

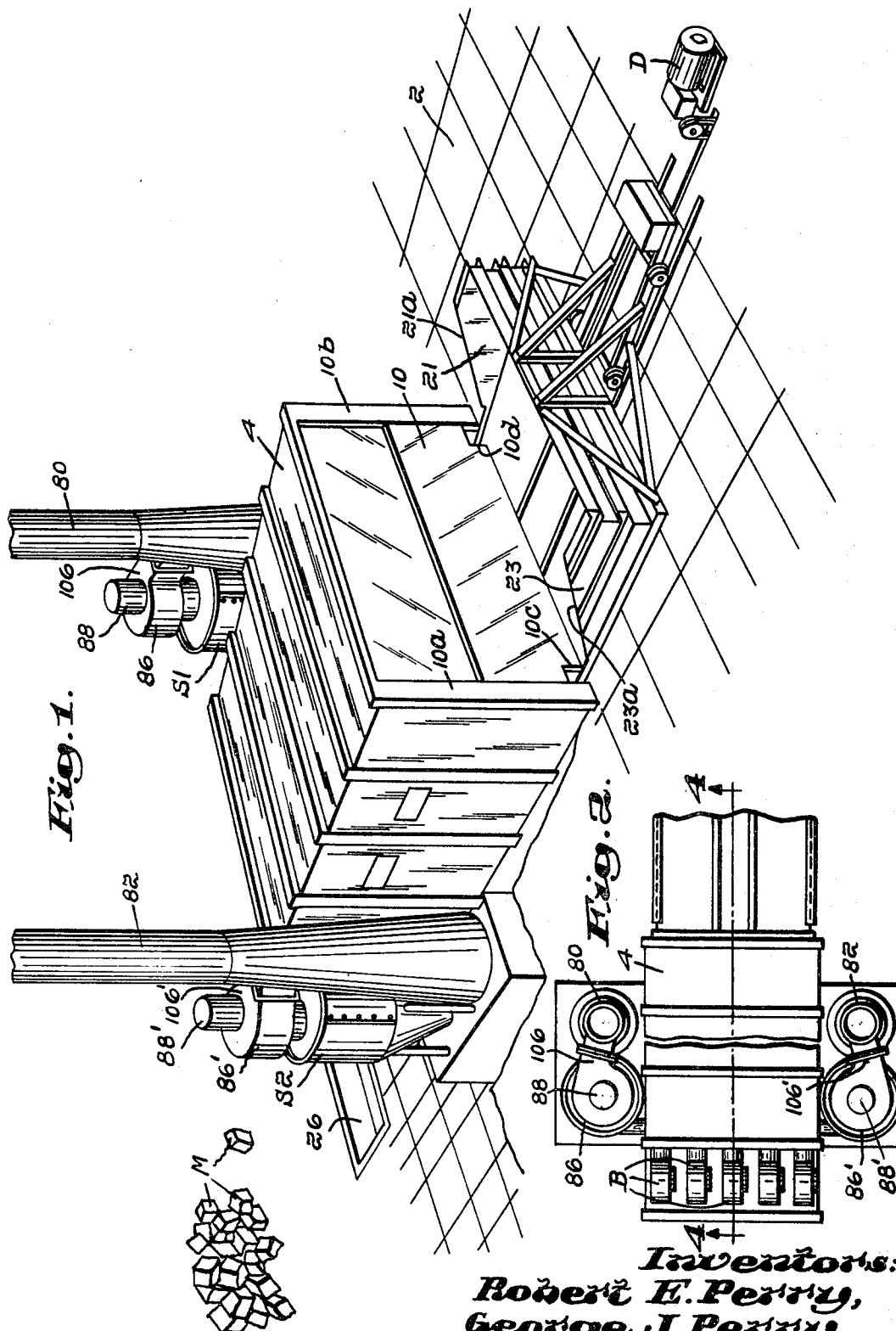
Nov. 26, 1968

R. E. PERRY ET AL
METHOD AND APPARATUS FOR BURNING AUTOMOBILE BODIES
AND OTHER WASTE MATERIALS

3,412,985

Filed May 23, 1966

5 Sheets-Sheet 1



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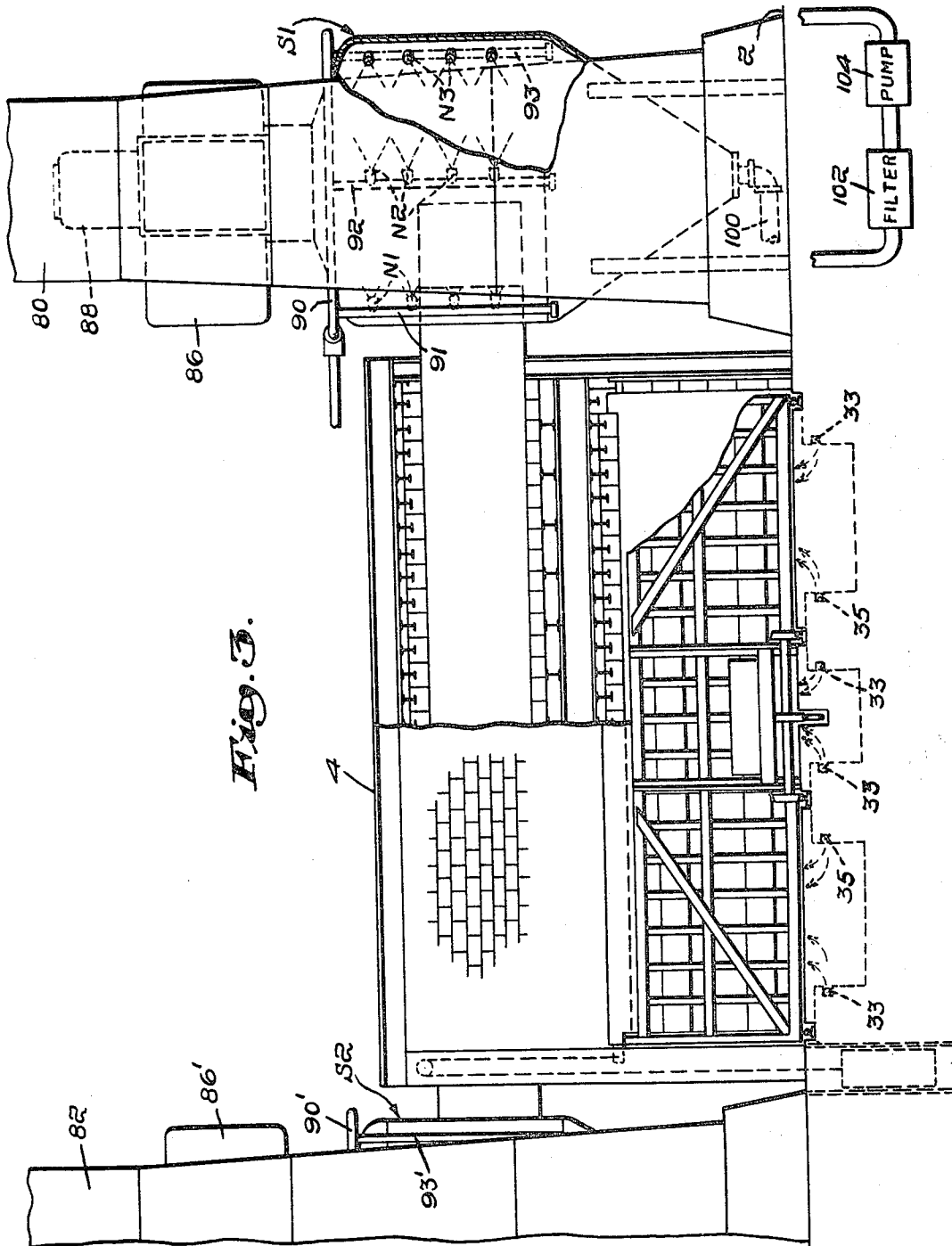
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968 R. E. PERRY ET AL 3,4
METHOD AND APPARATUS FOR BURNING AUTOMOBILE BODIES
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METHOD AND APPARATUS FOR BURNING AUTOMOBILE BODIES
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Fig. 4.

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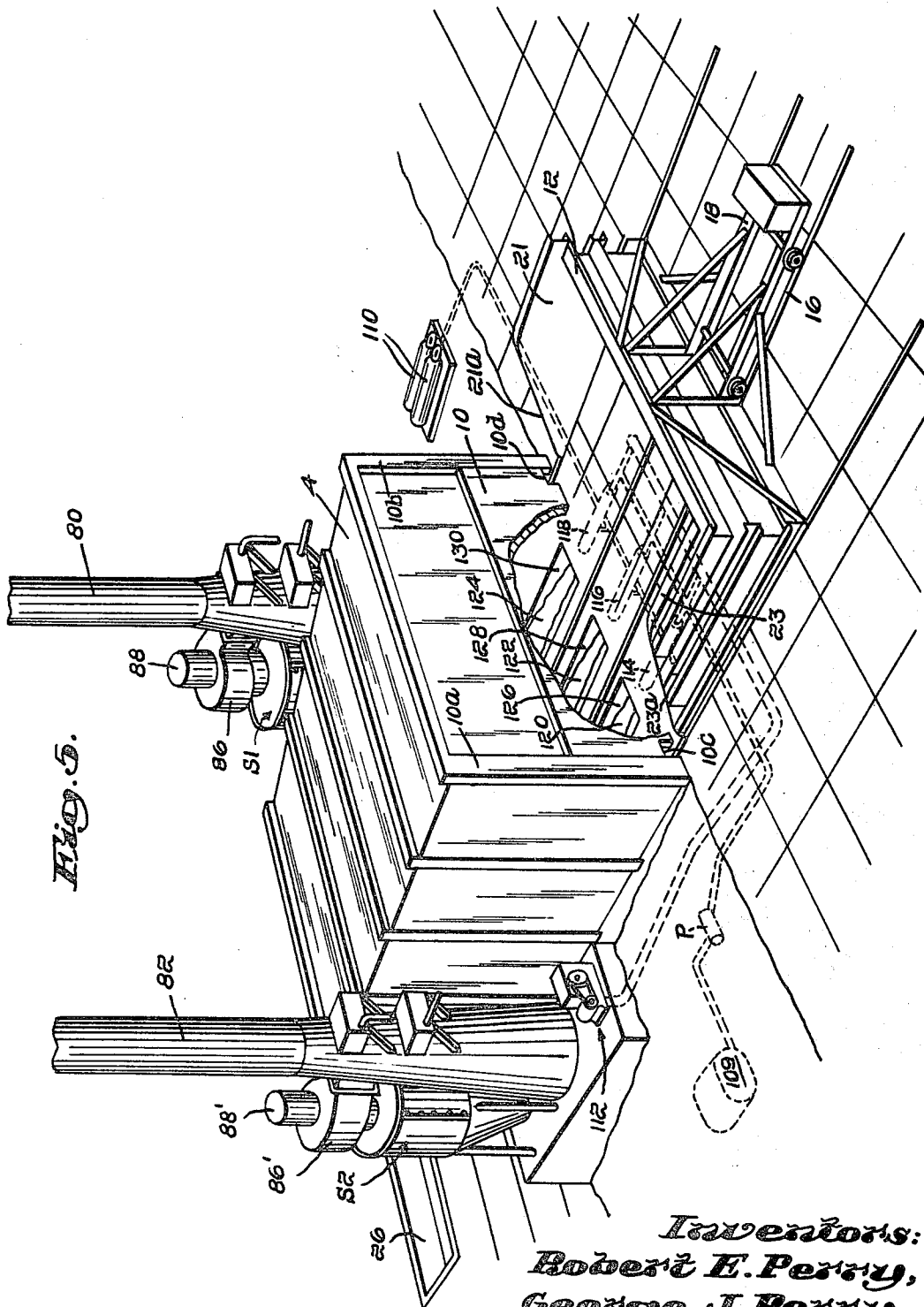
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5 Sheets-Sheet 4



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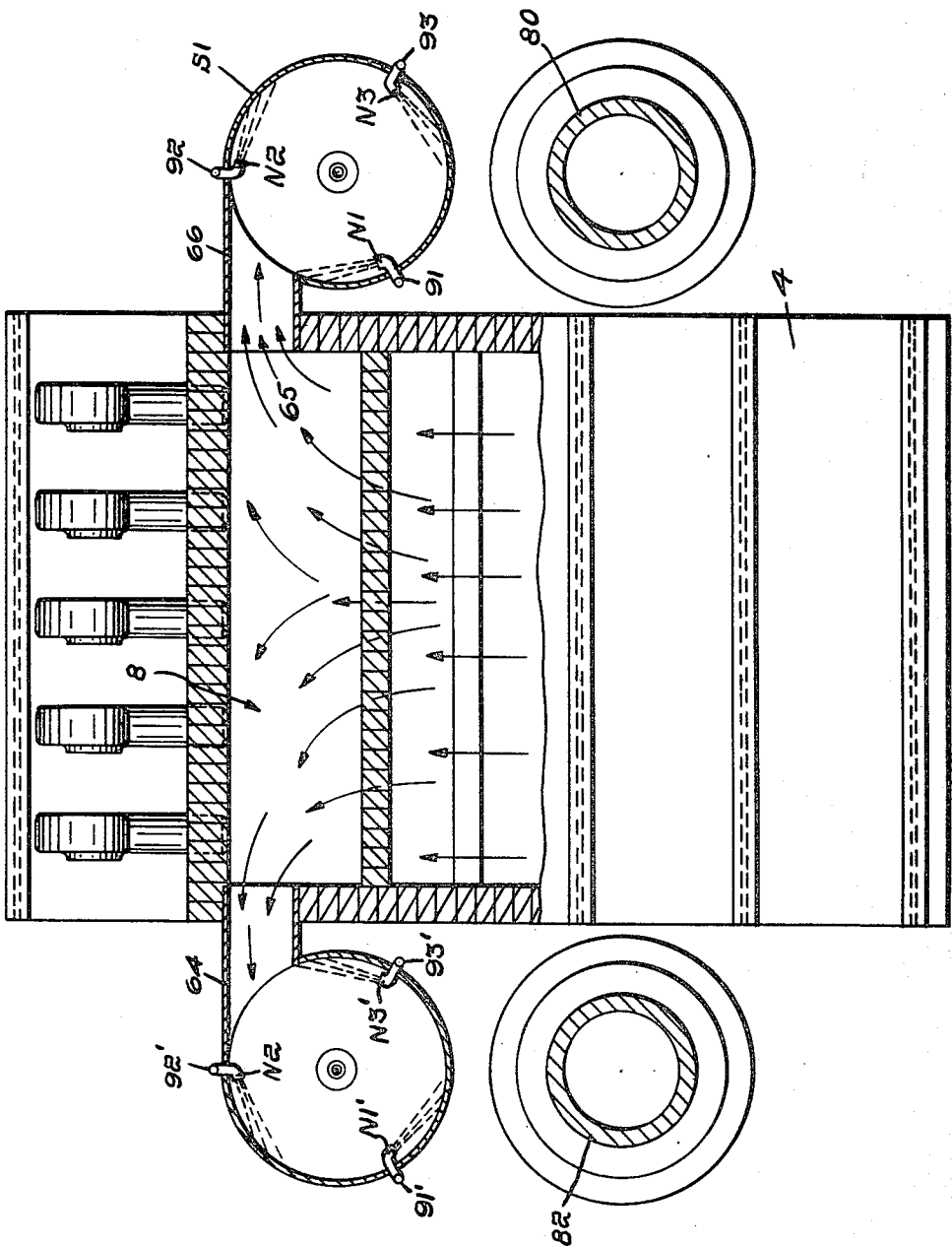
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Fig. 6.



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METHOD AND APPARATUS FOR BURNING AUTOMOBILE BODIES AND OTHER WASTE MATERIALS

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12 Claims. (Cl. 263—2)

ABSTRACT OF THE DISCLOSURE

A burning chamber formed with a channelled base is employed to slidably support a row of vehicles arranged side by side in abutting relationship above burning units in the base. A traveler member periodically advances auto bodies to be burned into the chamber to advance the entire row of burned bodies and eject a rearmost burned body into a discharge chute. Combustion gases are directed by the burning units along the underside of the row of vehicles and many includes both conventional and jet type burners operating at superatmospheric pressure. Products of combustion are processed to remove heavy smoke particles.

This invention relates in general to apparatus and methods for burning waste materials and, more particularly, the invention is concerned with an improved vehicular incinerator in which scrapped auto bodies and other waste materials may be continuously burned and metal salvaging carried out.

In disposing of scrapped automobiles a common practice is to burn auto bodies which have been stripped of usable materials so as to eliminate upholstery, paint, rubber, plastic parts and the like. If this burning operation is not controlled there may be produced a heavy black smoke which creates an undesirable air pollution with the result that automobile burning has been outlawed in many areas.

It is, therefore, a chief object of the invention to provide a process for salvaging auto bodies and other waste materials by burning in an incinerator structure in which control of air pollution may be realized.

It is also an object of the invention to provide an efficient burning apparatus into which a plurality of vehicles such as auto bodies may be continuously advanced and burned at a relatively rapid rate so that a large number of auto bodies may be efficiently burned and the resultant steel sheets subjected to hydraulic press action to provide reprocessed steel.

Another specific object of the invention is to devise a novel burning chamber in which a continuous flow of combustion gases is initiated and caused to pass through and around a series of vehicles which are burned simultaneously to develop maximum burning temperatures with a minimum use of independently supplied fuel.

Still another object of the invention is to devise a method of baffling and cleaning combustion gases passing out of the burning chamber of a vehicle incinerator in order to control and prevent discharge into the atmosphere of smoke particles and other substances tending to cause air pollution.

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Still another object of the invention is to devise a method of burning in which compressed fuel and oxidant may be burned at superatmospheric pressures to form a high velocity high temperature flame jet and the flame jet may be caused to flow through and around a plurality of auto bodies arranged in a row in a burning chamber in order to provide very high booster temperatures and in order to provide very high booster temperatures and time to time.

A further object of the invention is to provide a novel means of periodically introducing scrapped auto bodies which are to be burned through a vertically adjustable doorway arranged to open and close in response to advance and retraction of an auto body feeding mechanism.

The general nature of the invention and its other objects and novel features will be more fully understood from the following description of a preferred embodiment of the invention selected for purposes of illustration shown in the accompanying drawings, in which:

FIGURE 1 is a perspective view of the incinerator apparatus of the invention;

FIGURE 2 is a fragmentary plan view of the apparatus of FIGURE 1 as shown on a somewhat smaller scale and particularly indicating blower means at one end thereof;

FIGURE 3 is a front elevational view of the apparatus shown in FIGURE 1 with portions of the sidewalls of the burner chamber being broken away to indicate details of construction in the burning chamber and also in stack members associated therewith;

FIGURE 4 is a cross section taken on the line 4—4 of FIGURE 2 and shown on a somewhat enlarged scale;

FIGURE 5 is a perspective view of a burning apparatus similar to that illustrated in FIGURE 1 and further indicating auxiliary heating means for supplying jet flame booster heating to the interior of the burning chamber.

FIGURE 6 is a detail plan cross section of a portion of the upper burning chamber of the invention taken at a point at which combustion gases pass out to the stack members; and

FIGURE 7 is a detail elevational view.

The method of the invention is based on the novel concept of creating in a burning chamber a combustion region of sufficiently high intensity to make possible simultaneous burning of a plurality of auto bodies and further controlling the burning time interval in the chamber so that periodic charging of autobodies may be accomplished and a substantially continuous processing is realized.

The principal parts of the burner apparatus of the invention include stack means and an incinerator housing formed with a lower primary burning chamber in which combustion is initiated and an upper secondary burning chamber through which products of combustion are further combusted before passing into the stack means. A charging gantry is arranged at one side of the housing to move scrapped auto bodies through the lower burning chamber. Located between the stack and the upper secondary burning chamber is a specially devised spray unit for precipitating additionally processing smoke particles just prior to entering the bottom of the stack member. Completely burned bodies pass out of the housing through a discharge outlet into a hydraulic press station.

Considering these parts in greater detail the incinerator

housing may be of any desired size and in one preferred form may consist of a box shaped enclosure suitable for receiving therein a plurality of scrapped auto bodies arranged one against another. A typical size of a primary burning chamber enclosure volume is twenty-five feet wide, thirty feet long and from eight to ten feet high. It will be understood that the invention may be varied in size to burn various other types of scrapped materials such as demolition materials, old wire, trucks, freight cars, and the like.

It is intended that this apparatus be employed to contain a row of scrapped auto bodies closely compacted against one another. As successive auto bodies are introduced into the burning chamber the entire line of auto bodies which are being combusted will be periodically moved along the floor of the burning chamber and as each auto body is completely burned, it is dropped off into a suitable discharge chute where it is subjected to hydraulic forces and pressed into reprocessed steel body.

Referring more in detail to the structure shown in the drawings, numeral 2 denotes a base of concrete or other suitable material on which is supported an incinerator housing 4 as shown in FIGURE 1. This housing member may be constructed of steel framing and refractory brick and is formed as shown in FIGURE 4 with a lower primary burning chamber 6 and an upper secondary burning chamber 8.

The housing 4 is made up of a number of vertical and horizontal frame members welded or otherwise secured together to define a box shaped enclosure. The inner wall portion of this box shaped enclosure is comprised by refractory brick or other suitable fire resistant material. At the front side of the housing there is provided an entranceway in which is located a vertically adjustable door 10 which is supported in suitable channelled parts 10a and 10b and which is formed at its lower corners with notched portions 10c and 10d.

This vertically adjustable door 10 is opened and closed by means of a novel charging gantry 12 which, as best shown in FIGURE 1, is mounted on tracks 16 and 18, and powered by means of a drive mechanism D which operates through suitable pulleys to advance and retract the gantry as desired. At the front of the charging gantry is provided a receptacle portion into which a scrapped auto body may be received and advanced through the entranceway described. This receptacle portion of the charging gantry includes a pair of sides 21 and 23 which are formed with forwardly angled edges 21a and 23a. These angled edges are designed to move into the spaces defined by the notched corners 10c, 10d of the door 10 and to raise the door by sliding forward contact therewith as is suggested diagrammatically at the right hand side of FIGURE 4. By means of this arrangement it will be observed that loss of heat from opening and closing the door is greatly minimized and relatively higher burning temperatures may be constantly maintained within the burning chamber.

Scrapped car bodies may be placed in the charging gantry by some suitable means as, for example, a crane and magnet lifting apparatus of well-known type. By advancing and retracting the gantry charging apparatus described, it will be apparent that scrapped car bodies may be periodically advanced into the burning chamber with each successive auto body engaging against an adjacent body and causing the entire line of burning auto bodies to advance periodically until they have been subjected to a predetermined burning interval and reach a point at which combustion has been completed and the burned product is ready to be discharged.

As one suitable means of discharging completely burned bodies, we may provide at an opposite side of the housing 4 from door 10 a discharge opening 22. This opening, as shown in FIGURE 4, is located below the floor level 2 and in front of an inclined discharge chute 24 over which burned vehicles may be discharged from the burning cham-

ber and dropped down to become received in a hydraulic press station 26 as shown in FIGURE 5. In the hydraulic press station 26 the burned bodies are subjected to hydraulic pressure by hydraulic ram means or other device to crush and compress the metal into relatively small masses or blocks of metal M as indicated diagrammatically at the left hand side of FIGURE 1. A1, A2, A3, A4 and A5 denote auto bodies.

In carrying out the method of the invention in which a line of burning car bodies is periodically advanced through successive burning stations in a predetermined time interval, we provide for inducing a flow of products of combustion along the lower primary burning chamber as well as through car bodies therein to a passageway which is located at the front end of the chamber along the upper side thereof.

From this passageway the stream of products of combustion flow upwardly through a confined space and then change direction very abruptly. This tends to cause relatively coarse smoke particles to become momentarily slowed down as they are guided in a reversed direction, then along an undulating path of flow over and under a series of spaced baffles. Some of the particles are thus caused to drop down onto the bottom of the secondary burning chamber 8 from which they may be removed through cleanout openings C1 and C2.

The combined effect of confining and baffling the flow of products of combustion in the manner described provides an opportunity for secondary burning of a very large percentage of the coarse smoke particles present. This, we find, may be accomplished by establishing and maintaining substantially all the way through the secondary burning chamber elevated temperatures of an order of magnitude of from 800° F. up to 1480° F.

At a point where substantially all of the particles of an objectionable size have been consumed, the stream of products of combustion is subjected to still another change in direction and conducted towards the base of the stack means. Along this region of flow we may desire to employ liquid spray apparatus for further cleaning and removing objectionable smoke particles remaining in the stream of products of combustion and to facilitate further cleaning and removal of residual dampened smoke particles we may provide for introducing the stream of products of combustion to move in a helically directed path of flow momentarily before entering the bottom of the stack means.

In starting the burning operation of the invention it may become desirable to soak the car bodies with inflammable liquids or spray and then ignite the bodies directly. It may also be desirable to provide an independent flame source in the bottom of the lower chamber 6. For example, we have provided in the base 2 a plurality of spaced apart air ducts as 29, 31, etc. (FIGURE 7) which may extend from the inclined discharge chute surface 24 to points closely adjacent to the front of the door 10. In these air ducts are located, in protectively arranged channels, fuel pipes as 33, 35, etc., which can be supplied with a fuel such as gas under pressure and regulated to burn and produce a series of burning flames. The flames may be of some desired intensity and may be operated for a limited period only while starting up the burning operation, or the flames may be continued for a longer period if desired.

As shown in FIGURE 4, the primary burning chamber 6 is defined at the upper side thereof by a refractory brick top 7 which terminates in front of the door 10 to provide a vent passageway P leading upwardly out of the burning chamber 6. Supported in spaced relation to the upper side of the top 7 are retaining plates 30 and 32 rigidly secured to I beam members as 34, 36, 38 and 40. There is thus provided an air passageway 50 through which air is forced by means of a series of blowers B and this air moves along the passageway 50 to the opposite end of the structure and then is fed upwardly through a conduit 52 into the path of flow of combustion

gases in the secondary burning chamber to provide superheated oxidant air for increasing secondary burning of smoke particles. The flow of oxidant air also functions to reduce heat adjacent surfaces of the enclosure body and may be used to facilitate starting a burning cycle in operation.

The secondary burning chamber is comprised by a bottom section 60 and a top section 62 spaced slightly above the bottom section to form a relatively restricted and elongated smoke passageway which communicates with right angularly disposed conduits 64 and 66. Supported on the bottom section 60 in spaced apart relation to one another are a plurality of vertically disposed baffles 68, 70 and 72. Suspended from the top section 62 are additional baffle members 67, 69 and 71.

The baffle members 67, 69 and 71 occur in staggered relationship with respect to the baffles 68, 70 and 72 and are of a vertical dimension such that they overlap or extend beyond the tops of the baffles 68, 70 and 72 and there is thus produced a continuous passageway along which a stream of products of combustion rising through the passageway P is caused to move in an undulating path of flow.

Successive portions of the stream of products of combustion are caused to impact against the baffle sections with the result that some of the entrained smoke particles which are being combusted may be dropped down onto floors F1 and F2 of cleanout openings C1 and C2 and thus removed.

As noted above the combined effect of confining and restricting the stream of products of combustion while simultaneously increasing the flow of superheated oxidant air, can be regulated sufficiently to very greatly increase secondary burning of all smoke particles which leave the passageway P and enter the conduits 64 and 66 above described.

Attention is directed to FIGURES 3 and 6 wherein are illustrated stack members 80 and 82 located closely adjacent to the housing 4 and being supported on the base 2. These stacks are of substantial size and may have an inner diameter of from three to four feet or larger and may extend upwardly into the atmosphere for a distance of from fifty to seventy-five feet or more.

As noted above we may desire to conduct the stream of products of combustion leaving the conduits 64 and 66 through outlets 65 directly into one or more of the stacks 80 and 82. It is also contemplated that under some conditions only one of the stacks may be necessary in order to create a sufficiently strong induced draft in the burning chambers described.

However, when dealing with certain types of waste materials where smoke particles of particularly difficult nature are required to be processed, we may also employ centrifuging and spray cleansing units located between the stacks and the respective conduits 64 and 66. These centrifuging and spray cleansing units are generally denoted by the arrows S1 and S2 and are shown in more detail in FIGURE 6.

As noted in FIGURE 6, the spray unit S1 comprises a substantially cylindrical enclosure body which is connected to the conduit 66 in tangentially disposed relationship so that a stream of products of combustion leaving the secondary burning chamber and passing through the conduit 66 will be caused to flow against the inner cylindrical surface of the enclosure member S1 and momentarily caused to move along a substantially helical path of flow in the course of which some of the smoke particles are centrifuged and fall downwardly.

It will be understood that the induced draft of the stack member 80 will tend to draw the stream of products of combustion upwardly and this action may, if desired, be increased by a fan member 86 driven by a motor 88 located at the upper side of the spray unit S1. Similar fan and motor units 86' and 88' may also be

employed with the spray unit S2 and the stack 82 where a dual stack operation is found desirable.

Arranged around the upper side of the cylindrical enclosure body of spray unit S1 is a manifold member 90 which is connected to a source of water or other liquid under pressure. Connecting with this manifold member 90 are a plurality of vertical pipes 91, 92 and 93. Each of the vertically disposed pipes 91, 92 and 93 are mounted externally of the enclosure body as is better shown in FIGURE 6. Communicating with each of the vertical pipes 91, 92 and 93 are a series of spaced apart nozzles as N1, N2 and N3, which are disposed in an angularly directed manner as shown to direct a multiplicity of jets of spray inwardly of the enclosure body and into the flow of products of combustion which are moved helically within the enclosure body. The angle at which the jet extends may be varied as suggested by the dotted line showing in the figures.

By means of this arrangement the stream of products of combustion is wet down and any residual smoke particles passing out of the secondary burning chamber become dampened and tend to fall downwardly through the cylindrical enclosure where they can be removed from time to time. The bottom of the cylindrical enclosure is preferably formed with a conically shaped part at the lower end of which is connected a pipe member 100 which in turn may be connected to a filter 102 and a pump 104 for returning wash water back to the supply source. The water spray is employed to decrease the occurrence of poisonous gases and also to lower the temperature of the flow gases.

As will be observed from an inspection of FIGURES 3 and 6, the helically moving stream of products of combustion having been subjected to the spray washing step noted where this is desired, is then drawn through a conduit 106 into the base of the stack 80 and thereafter discharged into the atmosphere free from air pollution materials. Similar but primed numerals indicate corresponding parts for the stack 82 and the spray unit S2. It will be understood that in some cases the spray operation may be eliminated and in this case the cylindrical enclosure represented by the spray units S1 and S2 may constitute particle trapping regions wherein the stream of products of combustion may spread out as well as serving as connecting conduits between the secondary burning chamber and the respective stack members.

We may also desire to use much higher burning temperatures for certain more difficult burning requirements and to obtain these relatively higher burning temperatures we may employ a source of oxygen 110 shown at the right hand side of FIGURE 5 and a source of compressed gas such as compressed air indicated by numeral 112 at the left hand side of FIGURE 5. We may also use a source of liquid fuel as kerosene as indicated at 109 fed by a pump 111. Conduit means are provided for connecting these two units to a series of cylindrical combustion chambers 114, 116 and 118, in which compressed gas and fuel is burned at superatmospheric pressures to provide high velocity high temperature flame jets indicated diagrammatically at 120, 122 and 124.

The flame jets are directed generally longitudinally of the combustion chamber 6 in the housing 4, and flame guiding passageways are formed in the base 2 and denoted by numerals 126, 128 and 130. By angling the direction of flow of these flame jets and controlling their position relative to the position of a line of burning vehicles in the lower combustion chamber, it becomes possible to direct extremely high temperature high velocity burning flames against the bottoms of a line of scrapped auto bodies as well as through the bodies for a limited time interval so that a very rapid combustion effect may be produced.

We may also desire to direct and control the high temperature flame jets in various other arrangements and in various other time intervals depending upon changes in

the inner construction of the primary and secondary burning chambers.

As illustrated in FIGURE 5, we may employ an apparatus for taking a sample of flow gas from time to time and analyzing the contents of this gas. Numerals 150 and 152 denote gas sampling and analyzer devices connected into the respective stack members. It is intended that gas sampling and analyzing devices of well-known construction and operation may be employed for this purpose.

We may also desire to employ with the stack members flow gas modifying apparatus as indicated by the numerals 154 and 156 in FIGURE 5. These flow gas modifying units are essentially enclosure bodies with nozzle means for introducing gases or liquids in the form of sprays, jets or other types of flow and may be connected to a suitable supply of liquid or gaseous chemicals. It is contemplated that these chemicals may be of a type which is known to provide neutralizing or other reactive effects when some of the components in the flow gases pass upwardly through the stack member. For dealing with the burning of particularly troublesome chemical compositions such as rubber, plastic and the like, it may be desired to introduce controlling amounts of chemicals which will prevent the discharge into the atmosphere of gases or other pollution substances.

While we have shown and described preferred embodiments of our invention, it will be understood that changes and modifications within the scope of the appended claims may be carried out.

We claim:

1. A vehicle incinerator for burning vehicles, demolition materials and other waste substances, said apparatus including a burning chamber having means for producing and circulating therein high temperature combustion gases capable of igniting and combusting vehicles, means for moving a plurality of vehicles through one side of the burning chamber and out of the opposite side thereof, said burning chamber including a primary burning chamber, a secondary burning chamber and restricted conduit means for conducting a stream of products of combustion from the primary burning chamber into the secondary burning chamber along a reversely directed path of flow, said apparatus further including stack means communicating with the secondary burning chamber for inducing a high velocity draft of combustion gases, said secondary burning chamber being formed with a plurality of spaced staggered baffles for causing a stream of products of combustion to move through the secondary burning chamber in an undulating path of flow and said apparatus also including cylindrical enclosure means located between the said stack means and secondary burning chamber, said cylindrical enclosure means being connected to the said secondary burning chamber through a conduit extending tangentially away from one end thereof to cause a stream of products of combustion to become momentarily directed along a rising helical path of flow to the stack means.

2. A structure according to claim 1 in which the cylindrical enclosure means includes spray means for directing jets of spray into the stream of products of combustion to remove residual smoke particles, lower temperatures and reduce presence of noxious gases.

3. In a method of burning scrapped auto bodies, the steps which include igniting a plurality of auto bodies in a confined space and burning combustible material in the bodies to produce a stream of products of combustion, conducting the stream of products of combustion through a secondary burning chamber and simultaneously supplying a flow of superheated oxidant air to complete combustion of small particles and then introducing the stream of products of combustion into a stack member, and said stream of products of combustion being subjected to a centrifuging step.

4. A method according to claim 3 in which the stream of products of combustion is subjected to a fluid spray while being centrifuged,

5. Method of burning auto bodies and the like which comprises providing a burning chamber having a base for slidably receiving a row of auto bodies thereon, burner means in the base, an entranceway for admitting auto bodies into the chamber and a discharge chute for discharging burned auto bodies from the burning chamber, locating a series of auto bodies one against another in the burning chamber to provide a row of the auto bodies occurring in transversely disposed abutting relationship, actuating the burner means to direct burning flames against the undersides of the row of autos to burn the auto bodies, and periodically advancing additional auto bodies to be burned into the burning chamber into sliding contact with the said row of auto bodies to slidably advance the row of burned bodies along the base towards a discharge chute into which innermost auto bodies in the said row are successively discharged.

6. A method according to claim 5 in which the burner means is applied from spaced-apart points in the base upwardly along the undersides of the row of auto bodies to promote burning.

7. A method according to claim 5 in which the burner means is operated at superatmospheric pressure to form a flame jet and the flame jet is directed against the auto bodies along a path which extends angularly upwardly of the base from a point at the front of the burning chamber rearwardly thereof against the auto bodies.

8. A vehicle incinerator apparatus for burning vehicles, demolition materials and the like, said apparatus including a stack member, a burning chamber, conduit means for conducting products of combustion from the burning chamber to the stack member along an upwardly directed path of travel, said burning chamber having a base for supporting a row of vehicles thereon, flame producing means in the chamber for promoting combustion of the vehicles, said burner chamber being formed at one side with an entranceway and at the other side with a discharge outlet, traveler means movable through the entranceway for slidably advancing a row of vehicle bodies simultaneously while in abutting relationship along the base and into and out of the burning chamber.

9. A structure according to claim 8 in which the flame producing means includes a series of primary igniter burners operating on atmospheric air and a secondary booster burner operating at superatmospheric pressures.

10. A structure according to claim 8 in which the base is formed with spaced apart longitudinally extending channels across which said vehicles may be transversely disposed, and said flame producing means including a plurality of burners mounted in the channelled base in recessed relation to direct combustion flames upwardly against the underside of said vehicles.

11. A structure according to claim 8 in which the base is formed with spaced apart longitudinally extending channels across which said vehicles may be transversely disposed, and said flame producing means including a plurality of burners mounted in the channelled base in recessed relation to direct combustion flames upwardly against the underside of said vehicles, and said burners including primary igniter burners operating on atmospheric air and secondary booster burners operating at superatmospheric pressures and said igniter burners being located along the channelled portions of the base in spaced apart relation and said booster burner being mounted at one end of the channelled base.

12. A structure according to claim 8 in which said conduit for conducting products of combustion communicates with the burning chamber at an upper side thereof closely adjacent to the entranceway and extends upwardly and then rearwardly therefrom towards said stack, and the burning chamber at its upper side being formed

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with a hollow top section which defines a substantially horizontal passageway extending from the rear of the burner chamber to the front side and leading into the said conduit, blower means for forcing a flow of heated air through the passageway into the said conduit, and said discharge outlet constituting an air passageway for admitting a flow of combustion air into the burning chamber which is drawn upwardly over the row of burning vehicles and in contact with the top of the burning chamber to become heated and conduct heat into the said horizontal passageway.

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References Cited

UNITED STATES PATENTS

2,702,013	2/1955	Atteberry	110—18
2,873,101	2/1959	Babcock	263—2
3,074,644	1/1963	Geniesse	236—15
3,087,443	4/1963	Attanasio et al.	110—18
3,190,244	6/1965	Hoskinson	110—18
3,310,009	3/1967	Jacobs	110—8
3,322,508	5/1967	Ungerleider	110—18

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