H. A. DREFFEIN.

GAS WASHER.

APPLICATION FILED MAY 3, 1913.

1,268,100.

Patented June 4, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

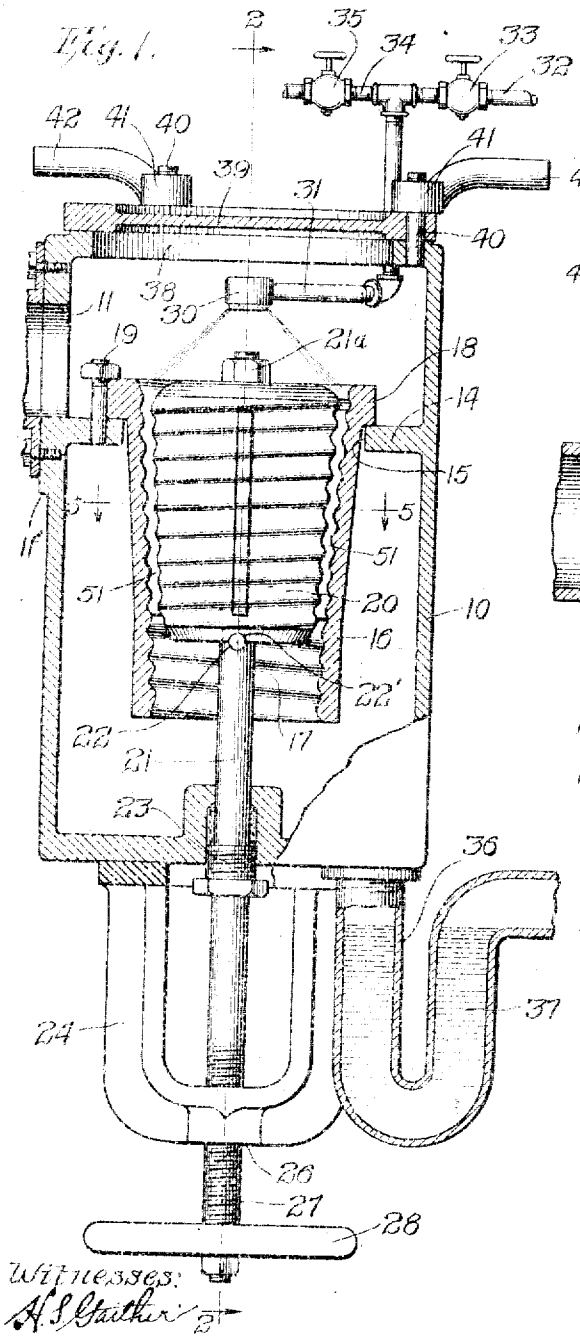
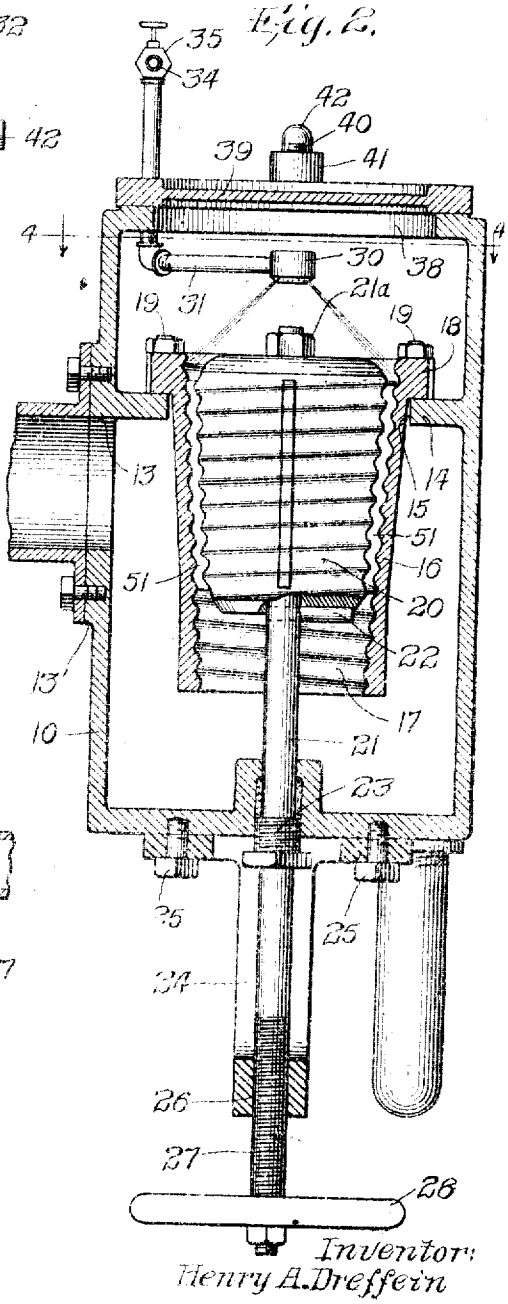


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

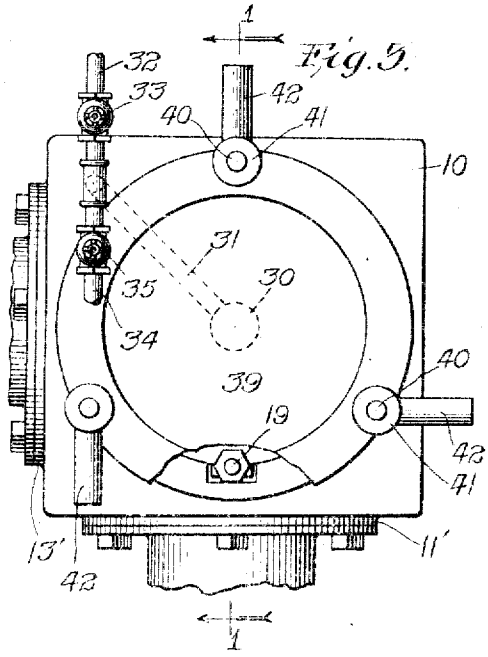


Fig. 4.

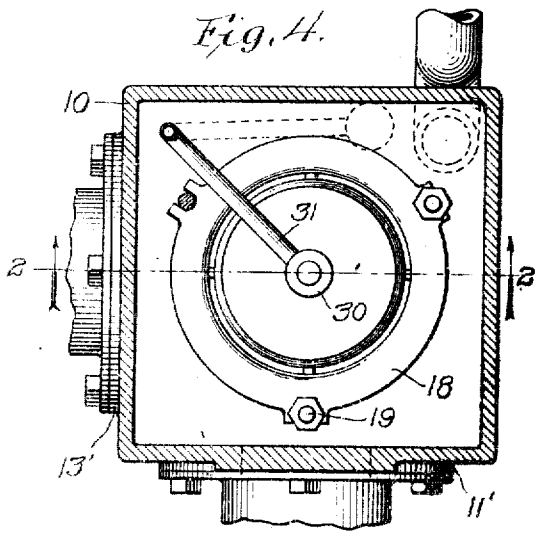


Fig. 5.

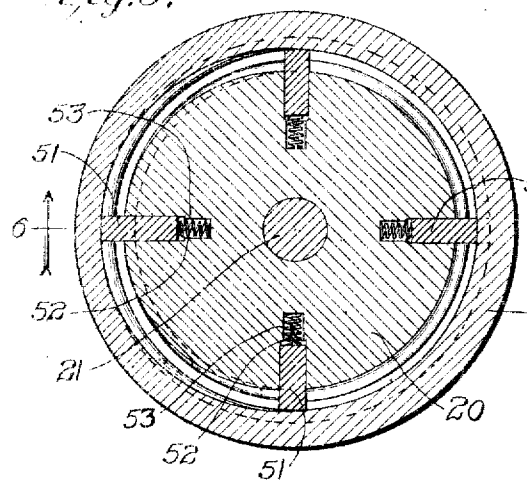
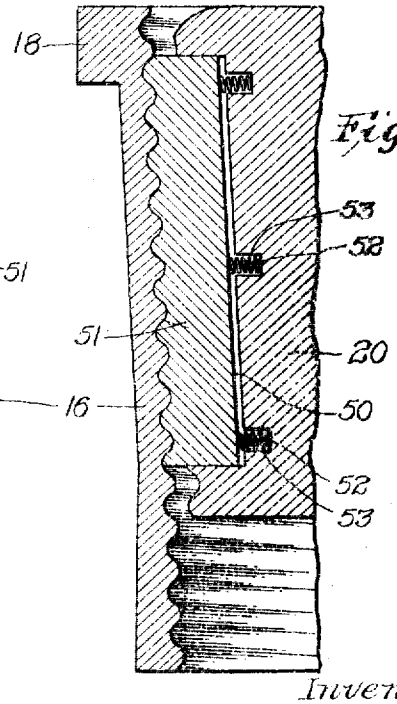


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY A. DREFFEIN, OF CHICAGO, ILLINOIS.

GAS-WASHER.

1,268,100. Specification of Letters Patent. Patented June 4, 1918.

Application filed May 3, 1913. Serial No. 765,274.

To all whom it may concern:

Be it known that I, HENRY A. DREFFEIN, a citizen of United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas-Washers, of which the following is a specification.

This invention relates to improvements in gas washers, and has for an object to provide an improved form of device in which the gas is forced to travel through a tortuous passage, the size of which may be varied at will.

Another object is to provide, in conjunction with said passage, a spray for wetting the surfaces of the passage and thereby assisting in the deposit and collection of the dust and carbonaceous material carried by the gas.

Another object is to provide means for supplying spray fluid to the spraying means, and for supplying steam or other heated fluid to such spraying means for the purpose of melting the deposited material from the surfaces of the passage when it is desired to clean the same.

Still another object is to provide a positive means for cleaning one of the surfaces.

This, and other objects will be set forth and made apparent in the following specification and accompanying drawings, in which;

Figure 1 is a vertical section of my improved device;

Fig. 2 is a similar section taken at right angles thereto along the line 2--2 of Fig. 1;

Fig. 3 is a plan view of the same, part of the cover being broken away;

Fig. 4 is a transverse section along the line 4--4 of Fig. 2;

Fig. 5 is a transverse section along the line 5—5 of Fig. 1;

Fig. 6 is a detail vertical section showing the scraping plate construction.

Like numerals refer to like elements throughout the drawings, in which;

10 designates generally my casing member shown as preferably rectangular in cross section. This casing member is provided with the inlet opening 11, surrounded by the integral flange or boss 11'. Casing 10 is further provided with the outlet aperture 13 surrounded by reinforcing flange 13'. The outlet and inlet openings are located on different levels and a flange 14 projects inwardly in the casing between the said outlet and inlet and is preferably formed integral with the casing. This flange is apertured, as indicated by numeral 15. A sleeve member 16, provided with the central tapered bore 17 and the upper external flange 18, projects through the aperture 15, the flange 18 resting upon the casing flange 14, to which it is detachably secured by bolts 19. The inner surface 17 of the sleeve 16 is provided with a continuous helical corrugation extending from top to bottom thereof, as shown in Figs. 1 and 2.

A plug member 20 tapered similarly to the bore of the sleeve 16, is mounted concentrically thereof. A rod 21 constitutes a stem for the plug 20, extending centrally therethrough, being secured thereto at one extremity by the nut 21^a and at the other extremity of the plug by the key or pin 22 seating in the groove 22' of plug 20, as clearly shown in Fig. 2. The external surface of this plug 20 is provided with the continuous helical corrugation complementary to the corrugation of the surface 17 of sleeve 16. By complementary, is meant that the corrugations of the plug are opposite the depressions between adjacent portions of the corrugation in the inner surface of the sleeve, being similar to the fit between the threads of a threaded plug and socket, save that the plug 20 is normally spaced from the inner surface 17 of the sleeve 16, in order to provide a passage for the gas. The purpose of this construction is described below.

The operation of the structure, in so far described, is as follows:--Gas is drawn into the chamber through inlet 11, is forced by means of the flange 14 and contacting flange 18, to travel between the corrugated surfaces of the plug 20 and sleeve 16. These corrugated surfaces serve to provide a tortuous passage for the gas which is drawn out through the aperture 13. In its passage between the corrugated surfaces the gas is thrown back and forth by means of the corrugations and impinges upon first one surface and then the other, thereby causing a deposit of the carried dust and carbonaceous material. By virtue of the taper of the plug and sleeve, and the complementary helical corrugations, I may rotate the plug with respect to the sleeve at the same time moving it longitudinally thereof to narrow the passage between; at the same time maintaining the tortuous character thereof. I accom-

plish this result by extending the rod 21 through the stuffing box construction 23, in the bottom of the casing 10. A yoke 24 is secured at its extremities by bolts 25 to the bottom of the casing 10 and is provided with the central aperture portion 26 internally threaded for engagement by the threaded portion 27 of rod 21. The thread of the rod 27 is of a pitch the same as that of the helix of the corrugations of the plug and sleeve. Secured to the lower extremity of the rod 21 is the operating wheel 28 which may be rotated to rotate the rod 21 and owing to the similarity in pitch between the said corrugations and the pitch of the thread, rotation of the rod 21 will operate to rotate the plug and move the same at the same time longitudinally of the sleeve. In short, the action is similar to that which would exist were the plug and sleeve in threaded engagement, in so far as concerns the relative movement. However, owing to the taper construction, the distance between the adjacent surfaces of the plug and sleeve will be varied as desired, by rotating the plug upwardly or downwardly to increase or decrease the said distance, respectively. Owing to the helical construction of the corrugations on the sleeve and the plug the latter may be screwed downwardly into contact with the sleeve if so desired without interference of the corrugations on the plug with those on the sleeve, as will be apparent.

Located upwardly of the plug and sleeve, is provided the spray 30 adapted to spray outwardly fluid such as water, into the space between the plug and sleeve. This water will be conveyed downwardly over corrugated surfaces and will materially assist in the deposit and collection of the dust carried by the gas. To supply water to the spraying nozzle 30, is provided a pipe 31, extending upwardly into communication with a fluid supply pipe 32, flow therethrough being controlled by the valve 33. A steam supply pipe 34 is also in communication with the pipe 31, flow of steam therethrough being controlled by valve 35. As the water or other fluid flows through the passage between the plug and sleeve and down the corrugated surfaces thereof, it collects in the bottom of casing 10 and is transported therefrom by the U-shaped outlet tube 36, sealed by means of the fluid 37 therein against the flow of gas therethrough. The pipe 31 extends upwardly through an aperture in the top of the casing 10, the latter being provided with an aperture or opening 38 therethrough of greater size than the diameter of the plug and flange 18 of the sleeve 16, so that access to the interior of the casing will be provided, and so that the plug and sleeve may be readily removed through the said opening. During the operation of my device this opening is maintained normally closed by means of the cover 39 secured in position by threaded studs or bolts 40, carried by the casing 10, and projecting upwardly through apertures in the cover 39.

Threadably engaging these studs 40, are the nuts 41 provided with handles 42. I have found that in use with gas carrying a large proportion of free dust and carbonaceous material, that the same is deposited in large quantities on the corrugated surfaces. It becomes gummy and sticky as it mixes with the fluid from the spray 30 and coats the corrugated surfaces. While this gummy or sticky coating enhances the deposit and collection of the dust, etc., it in time becomes so thick as to greatly impede the passage of the gas through the washer, even when the passage is full size. It then becomes necessary to clean the surfaces. Ordinarily this may be accomplished by shutting off the fluid from pipe 32 and opening valve 35 to permit the flow of steam through the spray 30 which will melt the gummy coating and permit the same to flow downwardly into the bottom of the casing and be drawn off.

I have sometimes found it desirable to provide a more positive means of cleaning these surfaces than by the use of steam and to accomplish this result I provide slots 50 in the plug 20, these slots being preferably closed at top and bottom. In each of these slots I provide a plate or scraper 51, slidably seated in the slots 50, but closely fitting the same. The outer edges of these plates 51 are corrugated so as to closely fit and contact with the corrugated surface of the adjacent sleeve 16. To maintain the plate 51 in close contact with the corrugated surface of the sleeve, I locate springs 52 in pockets 53 in the plug, one extremity of each of these springs pressing against the inner edge of the plate 51 and acting to force the latter outwardly against the corrugated surface of the sleeve.

It will be apparent that as the rod 21 is rotated to rotate the plug, scrapers 51 will ride over the corrugated surface of the sleeve 16 and will scrape therefrom any accumulated deposit. I have shown these scrapers as being four in number, but do not wish to be restricted to such a number.

It is believed that the general operation of my device is clear from the above detailed description so as to obviate the necessity of further explanation.

While I have shown and described my invention with more or less particularity, I do not wish to be restricted to such showing or description beyond the scope of the appended claims.

I claim:—

1. In a device of the class described, a pair of members having adjacent spaced apart concentric surfaces affording a tortuous passage for gas traveling therethrough, said

surfaces being corrugated, said corrugations being complementary the one set with respect to the other, and means to vary the distance between said surfaces.

2. In a device of the class described, a pair of members having adjacent spaced apart concentric surfaces affording a tortuous passage for gas traveling therethrough, said surfaces being corrugated, said corrugations being complementary the one set with respect to the other, and means to positively clean one of said surfaces.

3. In a device of the class described, a sleeve having an interior corrugated surface, and a plug concentrically mounted in said sleeve and having a corrugated outer surface, said sleeve and plug being tapered.

4. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, and a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve.

5. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to supply fluid to said corrugated surfaces.

6. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to supply fluid to said corrugated surfaces, said means comprising a jet.

7. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to supply fluid to said corrugated surfaces, said means comprising a jet, and said jet being in communication with a steam supply and with a water supply.

8. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to rotate said plug and move the same longitudinally of said sleeve.

9. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to scrape one of said corrugated surfaces upon rotation of said plug, said means comprising a plate yieldingly held in contact with said surface.

10. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, and means to scrape one of said corrugated surfaces upon rotation of said plug, said means comprising a plate yieldingly held in contact with said surface, said plug being corrugated at its outer edge to conform to the contour of said surface.

11. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, means to rotate said plug and move the same longitudinally of said sleeve, said plug being provided with a slot, and a plate carried in said slot, the outer edge of which is corrugated to conform to the contour of the corrugated surface of said sleeve, said edge being in contact therewith as the plug is rotated.

12. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, means to rotate said plug and move the same longitudinally of said sleeve, said plug being provided with a slot, a plate carried in said slot, the outer edge of which is corrugated to conform to the contour of the corrugated surface of said sleeve, said edge being in contact therewith as the plug is rotated, and means to maintain said plate in contact with said corrugated surface.

13. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, means to rotate said plug and move the same longitudinally of said sleeve, said plug being provided with a slot, a plate car-

ried in said slot, the outer edge of which is corrugated to conform to the contour of the corrugated surface of said sleeve, said edge being in contact therewith as the plug is rotated, and means to maintain said plate in contact with said corrugated surface, said means comprising springs carried by said plug and pressing against said plate.

14. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, a stem depending from said plug, said stem being threaded, and a guiding member apertured and threaded to engage said stem.

15. In a device of the class described, a sleeve having a tapered bore, the surface of said bore being provided with a helical corrugation, a plug concentrically mounted in said bore and tapered to correspond thereto, said plug being provided with a helical corrugation complementary to that of said sleeve, a stem depending from said plug, said stem being threaded, and a guiding member apertured and threaded to engage said stem, the pitch of said thread being equal to that of the helix of said corrugations.

16. In a device of the class described, a casing member having an inlet and an outlet, a supporting flange in said casing member constituting an apertured partition between said outlet and inlet, a sleeve provided with a tapered bore and having a flange carried by said casing flange and secured thereto, and a tapered plug concentrically mounted in said sleeve and adapted to be moved longitudinally thereto to adjust the size of the passage between said sleeve and said plug.

17. In a device of the class described, a casing member having an inlet and an outlet, a supporting flange in said casing member constituting an apertured partition between said outlet and inlet, a sleeve provided with a tapered bore and having a flange carried by said casing flange and secured thereto, a tapered plug concentrically mounted in said sleeve and adapted to be moved longitudinally thereto to adjust the size of the passage between said sleeve and said plug, and an outlet leading from said casing, said outlet being sealed to prevent discharge of gas from said casing.

18. In a device of the class described, a casing member having an inlet and an outlet, a supporting flange in said casing member constituting an apertured partition between said outlet and inlet, a sleeve provided with a tapered bore and having a flange carried by said casing flange and secured thereto, a tapered plug concentrically mounted in said sleeve and adapted to be moved longitudinally thereto to adjust the size of the passage between said sleeve and plug, an outlet leading from said casing, said outlet being sealed to prevent discharge of gas from said casing, and means to spray fluid upon the surface of said passage between said plug and sleeve, said last-named outlet being adapted to convey away from said casing fluid traveling through said passage.

19. In a device of the class described, a casing member having an inlet and an outlet, a supporting flange in said casing member constituting an apertured partition between said outlet and inlet, a sleeve provided with a tapered bore and having a flange carried by said casing flange and secured thereto, a tapered plug concentrically mounted in said sleeve and adapted to be moved longitudinally thereof to adjust the size of the passage between said sleeve and said plug, the interior surface of said sleeve being formed with a helical corrugation and the outer surface of said plug member being provided with a complementary helical corrugation, and means to rotate and move said plug longitudinally of said sleeve.

20. In a device of the class described, a casing member having an inlet and an outlet, a supporting flange in said casing member constituting an apertured partition between said outlet and inlet, a sleeve provided with a tapered bore and having a flange carried by said casing flange and secured thereto, a tapered plug concentrally mounted in said sleeve and adapted to be moved longitudinally thereto to adjust the size of the passage between said sleeve and plug, the interior surface of said sleeve being formed with a helical corrugation and the outer surface of said plug member being provided with a complementary helical corrugation, means to rotate and move said plug longitudinally of said sleeve, means comprising a guide member having a threaded aperture therethrough, and a stem secured to and depending from said thread member and threadedly engaging said aperture of said guide member.

In testimony whereof, I have subscribed my name.

HENRY A. DREFFEIN.

Witnesses:
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HENRY A. PARKS.