger than the external walls 3 and 3' to embrace also the deflector rings 12 and 13, leaving a space between the ring and the outer wall 3'. Preferably though perhaps not essential it is sufficiently larger than the deflector ring to leave a space between the ring and the chimney. It will also be observed that the plate 4 embraces the outer perforated extensions 3 and 3' at a point approximately intermediate their ends. By this construction one or more openings 10' and 11' have external communication, as also do the openings 33. From the foregoing it will be understood that the plate 4 embraces the outer perforated extensions 3 and 3' also at a point approximately intermediate its ends.

As stated herein I believe myself to be the first to produce a burner which accomplishes a complete combustion of the vaporized liquid near the trough, and I desire it to be understood that modifications or changes more or less can be provided so long as complete combustion is accomplished near the trough, and without departing from the spirit and scope of my invention as expressed in the appended claims.

Having thus described my invention what I desire to secure and claim by Letters Patent is:

1. A low burning oil burner, comprising a trough having short upwardly extending perforated walls, combined with a chimney embracing said perforated walls and extending upward a substantial distance above said walls, whereby complete combustion of the vapors generated in the trough is caused approximately at the top of said short perforated tubes.

2. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls, combined with a chimney embracing said walls intermediate their ends, the upper end of said chimney ending at a point a substantial distance above the upper ends of the walls, whereby complete combustion of the vapors generated is accomplished near the upper end of the trough.

3. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls of a height approximately one-half the width of said trough, combined with a long chimney embracing said walls and extending upward to a point a substantial distance above the ends of said walls, whereby complete combustion is accomplished near the upper end of the trough.

4. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls, combined with a long chimney embracing said walls at a point in-



intermediate their ends, whereby complete combustion is accomplished near the upper end of the trough.

5. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls of a height approximately one-half the width of said trough, combined with a long chimney having its lower end embracing said walls and removed from the outer wall, and an air deflecting ring located between the outer perforated wall and the said chimney, said ring deflecting the air inward, for the purpose described.

6. A low burning wickless oil burner comprising a trough having upwardly extending short inner and outer perforated walls combined with a long chimney having an air deflecting ring and its lower end sufficiently larger in diameter than the outer tube to receive the air deflecting ring, said ring having its upper end extending inward to deliver air approximately at the upper ends of the perforated walls, for the purpose described.

7. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls, of a chimney larger in diameter than the outer wall, a plate extending outwardly from the outer wall, the lower end of the chimney engaging the said plate, an air deflector between the chimney and said wall, the air deflector removed from the outer wall, and the said plate having air passages located between the deflector and the outer wall, for the purpose described.

8. An oil burning wickless oil burner comprising a trough having short upwardly extending perforated walls, the outer wall divided horizontally and the lower end of the upper divided portion provided with an outwardly extending flange, a long chimney having its lower end united to said flange, an air deflector located between the chimney and the outer perforated wall, the lower end of the air deflector connected to the horizontal flange, whereby the removal of the chimney removes the upper divided part of the outer perforated wall and the said air deflector to permit access to the trough for lighting purposes.

9. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls, the outer perforated wall horizontally divided intermediate its ends, the upper end of the lower portion of the outer wall having an outwardly extending flange and the lower portion of the upper part of the wall having an L-shape embracing the said flange and extending outward, of a chimney having its lower end attached to the outwardly extending portion, an air deflector between the chimney and the perforated wall, whereby the upper portion of the

perforated wall with its outwardly extending portion are removed together, and the L-shape serving to unite the parts in proper position.

10. A low burning wickless burner comprising a trough having upwardly extending short perforated walls, an outwardly extending plate extending from the outer perforated wall, a chimney having its lower end supported by the said plate, an upwardly extending air deflector connected with the said plate, the upper end of the deflector extending inward to a point substantially intermediate the ends of the two perforated walls, for the purpose described.

11. A low burning oil burner comprising a trough having short upwardly extending perforated walls, a plate extending outwardly from the outer perforated wall, a chimney connected with the outer part of the plate, an air deflector extending inward above the perforated walls, the plate having air passages, and an inner air deflector forcing air through the inner wall, and a cone shaped member within the inner deflector and separated therefrom, the cone shaped member and the outer deflector forcing air into the flame approximately at the upper ends of said perforated walls.

12. A low burning burner comprising a trough having upwardly extending short perforated walls, a long chimney embracing the outer wall, and an interceptor located in the trough for the purpose of preventing the blue flame being converted into a white flame and thereby maintaining the blue flame.

13. A low burning wickless oil burner comprising a trough having upwardly extending short perforated walls, a long chimney embracing the outer wall, of an interceptor located in the trough, said interceptor being substantially inverted L-shape, for the purpose of maintaining a blue flame.

14. A low burning burner comprising a trough having upwardly extending short perforated walls, of an interceptor located in the trough, said interceptor having a horizontal extension, the trough having openings above the horizontal extension, and a long chimney embracing the outer perforated wall, whereby a blue flame is maintained.

15. A low burning burner comprising a trough having short upwardly extending perforated walls, of an interceptor located in the trough, said interceptor having a horizontal portion located below the lower openings, and a long vertical chimney embracing the outer perforated wall, whereby a blue flame is maintained.

16. A low burning burner comprising a trough having upwardly extending short perforated walls, of an interceptor located in the trough, said interceptor having an outwardly extending horizontal portion



located between two lower rows of perforations, and a chimney embracing the outer wall, whereby a blue flame is maintained.

17. A low burning burner comprising a 5 trough having short upwardly extending perforated walls, a plate extending outward from the outer wall above the lower rows of perforations, a chimney supported by said plate, of an interceptor located in the trough, 10 said interceptor having an outwardly extending flange located below the said plate, and below some of the perforations, whereby a blue flame is maintained.

18. A low burning burner comprising a 15 trough having vertically extending short perforated walls, a plate extending outward from the outer wall and located above some of the openings therein, a chimney connected with the said plate, of an interceptor located 20 in the trough, said interceptor having an outwardly extending flange located between two rows of said openings, the interceptor

having openings in its vertical portion, for the purpose described.

19. A low burning burner comprising a 25 trough having upwardly extending short perforated walls, a plate extending outward from the outer wall, a long chimney having its lower portion supported by the plate, an air deflector located between the chimney 30 and the outer wall, an air deflector within the inner wall deflecting air through its perforations, and a cone air deflector located within the inner deflector, said air deflectors forcing opposite streams of air to the flame 35 above the perforated walls, and an interceptor located in the trough, whereby a blue flame is maintained and complete combustion accomplished near the upper end of the 40 trough.

In testimony whereof I hereunto affix my signature.

ARTHUR STOCKSTROM.