J. O. GRIGGS.

SHIELD OR AUXILIARY WALL FOR FURNACES.

APPLICATION FILED OCT. 25, 1918.

1,320,386.

Patented Nov. 4, 1919.

4 SHEETS—SHEET 1.

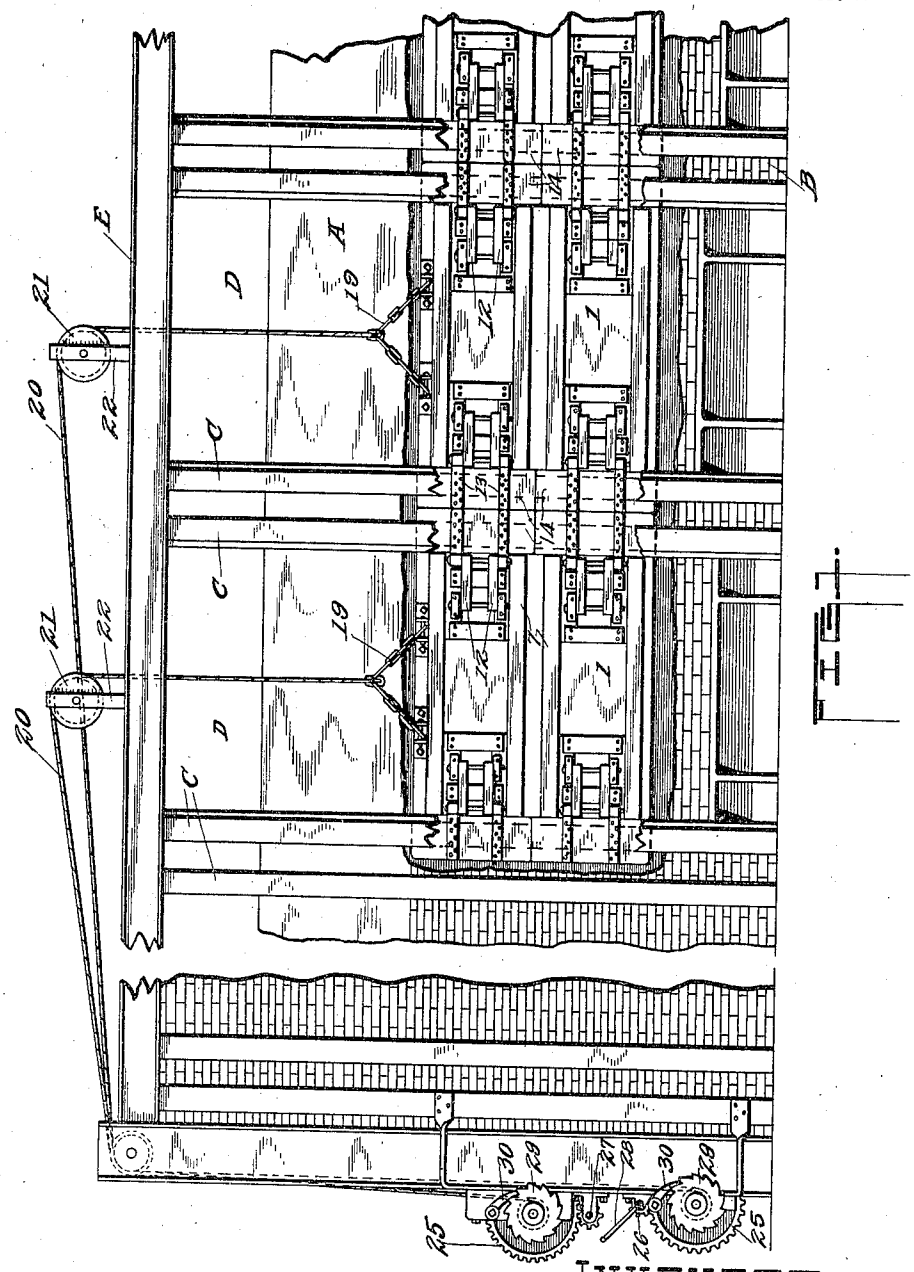


FIG. 1.

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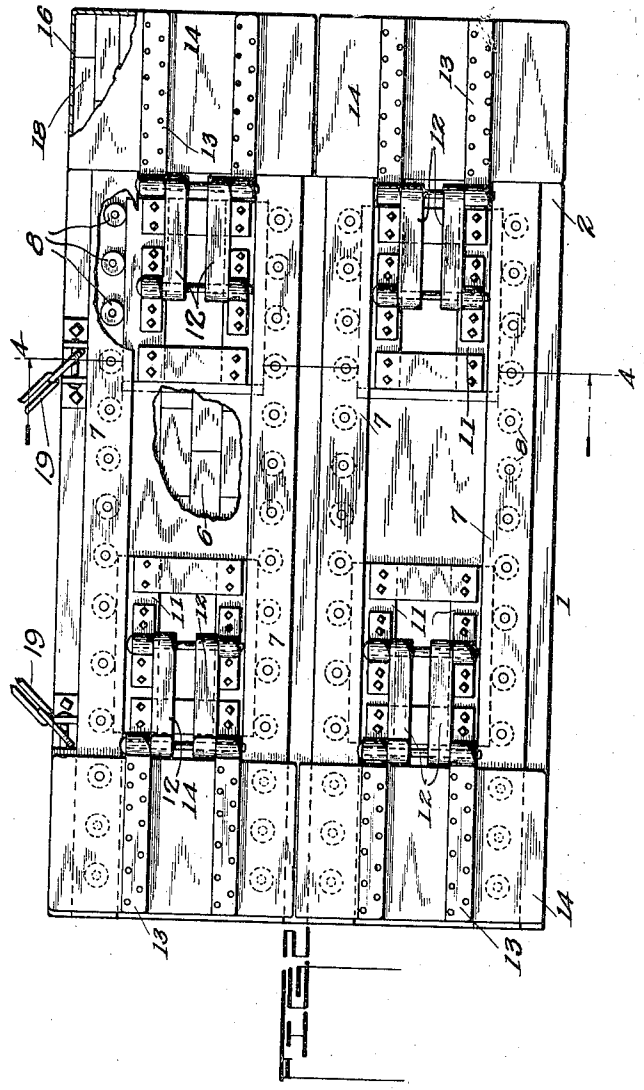


FIG. 2.

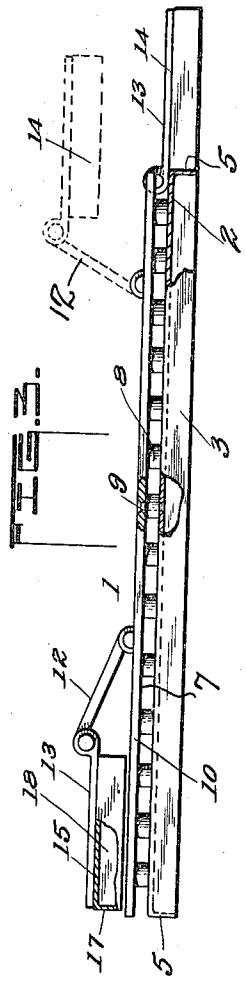


FIG. 3.

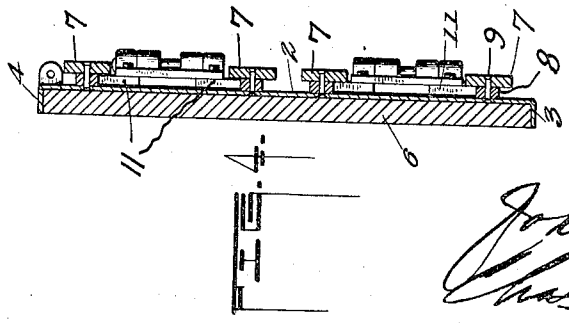


FIG. 4.

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4 SHEETS—SHEET 3.

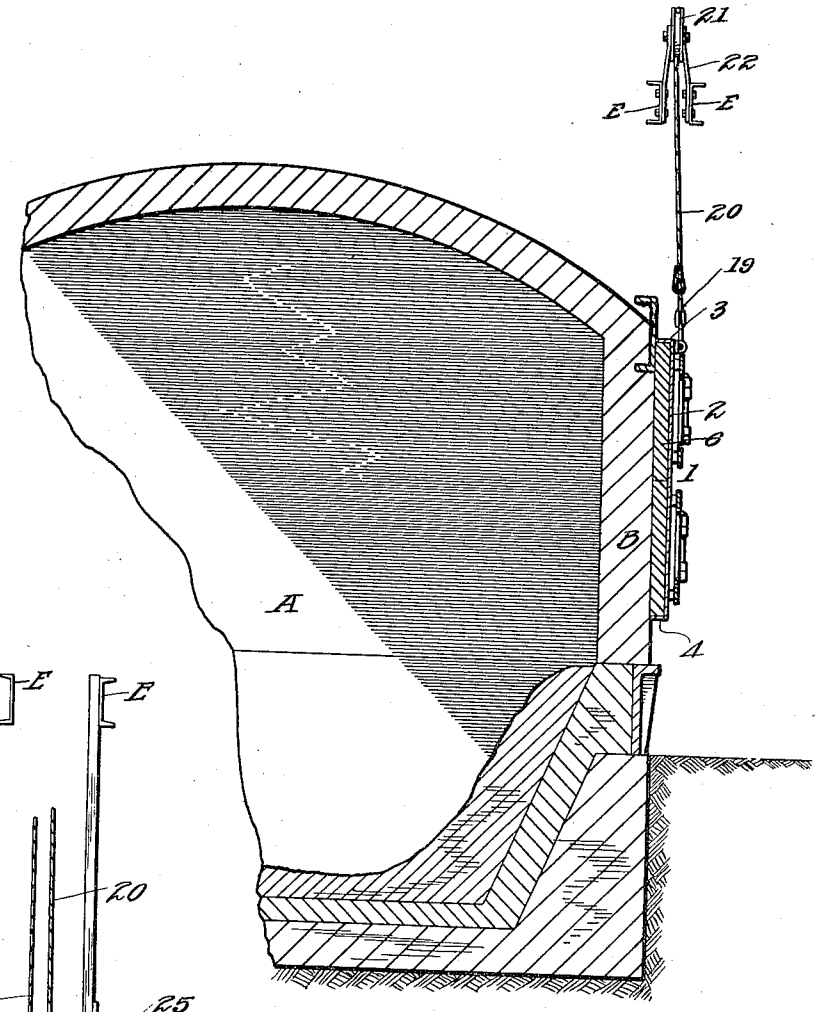


FIG. 5.

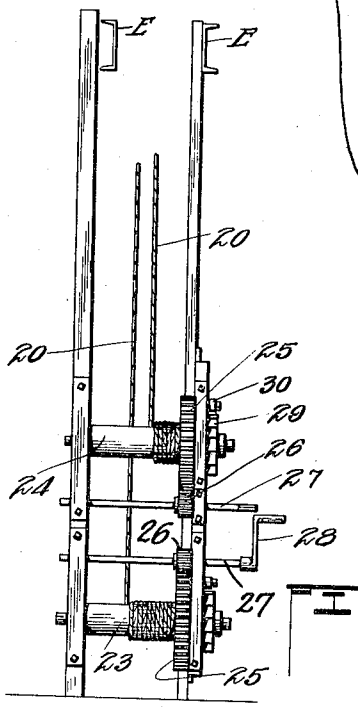


FIG. 6.

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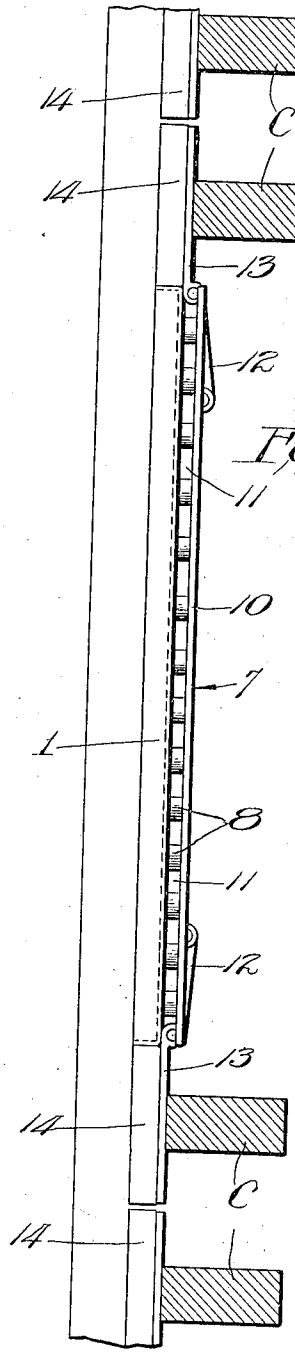


Fig. 8

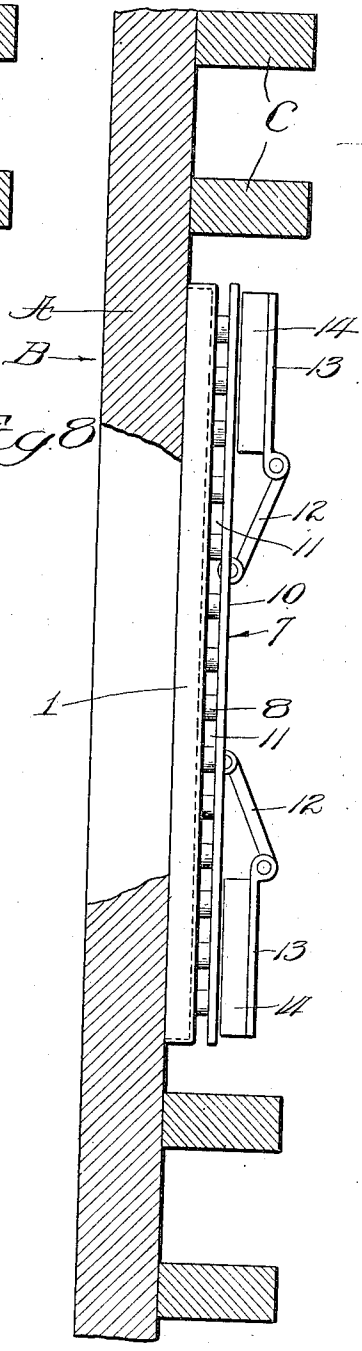


Fig. 9

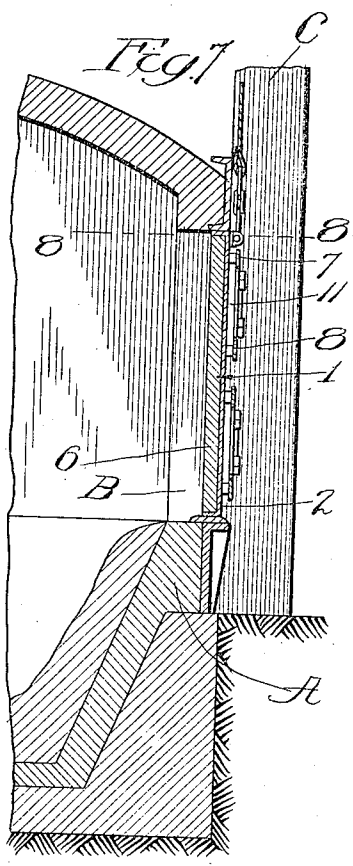


Fig. 7

Inventor:
John O. Griggs,
by Charles O. Sidney,
his Atty

UNITED STATES PATENT OFFICE.

JOHN O. GRIGGS, OF PEORIA, ILLINOIS.

SHIELD OR AUXILIARY WALL FOR FURNACES.

1,320,386. Specification of Letters Patent. Patented Nov. 4, 1919.

Application filed October 25, 1918. Serial No. 259,683.

To all whom it may concern:

Be it known that I, JOHN O. GRIGGS, a citizen of the United States, a resident of Peoria, in the county of Peoria and State of Illinois, have invented new and useful Improvements in Shields or Auxiliary Walls for Furnaces, of which the following is a specification.

This invention has reference to movable shields or auxiliary walls for the back-wall of an open hearth furnace.

The invention has for its principal object to permit the replacement of a back-wall of an open hearth furnace without interrupting the operation of the furnace, and this is accomplished by providing one or more, preferably, vertically movable auxiliary wall sections, which may be lowered into position to take the place of a wall which has fallen in during the course of a heat, and thus protect the heat against "freezing" or retardation; and which may also be used as a shield to protect working men against the extreme heat while replacing a back-wall or section thereof.

That the invention may be more fully understood, reference is had to the following drawings, in which:—

Figure 1 is a rear elevation of an open-hearth furnace, partly broken away, with my invention applied thereto;

Fig. 2 is an enlarged detail, in elevation, showing my back-wall shield or auxiliary wall;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is a view partly in end elevation and partly in vertical section, the line of section being taken on the line 4—4 of Fig. 2;

Fig. 5 is a cross-section through a furnace, showing my invention applied to the rear wall;

Fig. 6 is an elevation of the mechanism for raising and lowering the shields or auxiliary walls;

Fig. 7, is a cross section through a furnace showing my invention applied as a substitute for the rear wall of the furnace;

Fig. 8, is a horizontal section taken on the line 8—8 of Fig. 7, and

Fig. 9 is a horizontal section taken on the line 8—8 of Fig. 7, but showing the invention applied to the back wall in which a portion has fallen in.

Like characters of reference denote corresponding parts throughout the figures.

It is a well known fact, that during the operation of an open-hearth furnace, the back-wall will fall in, or it becomes necessary to replace a back-wall because of deterioration. If the back-wall falls in during a heat, it is the practice to shut down the furnace and permit it to cool sufficiently to permit the workers to replace the back-wall, and this takes, usually, from five to twenty-four hours, and the heat "freezes" or retards, as it becomes necessary to shut the gas off, entailing considerable loss, not only in the amount of time necessary for the furnace to cool, but also in the time necessary to reheat the metal, which, when once "frozen" or solidified, is not an easy matter to remelt and often requires from twenty to thirty-six hous to reheat it.

To prevent the back-wall falling in, while a heat is in progress, it is the custom to make an approximate estimate of the life of the wall, and if in the judgment of the operator, the wall may fall in during a heat, he will shut down the furnace between heats, tear out the back-wall and replace it.

My invention obviates the foregoing danger of the heat "freezing" or retarding, should the wall fall in, and also obviates the necessity of shortening the life of the wall by prematurely tearing it down, permitting it to be used until completely gone, or it falls in, the shield or auxiliary wall being lowered into place to serve as a wall, and also serving to protect the working men during the rebuilding of the wall.

While the invention is intended primarily for use on open hearth furnaces, it is applicable to other furnaces of like construction, and I, therefore, do not wish to be limited to its use on open hearth furnaces.

In the drawings, A designates the usual open hearth furnace, having the back-wall B, and C designates the "buck-stays", preferably arranged in pairs slightly spaced apart, and upon opposite sides of "panels" D. The upper ends of the "buck-stays" C are connected to longitudinally arranged channel-beams E.

Adapted to slide up and down in the "panels" D and between the "buck-stays" C, I show a shield or auxiliary wall 1, and while the main body of said shields or auxiliary walls may be constructed in many different ways, and the desired results be obtained, I prefer the construction shown, which includes a casing made with a rear wall 2, top and bottom walls 3 and 4, and

end walls 5. In this casing there is built up a front wall of brick 6, or other fire resisting or refractory material, which lies in juxtaposition to the rear furnace wall B, or acts as a substitute wall for it, or takes its place when said wall falls in; or is torn down for replacement, on account of deterioration of said back-wall.

Arranged longitudinally of and in spaced relation on the rear wall 2 of the shield, are two pairs of roller tracks 7, made up of a plurality of rollers 8, the spindles 9 of which are secured in the wall 2, and also in plates 10, the latter serving as guides for frames 11 which are adapted to be moved back and forth on the rollers 8. Hinged on the frames 11 are arms 12, which, at their outer ends have a hinged connection with straps 13 secured to wings 14. These wings are of the same general construction as the main shield 1; that is to say, they are formed with a back-wall 15, top and bottom walls 16, and end walls 17, and being in the form of a casing have a filling of fire brick 18, or other fire resisting or refractory material.

Normally, the frames 11 are withdrawn so that the wings 14 are disposed on the rear of the shield and do not project beyond the end walls 5 thereof. In this arrangement the shield is normally supported above the panel D and between a pair of "buck-stays" C. When the shield is to be used for protecting a deteriorated panel, or in case a portion thereof has fallen in, the shield is lowered to the position shown in Figs. 5 and 9 in which position the shield closes or covers any break in the panel and permits the heat to go on. The shield is held in this position to protect a bad portion in the back wall or a break therein which is not sufficiently large to endanger the buck-stays. When the shield with its wings, is used for protecting a back-wall, which has fallen in and the shield and its wings is to serve as a substitute wall to protect the heat against "freezing" or retardation and the workingmen during the rebuilding of the back-wall B the shield is lowered from its raised position in case it is being supported above the panels, or in case it is being held in the position shown in Figs. 5 and 9, it is then pushed into the chamber of the furnace to permit the wings 14, to be moved behind the buck-stays; the frames 11 are moved to the ends of the shield and the wings are carried out over the end walls 5 of the shield, with one end wall 16 of each wing 14 abutting against an end wall 5 of the shield, as shown in Figs. 1, 2, 3, 7 and 8. In this position of the wings 14 they are behind the "buck-stays" C, and the adjoining shields 1, and wings 14 form a continuous wall over as many panels D, as may be desired, protecting the "buck-stays" C against the intense heat, and the working men while they replace the back-wall B.

The pivotal connection of the arms 12 with the frames 11, and the pivotal connection between said arms 12 and straps 13 on the wings, permits of the necessary adjustments to place the wings on the back of the shield or extended beyond the ends of the shield, as shown.

Any suitable mechanism for raising and lowering the shields 1, may be employed, as desired, but I have preferred to show sections of chains 19 coupled to the shields 1, and said chain sections in turn coupled to cables 20, which travel up and over sheave wheels 21 journaled in frames 22 secured to the beams E.

In the present arrangement one cable 20 is wound on a drum 23, and the other cable 20 is wound on a drum 24. Both drums are provided with gear wheels 25 meshing with pinions 26 on shafts 27 arranged to have a crank 28 placed thereon for operating the same. On each drum shaft is carried a ratchet wheel 29, the teeth of which are adapted to be engaged by a pawl 30 for locking the drums with the shields 1 elevated with different positions. The raising and lowering mechanism may be arranged on one end of a furnace, or the furnace equipped with such a mechanism at both ends, if desired.

The drawings show the wings 14 at each end of the shield, in pairs one above the other, and while it is preferable and desirable to so construct the wings, they may be made as one wing for each end of the shield. Making the wings at each end of the shield in pairs, it is provided that as the shield is raised, during the reconstruction of the back wall, the upper pair of wings may be folded back against the shield, so that there may be no interference from obstructions at the roof of the furnace behind the "buck-stays."

What I claim is:—

1. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat.

2. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, and means for moving said shield over the wall surface.

3. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, and wings for said shield adapted to be moved beyond each end thereof to increase the length of the shield.

4. In a device of the character described, in combination with a furnace wall, a shield

applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, wings for said shield adapted to be moved beyond each end thereof to increase the length of the shield, and means for moving said shield and wings over the wall surface.

5. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, wings for each end of the shield, and means for pivotally supporting said wings on the shield, whereby the wings may be withdrawn behind the shield, or moved beyond the ends of the shield to lengthen the same.

6. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, wings for each end of the shield, means for pivotally supporting said wings on the shield, whereby the wings may be withdrawn behind the shield, or moved beyond the ends of the shield to lengthen the same, and means for moving said shield and wings over the wall.

7. In a device of the character described, in combination with a furnace wall, a shield applied directly to said wall to cover a deteriorated or fallen portion thereof to prevent "freezing" or retardation of the heat, frames slidably supported on said shield, and wings pivotally connected with said frames, said wings adapted to be moved beyond the ends of said shield to lengthen the same.

8. In a device of the character described, in combination with a furnace wall, a shield to cover a deteriorated or fallen portion of said wall to prevent "freezing" or retardation of the heat, frames slidably supported on said shield, wings pivotally connected with said frames, said wings adapted to be moved beyond the ends of the said shield to lengthen the same, and means for moving said shield and wings over the wall surface.

9. In a device of the character described, in combination with a furnace wall, a shield to cover a deteriorated or fallen portion of said wall to prevent "freezing" or retardation of the heat, a plurality of tracks on said shield, frames slidable on said tracks, plates having a pivotal connection with said frames, wings for each end of said shield, and a pivotal connection between said wings and said plates.

10. In a device of the character described, in combination with a furnace wall, a shield to cover a deteriorated or fallen portion of said wall to prevent "freezing" or retardation of the heat, a plurality of tracks on said shield, frames slidable on said tracks, plates having a pivotal connection with said frames, wings for each end of said shield, a pivotal connection between said wings and said plates, and means for moving said shield and wings over the wall surface.

11. In a device of the character described, in combination with a furnace wall having "buck-stays," a shield lying adjacent the wall and between said "buck-stays," and means for elevating and lowering said shield.

12. In a device of the character described, in combination with a furnace wall having "buck-stays," a shield lying adjacent the wall and between said "buck-stays," wings for each end of said shield, said wings adapted to be moved beyond the ends of the shield and behind said "buck-stays" to lengthen said shield, and means for elevating and lowering said shield and wings.

13. In a device of the character described, in combination with a furnace wall having "buck-stays" dividing the wall into a series of panels, a shield between each pair of "buck-stays" and lying adjacent the wall, and a separate means for elevating and lowering each shield.

14. In a device of the character described, in combination with a furnace wall having "buck-stays" dividing the wall into a series of panels, a shield between each pair of "buck-stays" and lying adjacent the wall, a wing extension for each end of each shield, means for so connecting said wings to the shields that they may be moved beyond the ends of the shields to lengthen the same and form a continuous auxiliary wall, and a separate means for elevating and lowering each shield.

15. In a device of the character described, in combination with a furnace wall, a shield to cover a deteriorated or fallen portion of said wall to prevent "freezing" of the heat, the face of said shield lying adjacent said wall, at least one face thereof being made of a fire resisting or refractory material.

16. In a device of the character described, in combination with a furnace, a portable shield for replacing the back wall of the furnace, at least one side of the shield being composed of fire resisting or refractory material.

17. In a device of the character described, in combination with a furnace and its buck-stays, a portable shield having lateral extensions for replacing the back wall of the furnace, and protecting its buck-stays.

18. In a device of the character described, in combination with a furnace, a portable back wall movable as a unit and having at least one face composed of fire resisting or refractory material.

19. In a device of the character described, the combination with a furnace wall, a shield made of a multiplicity of sections and

adapted to cover a deteriorated or fallen portion of said wall to prevent "freezing" or retardation of the heat.

20. In a device of the character described, in combination with a furnace wall, a shield made of folding sections and adapted to cover a deteriorated or fallen portion of said wall to prevent "freezing" or retardation of the heat.

In witness whereof, I have hereunto affixed my hand this 21st day of October, 1918.

JOHN O. GRIGGS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."