2 Sheets--Sheet 1.

R. B. SWIFT & T. J. LIST.

Flask for Casting Propeller-Wheels.

No. 165,039. Patented June 29, 1875.

Fig. 1.

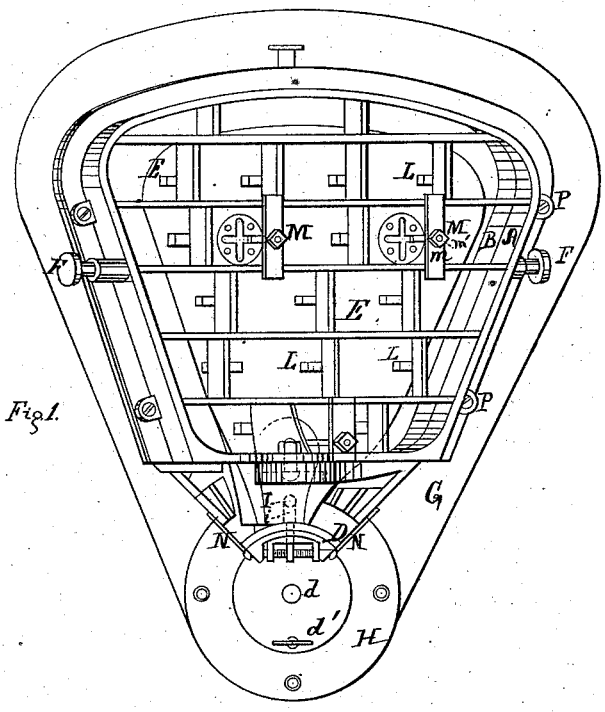
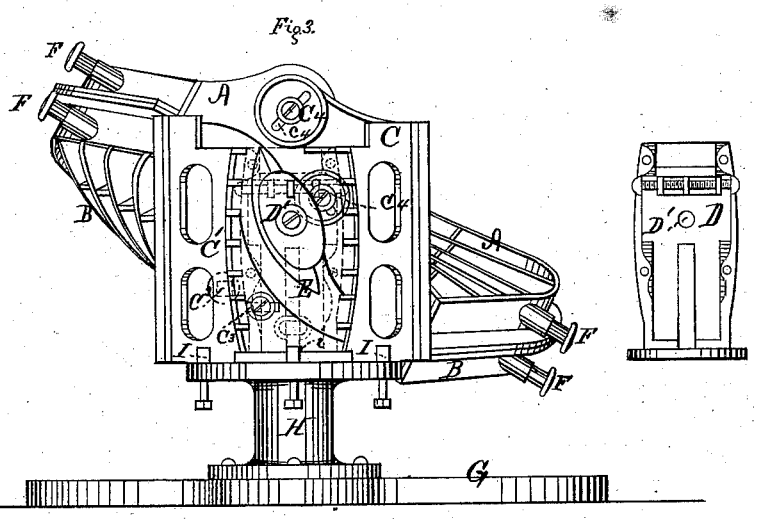


Fig. 3.



Witnesses.

William Ewart

Walter Miller

Inventors.

Rufus B Swift

Thomas J. List

Leggett & Leggett

Attorneys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

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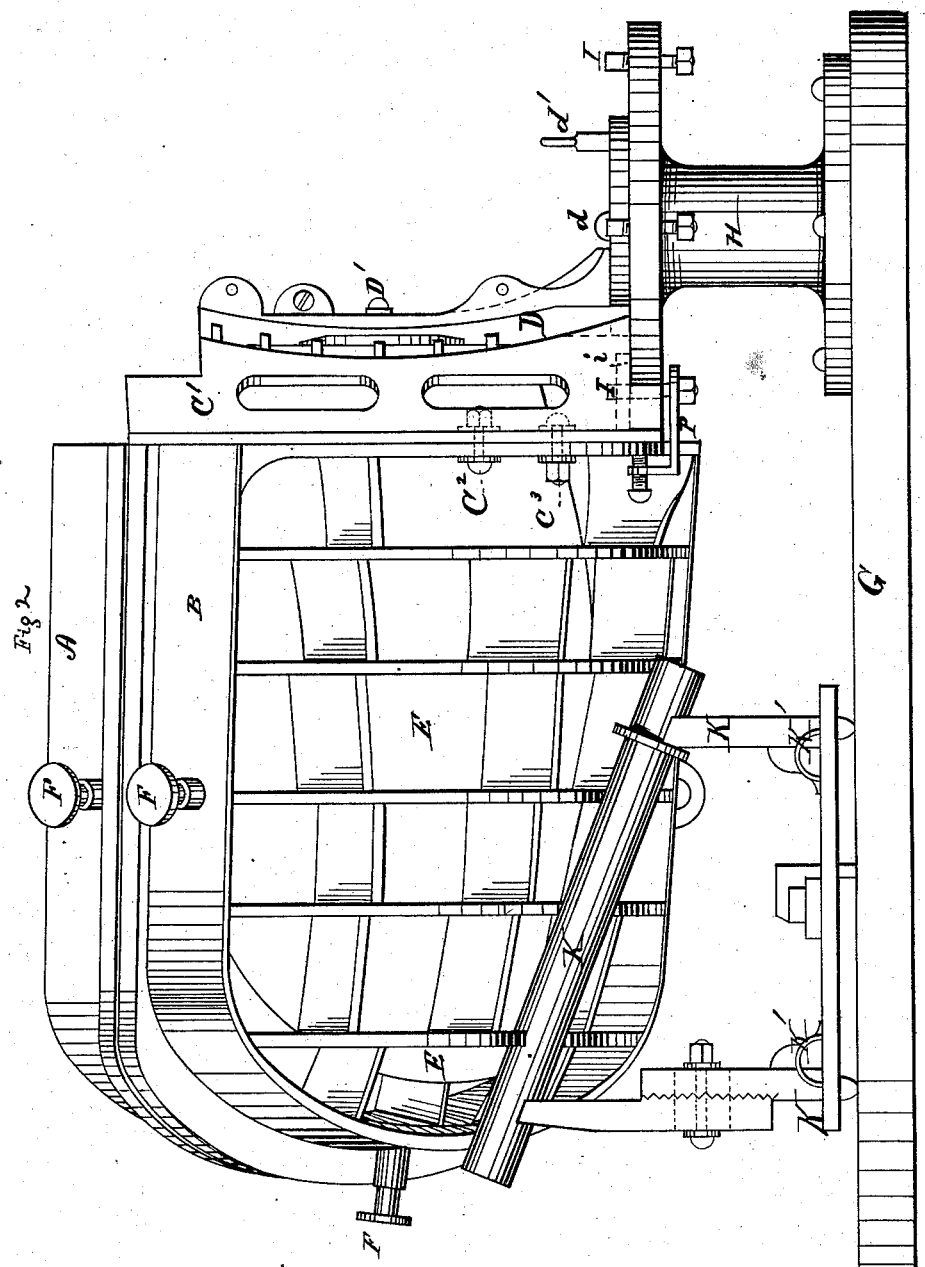

Witnesses

William Ewart.

Walter Miller

Inventors.

Rufus B. Swift.
Thomas J. List.
By Leggett & Leggett,
Attorneys.

UNITED STATES PATENT OFFICE.

RUFUS B. SWIFT AND THOMAS J. LIST, OF CLEVELAND, OHIO.

IMPROVEMENT IN FLASKS FOR CASTING PROPELLER-WHEELS.

Specification forming part of Letters Patent No. **165,039**, dated June 29, 1875; application filed March 29, 1875.

To all whom it may concern:

Be it known that we, RUFUS B. SWIFT and THOMAS J. LIST, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Iron Flasks; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to an improvement in iron flasks in which to mold and cast propeller-wheels and other similar castings; and consists in making the said flasks adjustable, whereby the incline or pitch of the blades may be varied; also, in combining with that portion of the flask designed for the propeller-blade another portion designed for the hub of the wheel and neck of the blade; also, to a peculiar construction and arrangement of the parts by which the blade portions of the flask can be adjusted without altering the position of the hub or end portions; also, the combination of the said flask with a bed-plate, and the arrangement of the bed-plate with relation to the central pedestal, whereby the flasks can be set to their exact positions; also, to the combination, with the flask, of an underneath adjustable and portable support; also, to the formation of the pedestal, so that it can be inverted to suit wheels of a different size, all substantially as hereinafter set forth and claimed.

In the drawings, Figure 1 is a plan view of a flask embodying our invention; Fig. 2, a side elevation of same; Fig. 3, a front elevation.

Heretofore flasks that have been made for the purpose of molding propeller-wheels have been required to be made new and different for every variation in an angle, pitch, or lead of the said blades, or else requiring changes to be made in the form of dimensions of the cope and drag. Our invention obviates this necessity, and enables us to vary the said angle or pitch to any desired limit with the same flask without alteration of the cope or drag; also, it has been customary heretofore to form the flask so as to mold simply the blade portions, and it was then necessary to brick up around the hub. This is also obviated by our invention.

A is the cope, and B the drag, which together make up the flask in which the blade portion is molded. C and C^1 are end pieces of the said flask, whereby a portion of the hub and the neck of the blade is formed. D is a portion of the hub-pattern.

In a two-blade propeller-wheel this portion of the hub-pattern would be one-half; in a three-blade propeller-wheel, one-third; in a four-blade propeller-wheel, one-fourth of the whole hub-pattern.

The hub-pattern D is connected with the blade-pattern E by a suitable joint D′, so that the blade with its neck may be given any desired inclination, or angle, or lead, as it is sometimes called, by turning the said blade-pattern around the pivot D′ without altering the vertical position of the hub-pattern.

In order that the end pieces C and C^1 of the flask adjacent to the hub, and the neck and blade portions, may not alter their positions with respect to the hub-pattern when the cope and drag of the blade portion of the flask is changed to vary the angle or lead of the said blade, it is necessary to make the said end portions C and C^1 adjustable. This is effected by pivoting the said portions at C^2 on the drag to admit of the required motion. It is then necessary to make a slotted connection at C^3. C^4 are also slotted connections. The latter connections are formed by circular washers, in which is a suitable slot. These circular washers revolve in corresponding recesses in the flask, as the said blade portions and end portions are adjusted with respect to each other. In this way there is only a small slot, c^4, left open.

F are trunnions attached to the different pieces, in order that they may be readily lifted into position or from position by a crane. G is a bed-plate, which is circular in form, only a portion of which is represented in the drawings. To this bed-plate is suitably attached the pedestal H. This pedestal is made reversible, with its ends suitably formed to suit wheels of different sizes without requiring a new pedestal. I are studs that project up through the pedestal, and, by means of a suit-

able corresponding slot, *i*, in the end piece C^1 of the flask, the studs I serve to fix the flask always in the same position. These studs I, for a two-bladed wheel, are located exactly opposite each other, so that the flasks, when they are ready to be placed in position, can, by adjusting the slots *i* to the pins or studs I, be certainly and quickly placed in proper position. For a three-bladed wheel these studs divide the circumference exactly into thirds, and for a four-bladed wheel, exactly into fourths. The hub-pattern D is pivoted at *d* to the center of the pedestal, so that its position is accurately fixed thereby, and pin *d'* serves to prevent it from revolving.

When the pattern is removed and the flasks are in position ready for the casting to be made, the hub-pattern is replaced by a suitable axle-core.

K is an adjustable underneath support for the purpose of supporting the blade portion of the flask when it is adjusted to its proper position. This support admits of adjustment up and down through the medium of two ratchet-bars and a set-screw or equivalent means, whereby it may be raised or depressed to correspond with different elevations required, owing to any change that may be made in the angle or pitch of the blades. This support is also provided with handles K' whereby it can be readily moved from place to place as required. L are wedges that are put in between the blade-pattern and the cope of the flask so as to hold said supports rigid while the drag is being rammed. They also serve the purpose, and therefore obviate the necessity of employing the follow-board; and the peculiar form of the flask admits of their being so employed. M are bolts, the heads of which are secured in suitable slats in the blade-pattern or in plates attached thereto. The outer ends of the bolt pass through plates *m*. By running a nut, *m'*, down upon the bolt the blade-pattern is held immovable in place while handling the flask and during the process of ramming. The end pieces C and C^1, it will be seen, form the molds of the neck and hub without the necessity of bricking up, as now required. Straps N serve to hold the hub-pattern and flask firmly together in their proper relative positions. Suitable screw or wedge clutches P serve to hold the flask snugly to the pedestal, and also serve to hold the cope and drag snugly together.

The operation of the device is as follows: The wedges L having been properly adjusted between the flask-pattern and the cope, the flask is lifted by a crane and held in a proper position for ramming the drag. After this has been done it is turned, the wedges removed, as also the bolts M, and the cope is rammed in like manner. The neck portions and the portions adjacent to the hub-pattern are then properly rammed. The patterns are then removed by disconnecting the hub-pattern from the blade-pattern by removing the screw D'. The flask is then opened, properly dried and baked, and is afterward adjusted to its proper place upon the pedestal, so that the slot *i* shall embrace the stud I, and the flask rest snugly against the pedestal and upon the underneath support.

The molds of the other blades are likewise prepared and placed in position in similar manner. The spaces between them are then rammed up, the axle-core adjusted, and the apparatus is ready for pouring in the molten metal. When the metal shall have set, the fastenings between the copes and drags are then loosened so as to permit the casting to shrink. The mold can be as readily removed, the clutches which fasten it to the pedestal are loosened, and the whole device is lifted off by the crane. When suitably cool, the copes are separately removed by lifting them off by the crane.

When it is desired to change the angle, pitch, or lead of the blade, the blade portions are suitably adjusted to the end pieces, and the blade-pattern suitably adjusted to the hub-pattern, after which the molds are made as before described.

By the above apparatus it will be seen that propeller-wheels can be readily cast and their blades easily adjusted to their exact positions with readiness, and with slight trouble and expense. So, also, the same patterns and the same flasks serve to make propeller-wheels of a different angle or pitch to its blades—that is, if desired in one wheel to give to the blades an angle or pitch different from that possessed by another wheel, the said variation can be made without making new flasks, simply by adjusting the blade portions to the end portions, as above described, and thus a vast expense is saved.

What we claim as new is—

1. A flask for casting propeller-wheels, the blade portion composed of a cope, A, and drag B, constructed substantially as described, the said blade portion A B made adjustable with respect to the hub portions, whereby the pitch or lead of the blade may be altered without altering the flask, substantially as and for the purposes described.

2. In a flask for casting propeller-wheels, the combination, with the cope and drag A B, respectively, of corresponding neck and hub portions, adjustable substantially as described, whereby the mold for the blades, necks, and hubs, is formed complete by uniting the separate flasks, substantially as for the purpose described.

3. The cope A, drag B, and end pieces C C^1, constructed and connected together with adjustable joints, substantially as and for the purpose described.

4. The double reversible pedestal, adapted for wheels of different sizes, substantially as and for the purpose described.

5. The combination, with the pedestal, of studs I in connection with slots *i* in the flask, whereby the flask is readily adjusted to its

proper position, substantially as and for the purpose described.

6. The combination, with the adjustable flask, of the adjustable underneath support, substantially as and for the purpose described.

7. The combination, with the blade and end portions of the flask, of intermediate circular, revolving, slotted washers C^4, substantially as and for the purpose described.

8. The combination, with the blade-pattern, of the wedges L, bolts M, plates *m*, and nuts *m'*, whereby the blade-pattern is held firmly in place during the ramming of the drag, without the use of the follow-board, substantially as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

RUFUS B. SWIFT.
THOMAS J. LIST.

Witnesses:
FRANCIS TOMNEY,
H. T. HOWER.