

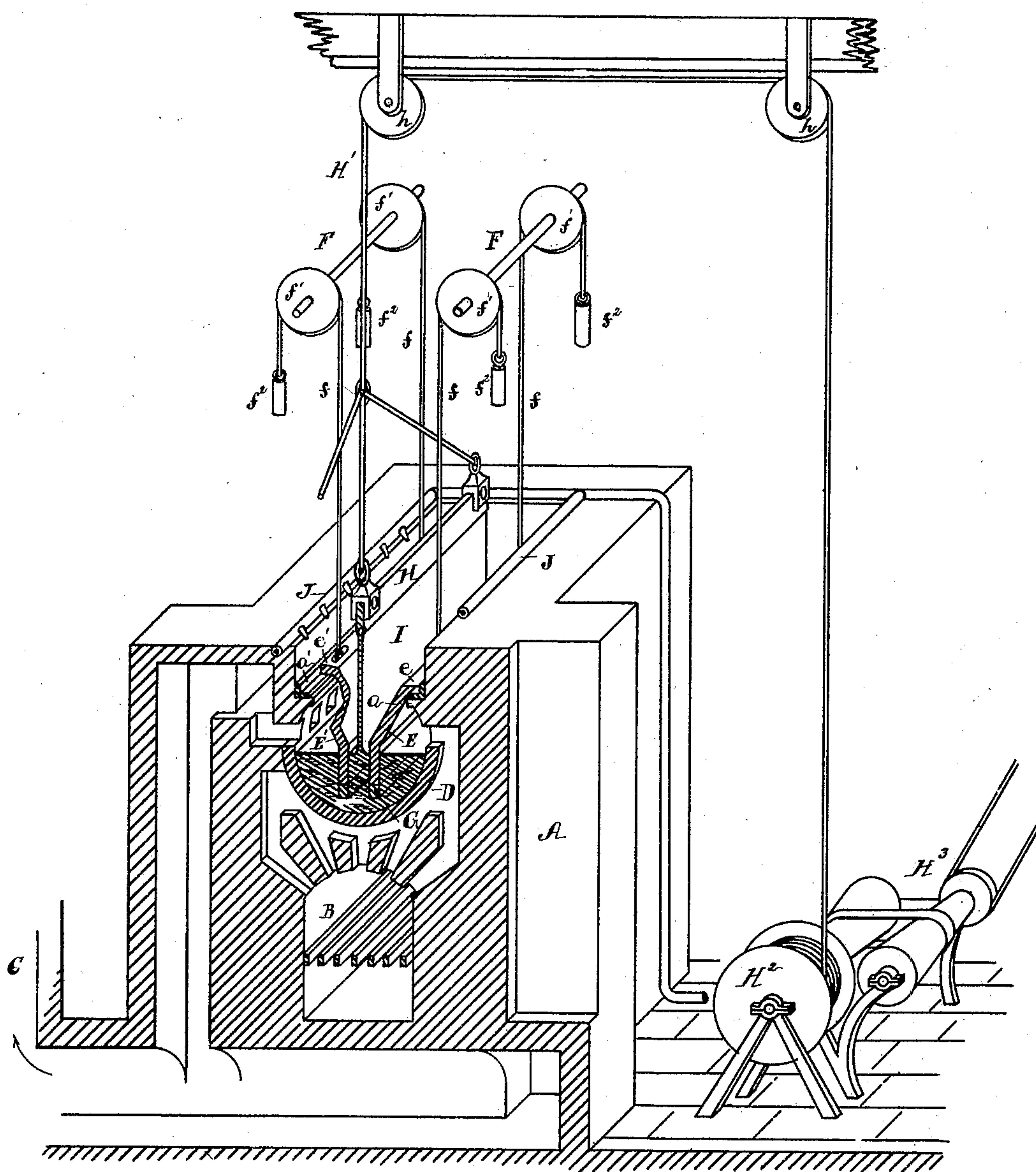
(No Model.)

H. FRANK.

MANUFACTURE OF GLASS.

No. 285,888.

Patented Oct. 2, 1883.



WITNESSES

WITNESSES
N. S. Wright.
A. E. Inglio.

~~INVENTOR~~

HIRSHMAN & FRANK
 BY W. W. JEGGERS

Attorney

UNITED STATES PATENT OFFICE.

HIMAN FRANK, OF DETROIT, MICHIGAN.

MANUFACTURE OF GLASS.

SPECIFICATION forming part of Letters Patent No. 285,288, dated October 2, 1882.

Application filed April 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, HIMAN FRANK, of Detroit, county of Wayne, and State of Michigan, have invented a new and useful Improvement in the Manufacture of Glass; and I declare the following to be a full, clear, and exact description of the invention, such as it pertains to make and use it, reference being had to the accompanying drawing, which forms a part of this specification.

My invention consists in an improved process of manufacturing glass and the mechanism employed therein, hereinafter more fully described, and more particularly pointed out in the claims.

The drawing is a perspective view of an apparatus embodying my invention.

My invention relates more particularly to the manufacture of sheet-glass for window-plates and other purposes.

I carry out my invention as follows:

In the drawing, A represents any ordinary furnace.

B is the grate.

C is the flue.

D is the crucible, containing melted glass.

E and E' represent diaphragms adapted to extend a suitable distance into the melted glass, and provided with mechanism whereby they may be raised and lowered. It will be convenient to construct these diaphragms with flanges *e* and *e'*, adapted to rest upon suitable beds, *a* and *a'*, although this is not essential.

F represents a hoisting mechanism for raising said diaphragms. As shown in the drawing, this mechanism consists of cables *f*, of any suitable number, passed over suitable pulleys, *f'*, suspended in any desired manner, said cables provided with weights *f''* to suitably counterbalance the weight of the diaphragms. While this mechanism is convenient for this purpose, I would have it understood that I do not confine myself to this precise mechanism, but would have it clearly understood that I design to use any suitable hoisting mechanism whereby the diaphragms may be raised and lowered as coming within the scope of my invention.

G represents rings, preferably two in number, said rings adapted to float upon the melted glass.

H is a suspended bar, provided with suitable hoisting mechanism. As illustrated in the drawing, this hoisting mechanism consists of a cable, *H'*, passed over suitable rollers, *h*, and wound about the drum *H''*, connected with a varied-speed machine, *H'''*. This machine may be of any desired construction, and I would have it understood that the bar *H* may be suspended by any suitable hoisting mechanism, so arranged that the lower edge of the bar may be dipped into the glass between the diaphragms and be raised vertically to any desired height.

The process of manufacturing the sheet-glass is as follows: The lower edge of the bar *H* is dipped into the melted glass, and is then hoisted vertically by suitable mechanism, care being taken to keep the bar in a horizontal position. As it is raised the fluid glass adheres thereto and is raised in a sheet therewith, as indicated at I. To prevent the glass from running down into the crucibles, I provide suitable air-blasts, *J*, adapted to throw blasts of air upon the sheet of glass as the bar is raised, thereby cooling the glass and preventing the sheet from becoming too thin. As the bar continues to be raised it will ultimately be necessary to sever the sheet from the glass in the crucible, thereby leaving a ridge of glass projecting somewhat above the surface of the glass in the crucible, which it will be desirable to force out of the way before dipping the bar again into the glass for the formation of another sheet. This may readily be accomplished by hoisting the diaphragms, forcing the ring last used aside, and bringing into proper location the unemployed ring, by which means a smooth surface of glass is secured between the diaphragms, and the ridge spoken of above will be caused to disappear in the fluid mass. The operation of dipping and hoisting the bar is then repeated.

What I claim is—

1. The combination, with a glass furnace and crucible, of a set of diaphragms provided with mechanism whereby they may be raised and lowered, a suspended bar provided with mechanism whereby it may be raised and lowered, the construction being such that the bar may be lowered into melted glass in the crucible and be raised with the glass adhering thereto, and in connection therewith means for

supplying blasts of air upon the glass as it is raised, substantially as described.

2. The combination, with a suitable glass furnace and crucible, of a set of diaphragms provided with means whereby they may be raised and lowered, a bar provided with mechanism whereby it may be raised and lowered, the construction being such that it may be dipped into the glass between the diaphragms and be raised with glass adhering thereto, and in connection therewith a suitable number of rings, and means for supplying blasts of air upon the glass as it is raised, substantially as described.

3. The combination, with a glass furnace and crucible, of suitable diaphragms provided with mechanism whereby they may be raised and lowered, suitable rings adapted to be located beneath the diaphragms, a bar provided with hoisting mechanism, said mechanism being driven by a varied-speeding gear, substantially as described.

4. The process of manufacturing sheet-glass, consisting of dipping the edge of a bar into the fluid glass between two diaphragms, then raising said bar vertically to the desired height by suitable mechanism, blasts of air being fur-

nished to the sheet of glass as it is being raised, substantially as described.

5. The process of manufacturing glass, consisting of dipping a suspended bar into the fluid material between two adjustable diaphragms, then raising said bar vertically by suitable mechanism, with the sheet of glass adhering thereto, said sheet of glass being prevented from becoming too thin by blasts of air, substantially as described.

6. The process of manufacturing sheet-glass, consisting of the following consecutive steps: first, locating suitable diaphragms upon a ring and lowering the same to a suitable distance in the fluid mass, then lowering the edge of a suspended bar into the fluid glass between said diaphragms, then raising said bar by suitable mechanism to the desired height, blasts of air being supplied to the sheet of glass as it is being raised, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

HIMAN FRANK.

Witnesses:

N. S. WRIGHT,
A. E. INGLIS.