(No Model.)

S. J. ADAMS.

POURING LADLE.

No. 521,519. Patented June 19, 1894.

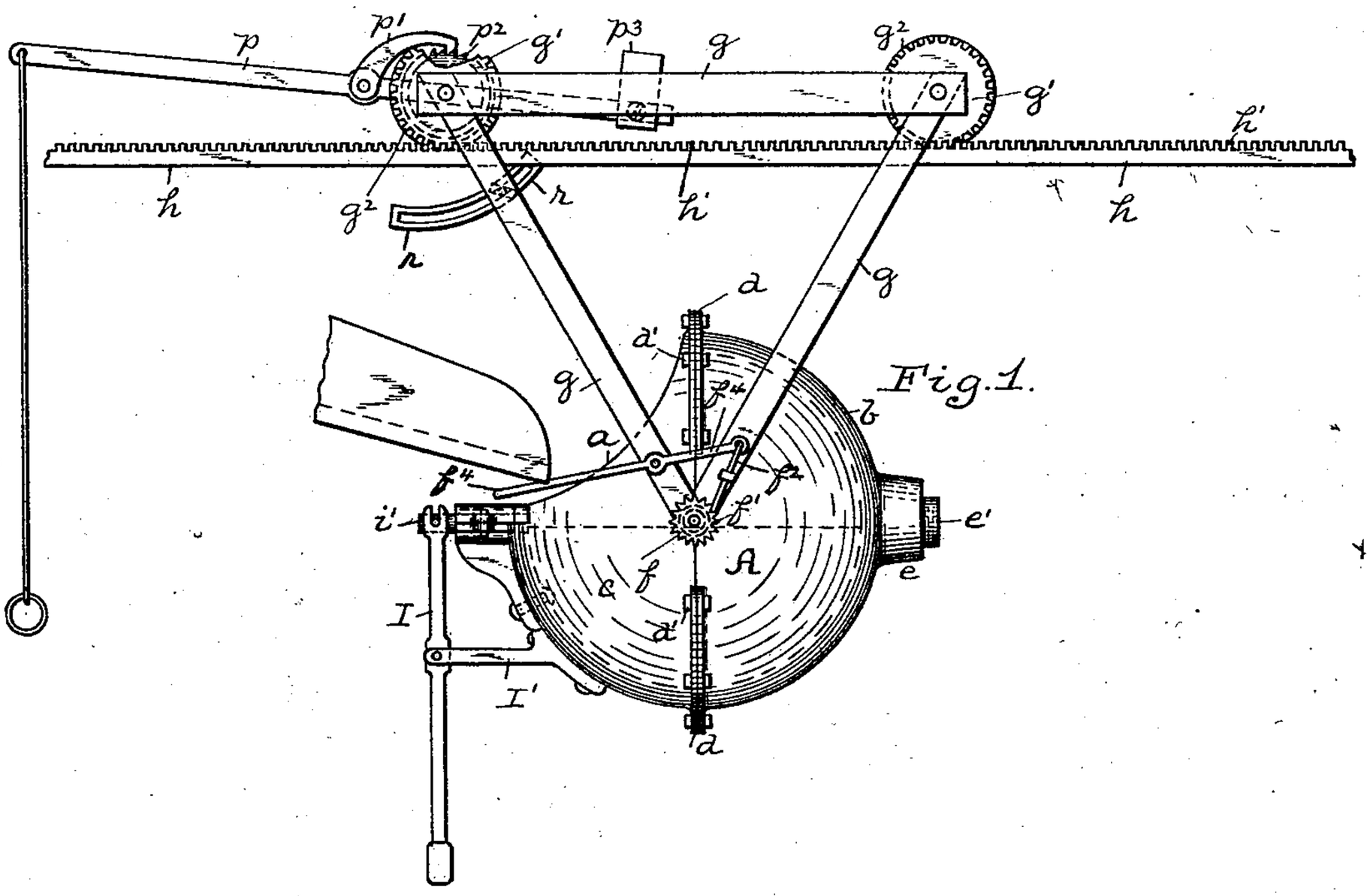

Fig. 1.

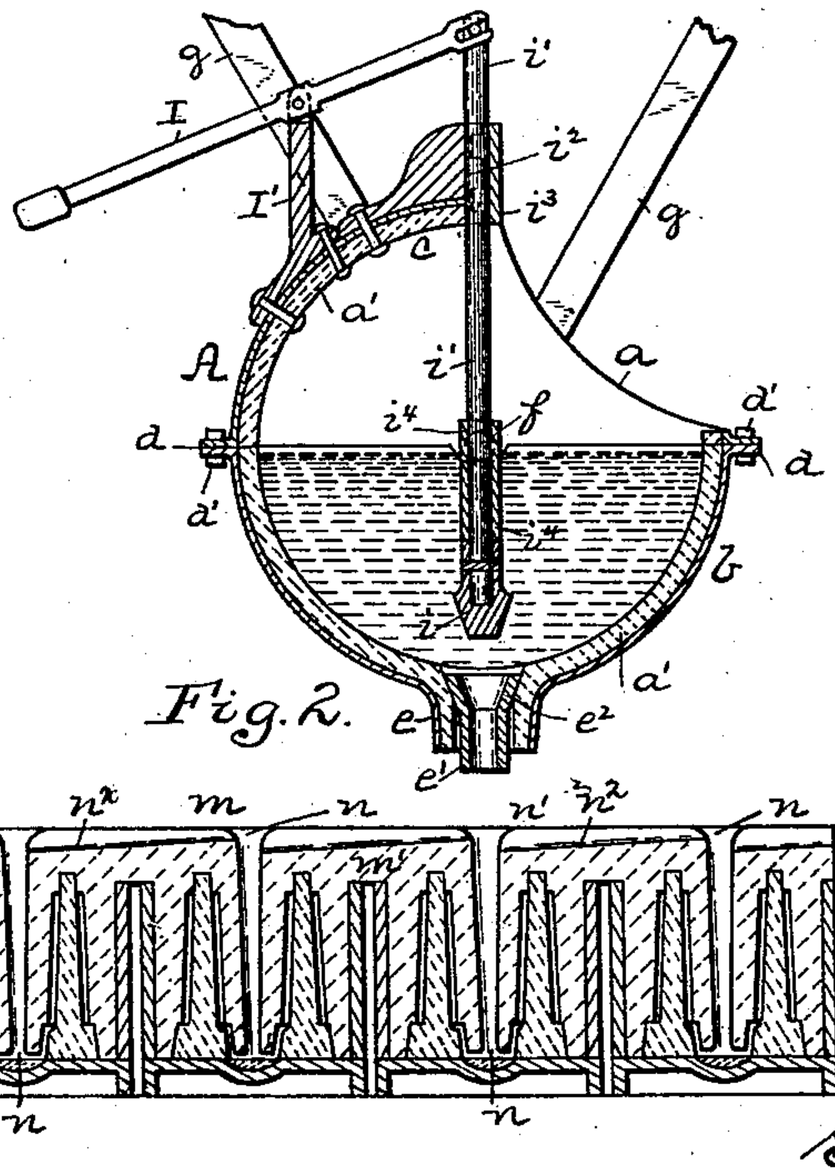

Fig. 2.

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POURING-LADLE.

SPECIFICATION forming part of Letters Patent No. 521,519, dated June 19, 1894.

Application filed October 24, 1892. Serial No. 449,910. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN JARVIS ADAMS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pouring-Ladles; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to casting ladles for casting in sand and like molds, its object being to provide a convenient form of ladle for the casting of a series of molds, for the transporting of metal in such way as to avoid the leakage of the same through the pouring spout or outlet, and at the same time to provide for the shifting of the ladle as found necessary from mold to mold, so as to reduce the labor of casting in the ordinary foundries.

The ordinary custom for casting metal in small molds has been to employ hand ladles which are carried by the workmen by means of a long handle, such weight as the ordinary man can carry in the ladle being received from the cupola and being carried by him to the molds and poured into the molds. This work is very laborious, as in large foundries the molds are often a long distance from the cupola and it requires the carrying of the molten metal this distance, while at the same time the molder must support his ladle above each mold and pour carefully so as to cause the metal to flow into the pouring gate of the mold and prevent the metal from overflowing, and in making small castings he must move from mold to mold and repeat the operation, this work being the heaviest in the ordinary foundry operations.

By my invention I provide a ladle which is under the control of the workman and by which the large body of metal can be taken and carried to the molds and fed to the molds, the heavy work usually done by the molder being thus overcome.

To these ends, my invention consists in a ladle mounted on trunnions and having a cover extending over one side thereof, and a receiving opening in the other side and a valve controlled outlet in the base, such ladle being adapted to swing on its trunnions so that when receiving the metal its pouring outlet may be brought to the side of the vessel or above the body of molten metal received in same and the metal be held in the basin formed by the one side thereof and the cover extending over that side, and the metal be carried by the ladle in this way to the point at which it is to be poured, when the ladle may be turned up and the pouring spout or outlet brought as far as necessary toward the base of the ladle so that the metal may be fed therefrom to the several molds, the flow of the metal being controlled by the valve or stopper, or by the swinging of the ladle.

It also consists in mounting this ladle on a suitable track or railway and in providing means for moving the same thereon, in such way as to bring its pouring spout or outlet over the different gates in the series of molds.

It also consists in certain other improvements as will be hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is an enlarged side view of the ladle. Fig. 2 is a sectional view of the same showing the ladle over a series of molds and in its pouring position.

Like letters of reference indicate like parts in each of the views.

The ladle A is preferably spherical in shape, having the form of a large hollow ball with a receiving opening *a* in one side thereof, through which the metal may be introduced into the ladle. It is preferably formed of two metal sections or shells *b c* connected together by means of flanges *d* extending out therefrom, through which bolts *d'* pass, so as to connect the two parts or sections together, this form having the advantage that the lower section carrying the pouring outlet or spout *e* may be removed for repair, while the upper section *c* carries the operative parts of the ladle and which are not subject to so great wear.

The ladle is preferably lined with loam, fire clay or brick, or like material, as at *a'*, and each section thereof may be lined in this way, so that when a new lower section *b* is secured to the upper section, it will only be necessary to close the joint between the two sections, and in this way the lower section may be quickly changed when desired.

The ladle is hung on suitable trunnions *f* in a frame *g* from a suitable track *h*, which in the drawings is shown as an overhead track, and which is arranged to extend from the cupola or other receiving point to and above the line of molds into which the metal is to be cast, the frame *g* having the flanged rollers or wheels *g'* traveling on the track *h*, and so supporting the ladle.

It will be noticed that the section or shell *c* forms what I have termed the cover to the ladle, that cover extending over at least half of the ladle, so that when the ladle is in the position shown in Fig. 1, the pouring spout *e* will be at the side of the ladle, and when the metal is run into the same it will hold the large body of metal below such spout and in the basin formed on one side of the ladle and the cover extending over that side, as indicated in dotted line, this being the position in which the ladle is arranged to carry its load until it is brought to the point at which the metal is to be cast. The ladle in this way provides for the transporting of the metal when held below the pouring spout, so that all liability of leakage through the same is prevented, this being an important feature in its construction, as it is well known that the ordinary valve or stopper for closing such outlet cannot well be made tight, as it or the spout is quickly scored by the molten metal as it flows through the same.

The pouring spout *e* has preferably the tubular lining *e'* which fits within a seat formed for it in the spout or outlet, the upper end of such lining being flaring as at e^2 to support it within the spout and to form a seat for the valve or stopper *i* which enters the mouth e^2 of the lining and seats itself therein; this valve or stopper *i* is secured to the base of a reciprocating valve rod *i'* which preferably extends through the top or cover *c*, a suitable guideway i^2 being formed for the same, and the rod being held in position by a hinged cap i^3 which can quickly be opened so as to provide for the removal of the rod and its stopper. As the lower end only of the rod is exposed to the heat of the metal, it will only be necessary to protect that end of the rod by the suitable fire clay sleeves or loam covering, as at i^4. This rod and its stopper are operated by any suitable means, such as by the lever I mounted on the bracket I', the upper end of the lever being made forked to fit over the end of the stopper rod *i'* and impart the necessary movement thereto. By such movement it is evident that when the stopper becomes worn, it will be only necessary to throw open the cap i^3 and draw out the stopper rod and insert a new one and to close the cap so that in case of leakage on account of a defective stopper, this stopper can be very quickly changed.

In case the fire clay lining *e'* of the pouring spout becomes worn, it can be quickly removed from the ladle and a new one inserted, or its surface may be repaired.

On account of the weight of the upper section or cover *c* being on one side of the trunnions, the normal position of the ladle will be that shown in Fig. 1, that is, in the position in which it received the metal from the cupola. When it is desired to bring the ladle into its pouring position, it is turned through the lever I, or by other suitable mechanism, and in order to hold it in place, I secure upon one trunnion a ratchet wheel *f'* into which a pawl or catch f^2 supported on the frame *g* takes, this pawl being controlled by the lever f^4 and acting to hold the ladle in whatever position is desired. The ratchet wheel *f'* is made with deep teeth in order to give a strong hold between it and the pawl, and to prevent the freeing of the ladle by any but a long movement of the pawl. In order to turn the ladle, it is necessary to withdraw the pawl, and in bringing it to its pouring position to turn the ladle on trunnions, and then cause the pawl f^2 to engage, when the ladle will be held in that position until it is desired to bring it back to its receiving position.

The basin of the ladle is of curved contour, and the extension or cover formed on the same general curve or contour, for the reason that when so formed I prevent the agitation of the metal and mixing of dross therewith in turning it from one position to another. I, of course, prefer that the ladle shall be substantially spherical, as above stated, but other shapes embodying the above principle may be employed.

In Figs. 1 and 2 I have illustrated the ladle in connection with a series of sand molds *m*, with which it is specially adapted to be employed, that series of molds *m* being shown with a continuous runner *n'* extending along the same from which runner the pouring gates *n* extend down into the molds. The continuous runner is illustrated as being inclined from one of these pouring gates to the next pouring gate, as at n^2, the purpose of such inclination being to feed any of the metal from such runner down into the next pouring gate so that as soon as one mold is filled the ladle may be moved, and in case any metal is flowing therefrom, that metal will be fed into the next pouring gate. Any suitable form of bridge between the several molds in the series may be employed, such bridge being shown at *m'*.

The construction of the molds and runner illustrated forms the subject matter of other applications of even date herewith, Serial Nos. 449,901, 449,902, and 449,903; and application filed on November 11, 1893, Serial No. 490,650.

In the operation of pouring from such ladle over such series of molds, it is desirable to hold the ladle as nearly as practicable over the pouring gate of one mold, and then quickly bring it to the next mold, and so do away with the necessity of checking the flow of the metal, and for this purpose any suitable shifting or step by step mechanism may be employed. I have illustrated one form thereof which is considered preferable for the pur-

pose, the track h where it extends over the series of molds having a rack h' thereon, and one or both wheels g' having a geared face q^2 engaging with that rack, so that upon the turning of the wheel a fixed distance, according to the distance between the pouring gates, the ladle with its frame may be carried that distance. To shift the frame and ladle along the track, I prefer to employ a lever p which is mounted on the frame, and has the pawl or dog p' engaging with a ratchet wheel p^2 secured to the wheel g' or on the same shaft therewith, so that by drawing down the lever p the pawl or dog will through said ratchet wheel turn the wheel g', which by means of its gear face engaging with the rack face of the rail h will carry the frame the desired distance. In order to regulate this distance, I secure to the frame g the adjustable stop r which extends out in the course of the lever, so that when the lever is drawn down it will strike against this stop and its movement be checked thereby, the stop being adjustable on the frame so that it can be regulated according to the distance between the pouring gates of the mold. The lever p has also the counter weight p^3 on an extension thereof, and when the lever is free, the counterweight will draw it up, the dog p' passing over the ratchet teeth of the wheel, and the lever assuming its normal position ready for the next stroke in moving the ladle and its frame. The form of the propelling mechanism or the stop mechanism can, of course, be varied, as found desirable.

In employing the apparatus as above described, the ladle is run along its track to the cupola or other point at which it receives its charge, such, for example, as where a series of these molds is arranged to be fed from another larger ladle carrying a large body of metal which is filled at the cupola and carried along the track to different parts of the foundry at which the ladles, such as described, may be filled. The normal position of the ladle is that shown in Fig. 1 in which position it will be held by the weight of the cover or upper section c, though it may also be locked in this position by means of the catch f^2 engaging with the ratchet wheel f'. While in this position, the metal is poured into the ladle, filling the same to about the dotted line shown therein. The ladle is then drawn in any suitable way to the point at which the metal is to be cast, when the operator by raising the catch f^2 and lifting on the lever I can quickly turn it into its pouring position, such as shown in Fig. 2, in which case the metal will flow within the ladle to about the dotted line in Fig. 2. The ladle is then brought over the series of molds to be poured, and the operator brings the pouring spout or outlet e over the first pouring gate in the series of molds and raises the stopper or valve i a sufficient distance to permit the proper stream of metal to flow into the mold. He holds or secures the stopper in this position, and as soon as he sees that this mold is filled, he draws down the lever p giving the full stroke thereto, which draws the frame and ladle over so that the spout is brought above the next pouring gate in the series of molds and upon releasing the lever p it returns to its normal position ready for the next stroke. The metal which flows from the spout during its passage from the one pouring gate to the next pouring gate will flow down the inclined face of the continuous runner into the second pouring gate, so that there is no fear either of the loss of metal or of the splashing of the metal such as where it strikes a flat surface, this often causing the burning of the workmen if they are too close thereto. He continues in this way to fill all the molds in the series, or a number of series of molds, feeding the metal in the manner above described, or feeding from the ladle at the end of a continuous runner which leads to a series of molds, such, for example, as shown in an application of even date herewith, Serial No. 449,901, having the metal under full control and regulating the stream as he finds proper, and in some cases, if necessary, closing off the stream entirely by forcing the stopper into the seat of the spout. As soon as he has filled this series of molds the ladle can be quickly shifted onto another track and brought over another series of molds which may be poured in the same way. During this shifting operation, if desired, the ladle can be quickly brought into its receiving position, such as shown in Fig. 1, but this will not generally be found necessary. In this way the pouring of metal to small sand molds can be easily and properly accomplished and the flow of metal to the same be regulated, while the heavy labor of carrying the metal to the molds is entirely overcome.

In case the operator desires to pour a series of molds of different sizes or widths, he can quickly adjust the stop r according to the space between the molds and so arrange for the carrying of the ladle the proper distance between each mold to be poured.

In case it is found that the stopper i is so worn as to permit the leakage of the metal, it is only necessary to open the hinged box or bearing and withdraw the same, and introduce a new stopper or another rod, and in case it is found that the lining of the outlet is worn, it can be repaired, or it can be quickly removed and a new lining inserted. Where it is found that the lower section b of the ladle requires relining, it can be quickly separated from the upper section c and a new lower section be secured in place while that section is being repaired, the operative parts being entirely connected to the upper section on the ladle.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A ladle for casting metal in molds, mounted on trunnions and having a cover extending over one side thereof and a receiving opening on the other side, and an outlet in

the base of the ladle body and a longitudinally movable valve controlling the said outlet, said ladle being adapted to swing on its trunnions so that when receiving the metal the ladle body is swung over to bring its pouring outlet above the level of the metal and the metal is held in the basin formed by one side of the ladle body and by the cover extending over the same, substantially as set forth.

2. A ladle for pouring metal into molds, mounted on trunnions and formed in two sections, the upper section having a cover extending over one side of the ladle, and the lower section having a valve controlled outlet, substantially as and for the purposes set forth.

3. A ladle for pouring metal into molds, having a pouring outlet in the base, a longitudinally movable stopper adapted to form a seat with such pouring outlet, and a bearing for the stopper rod in the upper part of the ladle, said bearing having a part thereof hinged so as to open to permit the removal of the stopper thereof, substantially as and for the purposes set forth.

4. In ladles for pouring metal into molds, the combination of a ladle body having a pouring outlet in the base, a cover extending over one side thereof, a valve or stopper carried on the end of a longitudinally moving rod having a bearing in the cover of the ladle, and an operating lever pivoted on said cover and engaging with said longitudinally moving rod, substantially as and for the purposes set forth.

5. In ladles for pouring metal into molds, the combination of a track having a rack face thereon, a frame running on said track and carrying the ladle and having a pinion engaging with said rack face, and mechanism carried by the frame for rotating said pinion, and so propelling the ladle, substantially as and for the purposes set forth.

6. In ladles for pouring metal into molds, the combination of a track, a frame running on said track and carrying the ladle, mechanism carried by the frame for propelling said ladle, and a stop on the ladle frame to regulate the length of movement of the frame on the track, substantially as and for the purposes set forth.

7. In ladles for pouring metal into molds, the combination of a track having a rack face thereon, a frame carrying the ladle and having a pinion engaging with said track, a ratchet wheel on said frame, and a lever mounted on said frame and having a pawl engaging with said ratchet wheel to turn the same, substantially as and for the purposes set forth.

8. In ladles for pouring metal into molds, the combination of a track, a frame on said track carrying the ladle, a ratchet wheel on said frame, a lever mounted on said frame and having a pawl engaging with said ratchet wheel to propel the frame, and a stop mounted on the frame in line with said lever to limit the movement thereof, substantially as and for the purposes set forth.

In testimony whereof I, the said STEPHEN JARVIS ADAMS, have hereunto set my hand.

STEPHEN JARVIS ADAMS.

Witnesses:
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J. N. COOKE.