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Overmyer et al.

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[54] **EXHAUST AND CHARGING HOOD FOR TILTING FURNACE**

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[73] Assignee: **Hawley Manufacturing Corporation,** Indianapolis, Ind.

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[21] Appl. No.: **185,682**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 61,287, Aug. 5, 1970, abandoned.

[52] **U.S. Cl.** ..... **266/15,** 266/35, 214/18 V, 214/35, 98/115

[51] **Int. Cl.** **C21c 5/38**

[58] **Field of Search** ..... 266/15, 16, 27, 31, 266/35; 214/18 V, 35; 98/115

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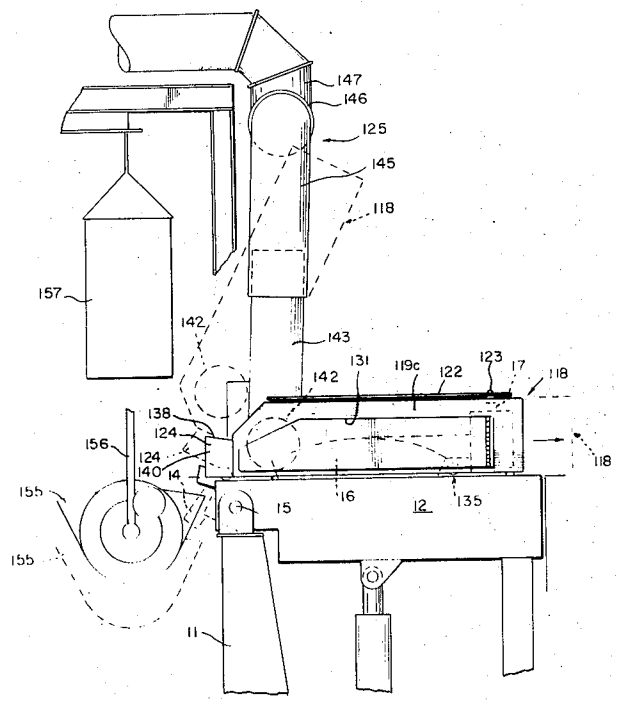
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[57] **ABSTRACT**

A fumes controlling hood for a melting furnace, the hood being constructed and arranged to envelop the conventional upwardly opening charging mouth of the furnace, the lid therefor and the lid-actuating post and being provided in its ceiling with a port registering with the furnace mouth and with a cover for the port mounted to swing about an axis coincident with the axis of movement of the lid, and a driver movable with the lid and establishing a driving connection with the cover so that the cover is moved with the lid to open the port when the furnace mouth is opened. The hood may be mounted on the furnace for shifting movement toward and away from its pouring spout. In those instances in which the furnace lid is raised before it is swung to open the mouth, the driver movable with the lid may establish such driving connection only as a result of such lid elevation. The conventional charging bucket may be modified by the provision of a removable closure for its open top and by the addition of a perimetral skirt which, when the valved bottom portion of the bucket has been entered through the hood port to rest on the furnace top in registry with the furnace mouth, will cover and substantially enclose the hood port. An exhaust system is provided to maintain a subatmospheric pressure within the hood; and when the furnace is of the tilting variety with a pouring spout, the exhaust system will include swivel connections and telescoping ducts permitting the hood to shift on the furnace and to tilt with the furnace in its shifted position. The hood may include a section movable about a vertical axis to provide greater access to the mouth of the furnace.

26 Claims, 6 Drawing Figures



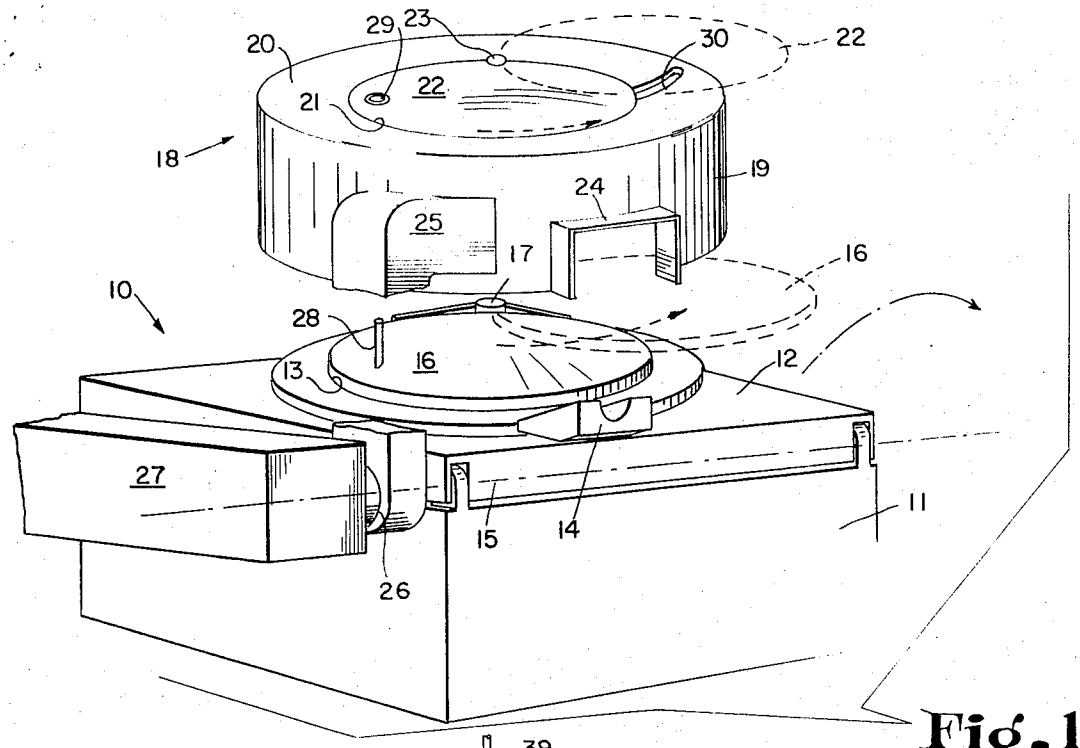


Fig. 1

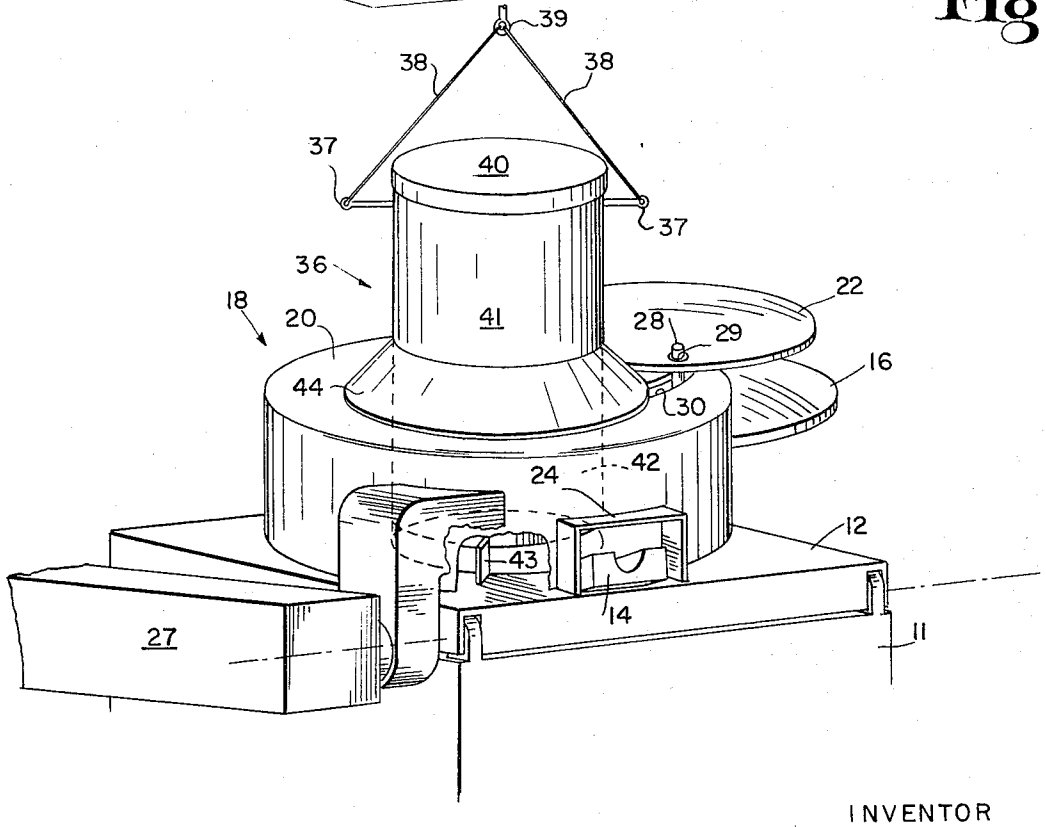


Fig. 2

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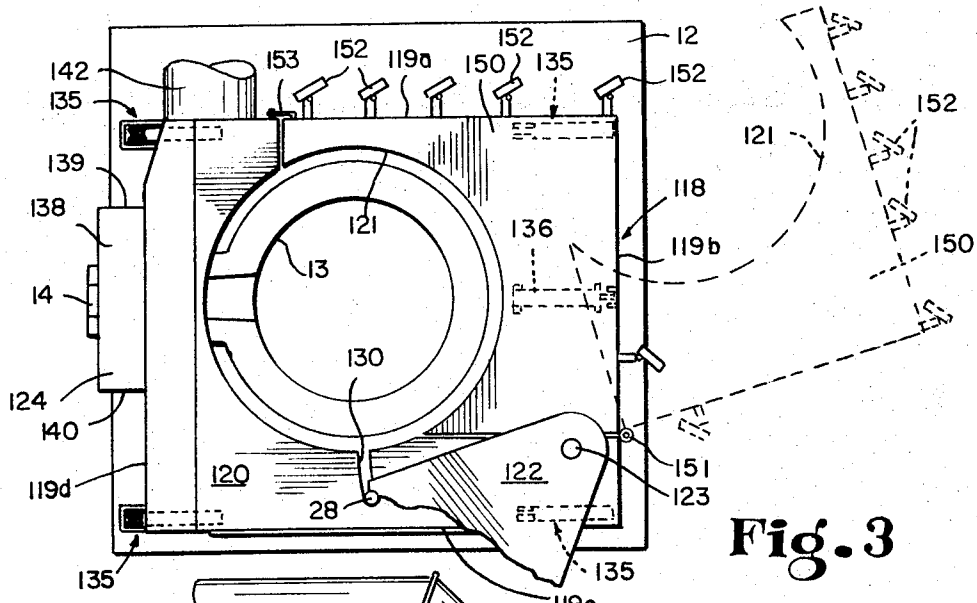

142
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139
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124
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119d
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119a
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119b
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123
135
119c

Fig. 3

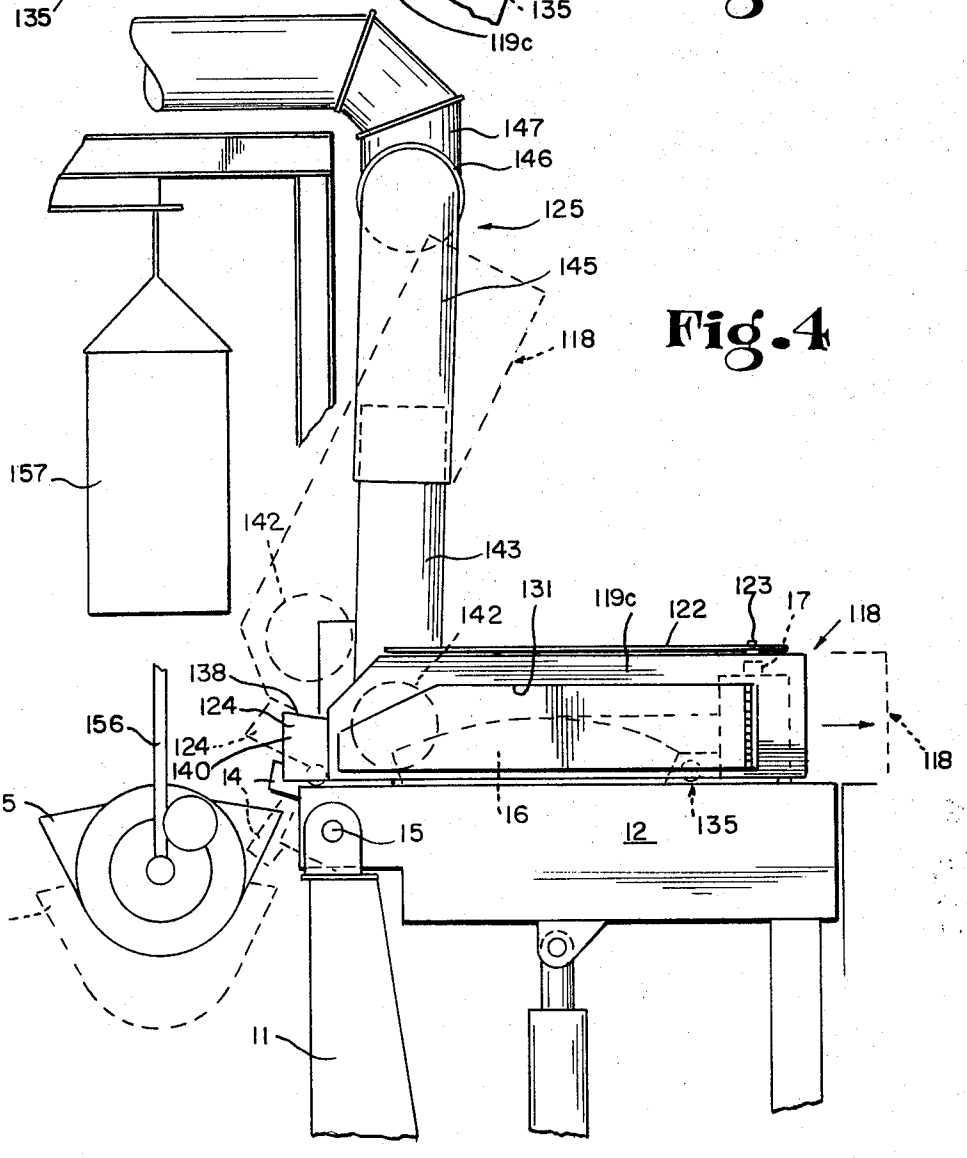

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146
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131
119c
122
123
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118

Fig. 4

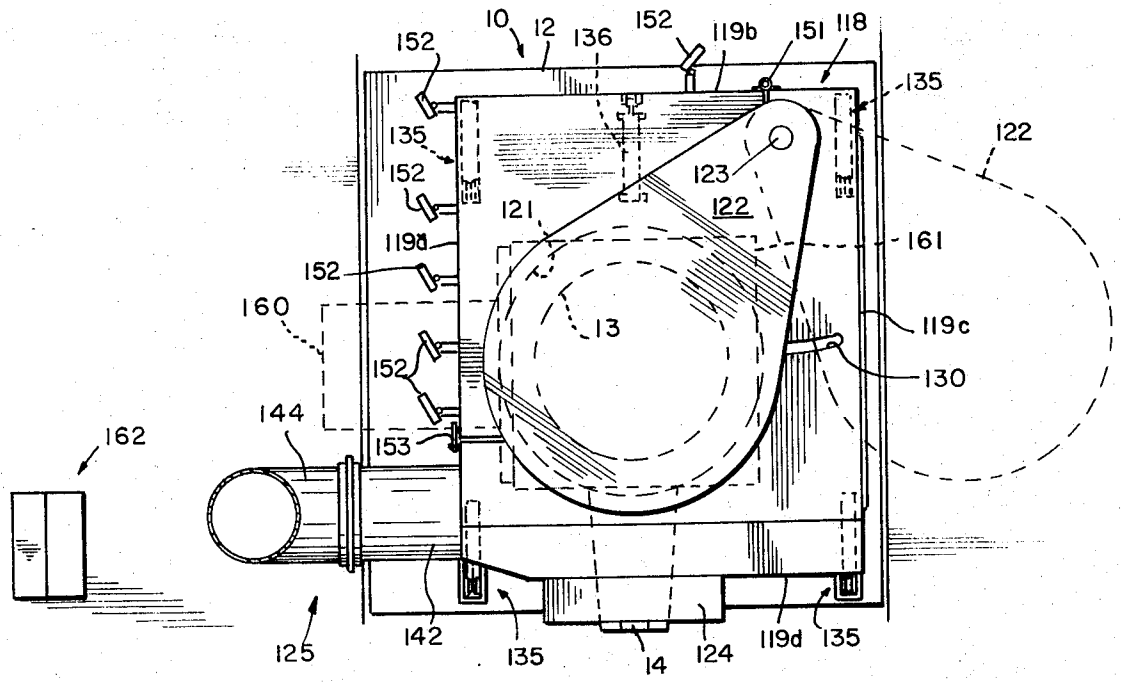

10
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152
119b
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119a
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119c
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144
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119d
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Fig.5

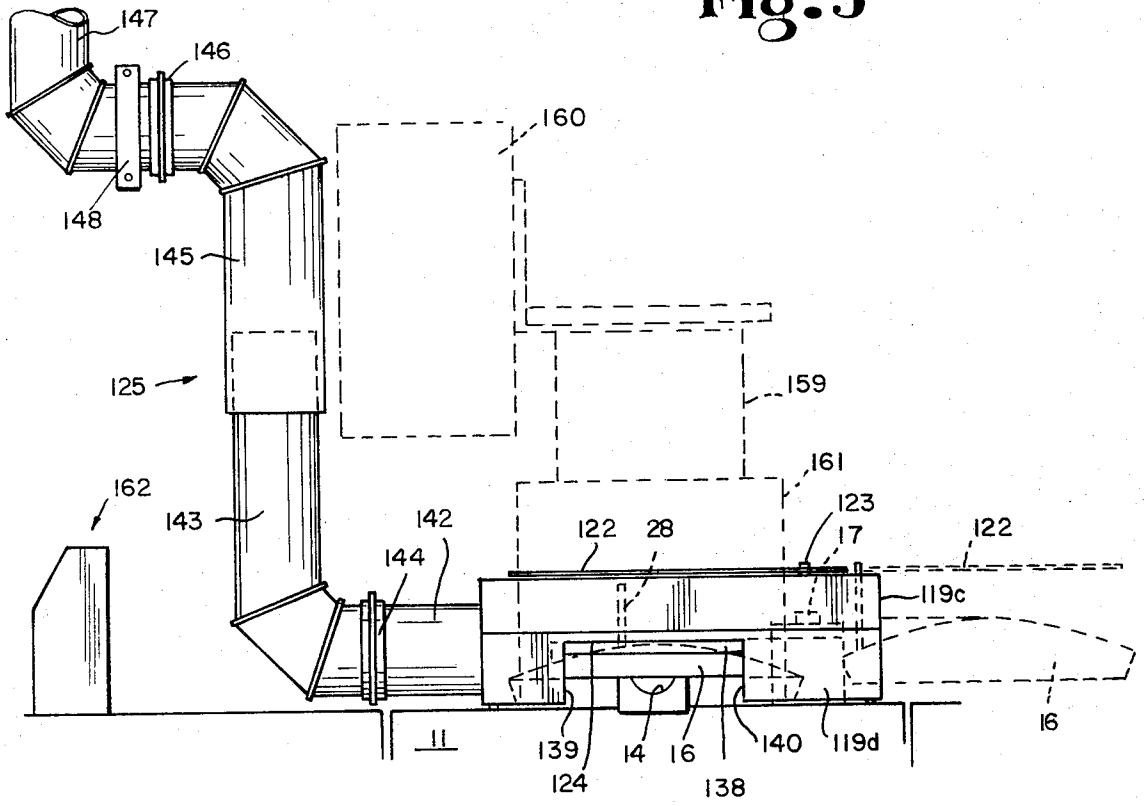

147
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161
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122
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119c
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119d
124
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Fig.6

EXHAUST AND CHARGING HOOD FOR TILTING FURNACE

This is a continuation-in-part application based upon copending application, Ser. No. 61,287 filed Aug. 5, 1970 by Robert C. Overmyer and now abandoned.

The present invention relates to a fumes-controlling hood primarily intended for association with a metal-melting furnace of the type having an upwardly opening charging mouth equipped with a lid which is mounted to swing about a substantially vertical axis outside the boundaries of the mouth, between a position in registry with the furnace mouth and a position laterally displaced from such registry. It is necessary, at times, to deliver material to be melted through the furnace mouth and a charging bucket of known construction, provided with a valved bottom, is conventionally swung into registry with the furnace mouth, at a time when the lid is in its laterally displaced position, whereupon the bucket valve is opened by known actuating means to dump the bucket load into the furnace. Many of such furnaces are mounted to tilt about a substantially horizontal axis to discharge the molten contents. Whenever the furnace mouth is open, and particularly when material to be melted is charged into the furnace or when molten material is being poured, heavy, noxious fumes arise from the furnace into the circumambient atmosphere.

The resultant pollution of the working environment in foundries has long been a serious problem. For many years, huge exhaust systems have customarily been used in an effort to maintain tolerable conditions for foundry workers by frequently changing the entire atmosphere within the foundry; but such systems, though they require the rapid movement of tremendous volumes of air, have been found to be quite ineffective even to maintain an average breathable atmosphere in a foundry; and of course they are utterly incapable of protecting the workers against the sudden intense pollution which occurs in the immediate vicinity of a furnace when it is thus fuming.

The primary object of the present invention, then, is to provide means whereby fumes arising from such a furnace will be immediately captured and prevented from emanation into the environmental atmosphere and whereby such captured fumes may be led away to a point at which solids may be precipitated and gaseous pollutants may be suitably treated before final disposition. To that end, we provide a hood which may be suitably supported upon a furnace top in enveloping relation to the furnace mouth and pouring spout, and duct means whereby the interior of the hood may be maintained in open communication with a region of subatmospheric pressure so that a high-velocity stream of environmental air will be constantly drawn into and through the hood to entrain any arising fumes and carry them away for suitable disposition. Such a hood must, of course, be so constructed and arranged as to accommodate the conventional charging bucket above mentioned; and it is an object of the present invention to provide a bucket-accommodating port in the ceiling of the hood, a cover for that port and means whereby the conventional movement of the furnace lid between closed and open positions will automatically move the hood cover in the same way.

A further object of the invention is to provide a hood of the character described which may be suitably supported upon a tilting-type furnace for movement therewith and to provide duct means between the hood and the region of subatmospheric pressure of such character as to accommodate such hood movement without disruption of the connection.

Still another object of the invention is to provide, for use with such a hood, a modified form of charging bucket of such character that, when the bucket is in position to discharge its load to the furnace, the top of the bucket and the charging port in the hood will be substantially closed.

A still further object of the invention is to provide, in connection with such a hood, guard means associated with the pouring spout of such a tilting furnace in a manner such that fumes arising from the flowing stream of molten metal and from the receptacle into which that stream is flowing will be effectively captured during a pouring operation.

Another object of the invention is to provide such a hood mounted on the furnace for rectilinear movement toward and away from the pouring spout of the furnace and to provide duct means including swivel connections and telescoping ducts arranged to accommodate the tilting movement of the hood in its shifted positions on the furnace.

A further object of the invention is to construct the hood such that a major portion of its ceiling defining approximately one-half the periphery of the port therein and the side walls depending from that ceiling portion are swingably movable away from the mouth of the furnace about a vertically-extending axis to provide greater access to the mouth of the furnace.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, our invention may be embodied in the forms illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is an exploded perspective view of a portion of a conventional tilting furnace, a hood constructed in accordance with the present invention for association therewith and a fragment of a plenum chamber in which a subatmospheric pressure is continuously maintained, with the furnace lid and the hood cover shown in solid lines in closed positions;

FIG. 2 is a perspective view illustrating the same parts in assembled relation but with the furnace lid and hood cover in displaced positions and with a charging bucket according to the present invention in position for delivering its load;

FIG. 3 is a plan view of another embodiment of the present invention, a fragment of the cover for the port in the ceiling of the hood being illustrated in its open position;

FIG. 4 is a fragmentary elevational view taken from the bottom of FIG. 3 and showing, in addition to the furnace and the hood, the duct system used with the hood;

FIG. 5 is another plan view of the hood and furnace of FIG. 3 rotated counterclockwise 90° relative to FIG. 3 and showing the cover in its closed position and showing also the position of the conventional control console; and

FIG. 6 is a fragmentary elevational view taken from the bottom of FIG. 5 and showing more details of the duct system as well as the positioning of the conventional charging bucket and its supporting frame relative to the hood and furnace.

Referring to the drawings, and particularly to FIGS. 1 and 2, it will be seen that we have illustrated a conventional tilting metal-melting furnace, indicated generally by the reference numeral **10** and mounted upon a frame or base **11.** The furnace body **12** is provided conventionally with an upwardly opening charging mouth **13** and with a pouring spout **14,** the furnace body being suitably mounted to tilt, relative to the base **11,** about a substantially horizontal hinge axis indicated by the broken line **15.** A lid **16,** proportioned and arranged to close the mouth **13** at times, is conventionally mounted upon a post **17** which is supported from the furnace body upon an axis outside the boundaries of the mouth **13.** In the illustrated embodiment of the invention, the post **17** is mounted for limited vertical reciprocation and for oscillation about its axis, means (not shown) being conventionally provided for actuating said post. It will be obvious that, when the lid **16** is to be shifted to open the mouth **13,** the post **17** rises to lift the lid **16** away from the mouth **13** and then turns about its axis to shift the lid **16** laterally out of registry with the mouth **13** substantially to the position illustrated in broken lines in FIG. **1** and in solid lines in FIG. **2.** When the mouth **13** is to be reclosed, the post **17** is turned about its axis in the opposite direction to bring the lid **16** into registry with said mouth, and is then lowered to fit the lid **16** into closing relationship to said mouth.

The hood, indicated generally by the reference numeral **18,** may advantageously be made from sheet metal and comprises a perimetral wall **19** and a ceiling **20,** said hood being open at its bottom and being supported and suitably secured to the top of the furnace body **12,** in enveloping relation to the furnace mouth **13** and its post **17,** for movement with said furnace. A port **21** in the hood ceiling **20** registers with, and is somewhat larger than, the mouth **13,** and a closure cover **22** for said port is supported from said hood ceiling for swinging movement about a pivot **23** which is coaxial with the post **17.** A guard **24** substantially envelops the pouring spout **14** and surrounds an opening into the interior of the hood **18,** as clearly illustrated.

Duct means **25** is in open communication with the interior of the hood and communicates, through a swivel connection **26** coaxial with the hinge axis **15** for the furnace **10,** with a region in which a subatmospheric pressure is constantly maintained. In this illustrated embodiment of the invention, such region is defined by a plenum chamber **27** which is continually exhausted by suitable means such as an exhaust fan or blower (not shown).

Upstandingly carried upon the lid **16** at a point remote from the post **17** is a pin **28,** and the cover **22** is provided with means, enterable by said pin **28** at times, to provide a driving connection between the lid **16** and the cover **22.** As shown, such means is a perforation **29** through the cover **22;** but it will be obvious that, instead, the cover could be provided with a downwardly opening socket or with downwardly extending abutment means for engagement by the pin **28.** In this illustrated embodiment of the invention, the extent of upward projection of the pin **28** above the lid **16** is such that, when the lid **16** is in closing relation to the furnace mouth **13,** the pin **28** is wholly disengaged from the means **29** but, when the lid **16** is raised out of closing association with the mouth **13,** the pin **28** will enter the means **29** to establish such a driving connection. Thus, when said lid, having been so raised, is turned toward the solid line position of FIG. **2,** the cover **22** will be entrained therewith to open the port **21,** the pin **28** travelling, during the latter portion of such turning movement, through an arcuate slot **30** formed in the hood ceiling **20** for that purpose. It will be obvious, of course, that the perimetral wall **19** of the hood **18** will be suitably formed to accommodate the necessary lateral movement of the lid **16.** As shown, said wall **19** is formed with an opening (not shown) which permits partial emergence of said lid **16** from the interior of the hood. In some cases, to conserve air volume, such an opening may be provided with a gravity or spring-urged, outwardly opening door which will normally close such opening but which will open under the influence of the moving lid; or, if desired, the hood may be formed with a lateral enlargement to accommodate the lid **16** in its position of FIG. **2.** In other cases, it is advisable not to close such an opening, and this concept will be discussed in conjunction with FIGS. **3–6.**

The above-mentioned disengagement of the driving connection between the lid **16** and the cover **22** is desirable and preferred, but it is not essential even in an installation in which the lid rises before it is turned out of closing registry with the furnace mouth; and of course it will not occur in installations in which the furnace lid has no significant vertical movement.

With the lid **16** and cover **22** in open positions, a charging bucket, indicated generally by the reference numeral **36,** may be swung into position to deliver its load to the furnace. Conventionally, such a bucket comprises a cylindrical body, open at its upper end and provided at its lower end with suitable valve means and with conventional means (not shown) for actuating the valve means to dump the load from the bucket. A plurality of radially outstanding brackets **37** may be connected by individual strand means **38** to a common suspension and transfer means suggested at **39** in FIG. **2.** Such means may be, for instance, the cable of a travelling crane by which the bucket may be transported from place to place and raised and lowered.

According to the present invention, a removable closure means **40** closes the open top of the bucket body **41** after the bucket has been loaded and it will be understood that the lower portion **42** of the bucket body, which preferably carries a plurality of outwardly radiating toes **43** to rest upon the top of the furnace body **12** while the bucket is in registry with the furnace mouth **13,** is proportioned and designed to move freely through the hood port **21.**

At a suitable level intermediate its ends, the bucket body carries an outwardly perimetral, depending skirt **44** so constructed and arranged that, when the toes **43** rest on the furnace top, the depending edge of the skirt **44** will substantially bear upon the hood ceiling **20** in surrounding relation to the port **21,** thus substantially closing said port.

After the bucket load has been deposited in the furnace, of course, the bucket will be lifted and carried away from the furnace and the post **17** will be actuated to move the lid **16** and cover **22** into closing relation to the mouth **13** and port **21.** As the lid **16,** after reaching

registry therewith, descends into closing relation with the mouth **13**, the pin **28** will be withdrawn from the engaging means **29** so that, if for any reason it should be desirable to do so, the cover **22** may be moved out of closing relation to the port **21** without disturbing the lid **16**.

When the melt in the furnace is ready to be discharged, the furnace may be tilted about the axis **15** to permit the molten contents to flow through the spout **14**. The hood moves with the furnace, with the duct means **25** turning about the same axis as the swivel connection **26**, so that the continuously moving stream of air entering the assembly within the guard **24** will entrain any fumes arising from the pouring operation.

Turning now to FIGS. **3–6**, another embodiment of the hood of the present invention will be discussed, this hood being indicated generally by the reference numeral **118**. This illustrative hood **118** is generally rectangular and includes four side walls **119***a*, **119***b*, **119***c*, and **119***d* and a ceiling **120** providing the centrally located port **121** to be closed by the cover **122** which is swingable about the indicated axis **123**. A cover **124** is provided for the spout **14**, and duct means, indicated generally at **125**, is connected to the hood **118**. The hood **118**, therefore, serves the same function as the hood **18**, and the hood **118** includes generally the same structural features as the hood **18**. The cover **122** is driven to its open position illustrated in dashed lines in FIGS. **5** and **6** by the drive pin **28** carried by the lid **16** of the furnace in the same manner discussed above, and the ceiling **120** is provided with an arcuate slot **130** to accommodate the movement of the drive pin **28**. In addition, the side wall **119c** is provided with a horizontally elongated opening **131** through which the lid **16** of the furnace moves as illustrated in FIG. **6**. An advantageous feature of this horizontally elongated opening **131** in the wall **119c** will be discussed hereinafter.

It will be appreciated that the illustrated opening **131** is considerably longer than the width of the lid **16**. This is required because the illustrated hood **118** is mounted on the furnace **12** for rectilinear movement toward and away from the spout **14**, the extent of this rectilinear movement being illustrated by the broken line showing of the hood **118** in FIG. **4**. Particularly, means indicated generally at **135** are provided for mounting the hood **118** on the furnace **12** for shifting movement toward and away from the spout **14**, each illustrative means **135** including a pair of rollers carried by the hood **118** and arranged to ride on, for instance, an inverted V-shaped rail. Means such as the illustrated hydraulic cylinder **136** may be used for power movement of the hood **118** on the furnace **12**.

The wall section or depending side wall **119d** is formed to provide an opening through which the spout **14** extends and the above noted outwardly extending cover **124**, the cover including an upper panel **138** extending outwardly and upwardly from the horizontally extending upper edge of the opening and side panels **139**, **140** extending respectively outwardly from the vertically extending side edges of the opening. The width of this opening is such that, when the hood **118** is fully retracted to its position away from the spout **14**, a portion of the periphery of the lid **16** may extend through the opening, i.e., through the plane defined by the side wall **119***d*.

Since the hood **118** is shiftable on the furnace **12** as well as movable with the furnace, the duct means **125** must accommodate the tilting movement of the hood **118** from any selected shiftable position on the furnace **12**. In the illustrative embodiment, this is accomplished by having the duct means **125** include a first duct **142** rigidly attached to the hood **118** to extend horizontally outwardly therefrom along an axis parallel to the tilt axis **15** of the furnace, a second duct **143**, a swivel connection **144** between the ducts **142**, **143** and permitting swivel movement about the axis of the duct **142**, and a third duct **145**. The upper end of this third duct **145** is connected as indicated at **146** to a duct **147** for swivel movement about an axis which is also parallel to the tilt axis **15**. A bracket such as indicated at **148** may be used rigidly to support the lower end of the duct **147** and the swivel connection indicated at **146**. In the illustrative embodiment, the lower end of the duct **145** telescopically receives the upper end of the duct **143** to accommodate the movement of the axis of the duct **142** relative to the axis defined by the swivel connection **146**.

Further, the illustrative hood **118** includes a movable section **150** mounted for swinging movement away from the mouth **13** and about a second substantially vertical axis defined by hinge **151** disposed generally on the opposite side of the mouth from the spout **14**, this section **150** including a portion of the ceiling **120** bounding approximately one-half the periphery of the port **121** and portions of the walls **119***a*, **119***b* extending downwardly from the ceiling portion to the furnace **12**. The movement of this swing-away section **150** is clearly illustrated in FIG. **3**. The section **150** may be movably supported on the furnace by means such as the illustrated casters **152**, and the section **150** may be locked to the rest of the hood **118** by means such as the illustrated hook **153**. The hook **153** may be of conventional structure arranged automatically to latch the movable section **150** when it is moved to its closed position.

In FIG. **4**, there is illustrated a conventional pouring ladle **155** carried by support members **156** depending from a hot metal carrier **157** of conventional type which may be movably supported on an overhead rail system. In FIGS. **5** and **6**, there is illustrated in phantom a conventional charging bucket **159** supported from a crane cab **160**, the bucket having a skirt **161**. Also in FIGS. **5** and **6**, there is illustrated a control console **162** positioned in a conventional location for such consoles so that the operator thereof will have a clear view of the pouring spout **14** during pouring operations. It will be appreciated that the operator stands behind the console **162** on the illustrated floor which is generally at the same level as the pouring spout.

The hood system disclosed in FIGS. **3–6** greatly facilitates slagging operations, pouring or tapping operations, and charging operations.

First of all, the slagging operation may be better manually performed by moving the furnace lid and the cover **122** to their respective open positions and the movable section **150** to its open position as indicated by dashed lines in FIG. **3**. The operator of the furnace can then move from the control console around to the rear side of the furnace where he can maneuver the conventional jib supported slagging spoon. During this operation, the full exhausting capabilities of the hood **118** will be moving the hot air away from the operator, thus shielding him from this discomfort. Any ensuing smoke or fumes will also be drawn into the hood.

During the pouring operation, the visibility of the operator at the control console is critical to the pouring procedure. In order to provide this visibility, the hood **118** is retracted away from the spout **14** to the point where the forward edge of the furnace lid **16** extends through the spout opening in the wall section **119***d*. Then, when the furnace **12** is tilted for pouring, the spout cover **124** will be generally in vertical registry with the spout to exhaust smoke arising from the spout and from the pouring ladle **155**. By retracting the hood **118** away from the spout, its extension into the area through which the pouring ladle **155** and associated equipment moves is limited to prevent collision. Importantly, the position of the hood **118** relative to the spout **14** can be selectively adjusted during the tilting and pouring operation to maximize the effectiveness of the hood in drawing off fumes from the spout and the pouring ladle.

The charging operation may be carried on as depicted in FIGS. **5** and **6** by lowering the charge bucket through the opening **121** after the lid **16** and cover **122** are opened to their laterally removed positions. Alternatively, the swing-away section **150** can be opened, the charging bucket **159** can be positioned, and then the swing-away section can be closed about the bucket.

In some instances, the large opening **131** through which the lid **16** moves proves to be of real advantage in that it permits a rather large volume of air to enter the hood **118** and to sweep across the top of the furnace to entrain fumes. This sweeping action of air entering the hood from the side opposite to the duct means **125** is beneficial. In some cases, perimetral slots (not shown) may be provided in the walls of the hood **118** to provide this sweeping action. Alternatively, there may be some space between the lower edge of the hood and the furnace to provide effective perimetral slots for this sweeping movement of air.

What is claimed is:

1. The combination with a furnace which is provided with an upwardly opening mouth, a lid for said mouth and means supporting said lid to swing, about a substantially vertical axis outside the boundary of said mouth, between a position in registry with said mouth and a position laterally removed from such registry, of a hood associated with said furnace and enclosing said mouth, said hood having a ceiling disposed above the uppermost position of said lid and said ceiling being formed with a port registering with said furnace mouth, a cover for said port, means supporting said cover from said hood to swing, about said axis, between closing and opening relation with said port, means moving with said lid to establish a driving connection between said lid and said cover, means establishing a region of subatmospheric pressure, and duct means establishing communication between said region and the interior of said hood.

2. The combination of claim **1** in which said lid is mounted for vertical movement when in registry with said mouth and in which said means moving with said lid establishes such driving connection only when said lid has been raised out of closing relation with said mouth.

3. The combination of claim **1**, and a charging bucket, said bucket having a valved floor and an open top, closure means for said bucket top, the lower portion of said bucket being proportioned and designed to pass through said port and to rest upon said furnace in registry with said mouth, and a perimetral skirt on said bucket intermediate the ends thereof and positioned substantially to bear upon said hood ceiling in enveloping relation to said port when said bucket so rests upon said furnace.

4. The combination of claim **1** in which said furnace is mounted for tilting about a substantially horizontal axis and is provided with a pouring spout, said hood being supported from said furnace to move therewith, and said duct means including a swivel connection coaxial with said horizontal axis.

5. The combination of claim **4**, and a charging bucket, said bucket having a valved floor and an open top, closure means for said bucket top, the lower portion of said bucket being proportioned and designed to pass through said port and to rest upon said furnace in registry with said mouth, and a perimetral skirt on said bucket intermediate the ends thereof and positioned substantially to bear upon said hood ceiling in enveloping relation to said port when said bucket so rests upon said furnace.

6. The combination of claim **1** in which said furnace is also provided with a pouring spout on one side of said mouth, and means for moving said hood on said furnace toward and away from said spout.

7. The combination of claim **1** in which said furnace is provided with a pouring spout on one side of said mouth, and means for supporting said hood for movement on said furnace toward and away from said spout, and means for moving said hood.

8. The combination of claim **1** in which said hood includes a movable section mounted for swinging movement away from said mouth and about a second substantially vertical axis, said section including a portion of said ceiling bounding a major portion of the periphery of said port and wall portions extending downwardly from said ceiling portion to said furnace.

9. The combination of claim **1** in which said furnace is mounted for tilting about a substantially horizontal axis and is provided with a pouring spout on one side of said mouth, said hood being mounted on said furnace for movement therewith.

10. The combination of claim **9** in which said hood includes a movable section mounted for swinging movement away from said mouth and about a second substantially vertical axis disposed generally on the opposite side of said mouth from said spout, said section including a portion of said ceiling bounding approximately one-half the periphery of said port and wall portions extending downwardly from said ceiling portion to said furnace.

11. The combination of claim **10**, and a plurality of casters for movably supporting said movable section on said furnace.

12. The combination of claim **1** in which said hood is provided with wall sections on generally opposite sides of said mouth and extending from said ceiling to said furnace, one of said wall sections being formed with a generally horizontally elongated aperture through which said lid moves outwardly to its said laterally removed position, said duct means establishing communication with said hood at the other of said wall sections.

13. The combination of claim **9** in which said hood is provided with wall sections on generally opposite sides of said mouth and extending from said ceiling to said furnace, one of said wall sections being formed

with a generally horizontally elongated aperture through which said lid moves outwardly to its said laterally removed position, said duct means establishing communication with said hood at the other of said wall sections.

14. The combination of claim **12** in which said furnace is provided with a pouring spout, and means for moving said hood on said furnace toward and away from said pouring spout.

15. The combination of claim **9**, and means for supporting said hood for movement on said furnace toward and away from said spout, and means for moving said hood.

16. The combination of claim **15** in which said hood is provided with wall sections on generally opposite sides of said mouth and extending from said ceiling to said furnace, one of said wall sections being formed with a generally horizontally elongated aperture through which said lid moves outwardly to its said laterally removed position, said duct means establishing communication with said hood at the other of said wall sections.

17. The combination of claim **16** in which said hood includes a movable section mounted for swinging movement away from said mouth and about a second substantially vertical axis disposed generally on the opposite side of said mouth from said spout, said section including a portion of said ceiling bounding approximately one-half the periphery of said port and wall portions extending downwardly from said ceiling portion to said furnace.

18. The combination of claim **15** in which said duct means includes a first duct rigidly attached to said hood for movement therewith, said first duct extending horizontally outwardly on a second horizontal axis parallel to the tilt axis for said furnace, a second duct, a swivel connection between said first and second ducts providing for swivel movement about said second horizontal axis, a third duct mounted for swivel movement at one of its ends about a third horizontal axis parallel to said furnace tilt axis and telescopically connected at the other of its ends to said second duct.

19. The combination of claim **15** in which said hood is formed with an opening adjacent to and registering with said spout and an outwardly extending cover for said spout bounding said opening, said cover including an outwardly and upwardly extending top panel and a downwardly extending skirt at each side of said panel.

20. The combination of claim **15** in which said hood is formed with a wall section extending from said ceiling to said furnace adjacent said spout, said wall section being formed to provide an opening through which said spout extends and an outwardly extending cover for said spout, said opening being proportioned and designed such that, when said hood is retracted away from said spout, a portion of said lid extends outwardly through said opening.

21. The combination with a furnace which is provided with an upwardly opening mouth, a spout on one side of said mouth, and a lid for said mouth, and which is mounted for tilting about a substantially horizontal axis to pour from said spout, of means for shifting said lid transaxially into and out of registry with said mouth, a hood associated with said furnace and enclosing said mouth, said hood having a perimetral wall formed with an opening therein to permit partial passage of said lid therethrough when said lid is shifted out of registry with said mouth, means establishing a region of subatmospheric pressure, and duct means establishing and maintaining communication between said region and the interior of said hood.

22. The combination with a furnace which is provided with an upwardly opening mouth, a spout on one side of said mouth, and a lid for said mouth, and which is mounted for tilting about a substantially horizontal axis to pour from said spout, of a hood associated with said furnace and enclosing said mouth, means for mounting said hood for movement on said furnace toward and away from said spout, said hood including a downwardly-extending wall section formed to provide an opening through which said spout extends and an outwardly extending cover for said spout, and said cover including a top panel extending outwardly and upwardly from the top edge of said opening and side panels extending outwardly respectively from the side edges of said opening.

23. The combination of claim **22** in which the width of said opening is such that, when said hood is moved away from said spout, a portion of said lid extends through said opening.

24. The combination of claim **22** in which said cover is proportioned and designed such that, when said hood is moved away from said spout and said furnace is tilted to pour from said spout, said top panel and side panels define a downwardly opening duct generally in vertical registry with said spout to receive fumes arising therefrom.

25. The combination of claim **22** in which said duct means includes a first duct rigidly attached to said hood for movement therewith, said first duct extending horizontally outwardly on a second horizontal axis parallel to the tilt axis for said furnace, a second duct, a swivel connection between said first and second ducts providing for swivel movement about said second horizontal axis, a third duct mounted for swivel movement at one of its ends about a third horizontal axis parallel to said furnace tilt axis and telescopically connected at the other of its ends to said second duct.

26. The combination of claim **22** in which said duct means includes a pair of telescopically related ducts, one of said ducts being connected to said hood for swivel movement about an axis parallel to the tilt axis for said furnace and the other of said ducts being mounted for swivel movement about another axis parallel to said tilt axis.

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