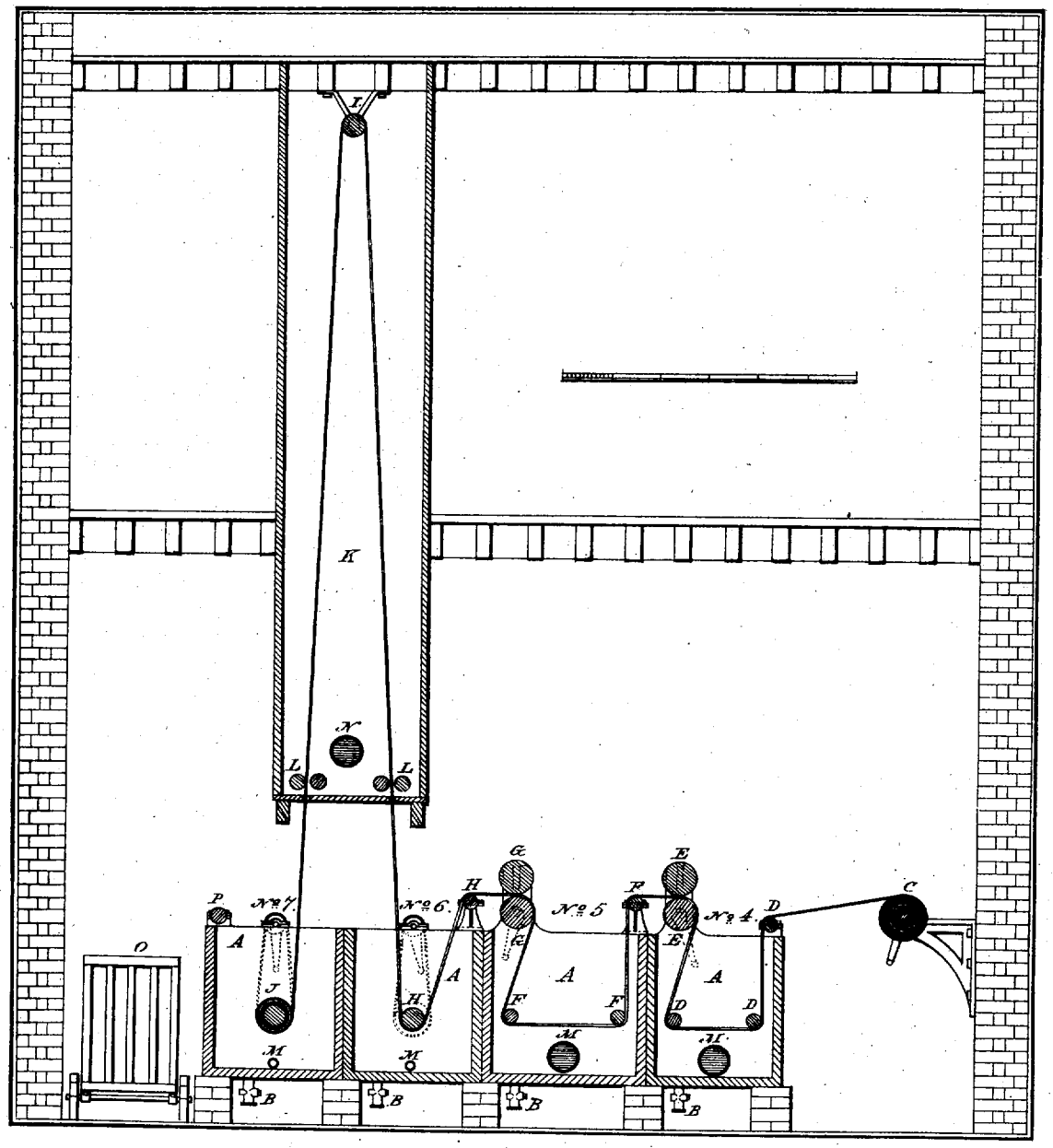
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F. FOSSARD.

Dyeing Vat.

Patented Nov. 7, 1835.



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Felix Fossard, Philadelphia

Letters Patent

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Felix Fossard himself of his improvement in the process of dyeing and in manufacturing the prussiate of potash and soda

To all whom it may concern. Be it known that I Felix Fossard of the City of Philadelphia in the State of Pennsylvania have invented or discovered certain improvements in the mode of manufacturing the Prussiate of Potash and Soda and of dyeing therewith and with certain other materials hereinafter named the processes described and claimed being improvements on those specifically described by me in the two several patents heretofore granted to me by the government of the United States, to wit one on the fourteenth day of December 1832, and one on the 23rd day of April 1834 and I do hereby declare that although there are certain processes and machinery herein after described which have been used and known before I do not intend to claim these as my invention in the patent which I am hereby soliciting but have introduced them with a view to render the process that I do claim perfectly plain and intelligible to those skilled in the art to which they appertain. Reference therefore not only to the descriptions herein given but also to the specifications contained in my former patents for a full understanding of the subject I state the claims are made to the following items. I claim the improved process of dyeing blue by the double decomposition of a soluble ferrocyanate or prussiate and a salt of iron or other metal by the means hereinafter recited — Process of Dyeing in Blue Acid Bath. No 1.

This Bath is formed with 100 parts of water in weight to one part of sulphuric or other suitable acid and is to be employed at 80 to 100 degrees Fahrenheit. Reduced strength of the acid bath

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after the woolen material has passed through it. Washing Bath No 2. consists of water to be used either at the ordinary temperature or warmer and its use is only recommended for economy's sake to wash off the excess of acid which may remain on the woolen material on being withdrawn from Bath No 1. — Alkaline Bath No 3. prepared with water and a small quantity of alkali but in proportion to others with the carbonate of Soda 1½ oz. to a pail and a quarter of alkali in weight to 100 parts of water heated to 75 or 80 degrees Fahr.

Intermediate Bath No 4. To be prepared with the ferruginous Prussiate Potash (any other ferruginous prussiate will answer the same purpose) and should be 3 degrees strenght Beaumes ascertained for salts and employed at about 90 to 100 degrees Fahr. as this Bath should always be kept in an acid state in preference to an alkaline one, one pound of sulfuric acid may be added to every 300 gallons of water Ferruginous Bath No 5. To be formed with a protosalt of iron and water (any other salt of iron, Molybdene &c. may be used with more or less success) and to mark about 1 degrees of Beaumes ascertained and should be employed at about 160 or 170 Fahr. This Bath may be acidulated like No 4 or be used in its neutral state — Bath No 6. Composed of water heated to about 100 or 110 degrees Fht to which should be added a small quantity of acid say as in No 4.

Bath No 7. Composed of water heated to about 100 degrees Fht to which should be added 1/2 part acid in weight to 100 parts of water. The liquid which drains from the material acted upon on being withdrawn from this Bath should always be of an acid taste

Steam Bath No 8. To be employed without immersing the dyed material in a liquid. It is simply a steam made close and heated to about 110 degrees Fht in which the dyed material is to be placed and this place should be covered with a woollen cloth at the top in order that the moisture may not pass off — Ammoniacal Bath No 9. To be employed and prepared as follows. A close place being prepared as for Bath No 8. the dyed stuff is to be hung up and some highly concentrated liquid Ammonia is to be placed in a vessel on the ground. Ammoniacal gas rising from the

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be diluted in any other convenient way. The vapour arising from the ammonia will have an instantaneous effect and produce a darker colour. The liquid ammonia may also be used in another form namely put as much of it in water as may be necessary to produce the desired colour and pass the material regularly through it. But these alone can elucidate the quantity and the quality of the ammonia both as that of the water employed may differ. This bath is to be used at the ordinary temperature or heated to 60 or 70 degrees Fht.

Bath No 1 will be useful for about 20 operations. No 2 for 5. No 3. for 10. No 4 for 100. No 5 for 50 No. 6. for 4 — No 7 for 7 — No 9 for as long as any of the ammoniacal gaz remains. The Baths No 1. 2. 3. 4. 5. 7 & 9. require being kept in the order indicated by adding from time to time the various things with which they are formed. when the baths No 4 and 5 are no longer fit for use they may be mixed together in equal volume and Prussian Blue be made with the deposit. The vessels containing the Bath, intended for dyeing in Prussian blue should be an oblong square form and those for dyeing wool of a round form furnished with a cover moved by means of a crane and with a frame to rest the skeins on the heat while the wool is draining. Skeins are worked in the ordinary way. The Baths No 4 & 5 should be heated by steam in contact and not condensed — The woolens in the piece the cloth or stuff being freed from grease and fulled when the last operation is necessary it should be passed through the baths No 1. 2. and 3. in any ordinary sort of vessels and by the means ordinarily employed by dyers. after the Bath No 3. the Cloth &c should be thoroughly rinsed and cleaned with fullers earth and be well washed in plenty of cold water. The cloth being well cleansed (or dyed in the former) pass it slowly through Baths No 4. 5. 6 and 7. by means of the apparatus represented in the plate accompanying these specifications and described below. The stuff should be passed 4 or 5 times alternately from Bath No 6 to Bath No 7. and vice versa for the purpose of raising the colour or fixing the oxide of iron. after this if the intensity of colour desired is not obtained it must be repassed through the Baths 4. 5. 6 & 7. as recommended until the desired colour is obtained

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after which the cloth should be stretched and cleaned with fullers earth and be washed with cold water. Then dry the cloth on tenters and steam it on lindwoodes in the Stone Bath No 8. for about 3 hours and if desired let it afterwards be submitted to the action of ammonia in the bath No 9 or be passed through a liquid ammonia bath. The application of ammonia is only wanted in certain cases when particular colours are wanted. but more so where a specific of Redness is desired.

The operation may be shortened by steaming the wool by means of the Baths No 1. and 3. washing it and working it into cloth. This cloth having been wound upon a roller in the finishing room is carried to the dye House and passed through the baths 4. 5. 6 and 7. then it is to be stocked and cleaned with a mixture of fullers earth and of white soap water cold and concentrated as experience will dictate it will be necessary to take care that the soap employed is not too caustick and that it is perfectly dissolved before it is applied. and that the cloth (if it has been dryed after the dyeing) is rendered a little humid before the soap is added. If however it should happen that the soap renders the colour less brilliant let the cloth be submitted to the action or contact of Steam and it will become quite fresh again then dry and finish the cloth — When light Blues are wanted Baths No 4 & 5 should be made weaker as the Bath No. 9 as well as the substitute the white soap water should be dispensed with. Description of the apparatus. A. Vessels in which the Baths are formed. B Cocks to draw off the contents of the Baths C Roller on which the cloth is wound before entering the baths. D rolling over and under which the cloth passes in Bath No 4. E Roping Rollers for equalizing and pressing the liquid out of the cloth. these rollers should be covered with coarse cloth &c. F Rollers. G pressing Rolling down as E. — H Rollers the first one to guide the cloth into the bath and the other one to pass it regularly through the liquid in the cloth may be wound on the last one previously to ascending into the air. I Roller. J roller on which the cloth may be wound or it may be descended into the tub at liberty K endless chain which should be heated by steam or other means

to the same temperature as the Bath No 6 & 7. This is not absolutely necessary but it is recommended. 2 guiding Rollers. 4 Tubes introduced into the bath for heating them by steam. 4 Tube for heating cleaning &c. Cranage to remove the cloth after it is dyed. 2 Guiding Rollers to conduct the cloth into the cranage &c. The system of Rollers is presented in the plate as recommended more particularly the peeping Rollers which should be made very true and flexible but they are not absolutely necessary. Any other means may be resorted to by which the distribution of the liquid on and through the tissue in an even and regular way shall be obtained. I will also have it understood that I lay no claim to any part of the apparatus above described. The operation for wool is as follows. Take wool which has been well cleaned by the ordinary process. Put it into Bath No 1 for about 10 minutes then raise it out of the liquid. let it drain for 10 minutes. Lower it again and let it remain 10 minutes. Then raise it and allow it to drain for 10 or 15 minutes and pass it into bath No 2 and 3 observing the same rule and following the same plan for each of these baths as for No 1. Then have the wool washed in the usual way. when it is well drained (or dryed would be preferable) place it again into a strainer and convey it to bath No 4. where it should be treated in the manner as in bath No 1. and after the last immersion it should be allowed to drain for 10 minutes suspended to the crane. Then it should be lowered on the frame, placed across the bath. and a fabi cover pierced with holes should be placed on. Turn then the strainer and wool aside down and allow them to remain in that position for 10 minets. This operation being intended to extract all the liquor as quickly possible over every part of the wool. Then turn the strainer into its original Section, and pass it promptly to bath No 5. when it should occasionally be raised and lowered for about 1/4 of an hour. Then raise it just clear of the bath and allow it to drain for about 20 minutes the wool into bath No. 6. when the immersions should be made similar to those required to bath No 1. after which pass it into bath No 7. when the immersion at intervals of 15 minutes will be sufficient. wash in plenty of cold water

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dry by the ordinary way and then place the wool into the New Bath No 8. for about 3/4 of an hour. This will complete the operation of dyeing and the wool may be treated as though dyed by any other process. The observations relating to the dyeing in the piece inserted above applies also to the dyeing also in the wool. another method for dyeing wool for Broadcloths by this new process is to pass it into bath No 1 and then to scour it in the ordinary way and wash in plenty of water. when drained pass it into a bath of carbonate of Soda. making about 2 degrees of the aeometer of Beaumes for salts and 120 degrees Fht for about 10 minutes when drained carry it to bath 3. for about 20 minutes wash immediately in plenty of water or rather lower the skeins when the wool will have been draining for but a few minutes into a vat full of lukewarm water so that the liquid draining from the wool be not allowed to become acid again by absorption of oxygen for in that state it combines anew with the iron and carries it off from the wool. Then dye. The advantage of this method is that at the stage of the process the mineral may be dyed in many colours (and especially in black) by means of dye woods without addition of metallic salts to the baths and with a great saving of dye stuffs. For Blues the yellow wool is worked into cloth fulled decated &c. then the piece is passed into baths No 4. 6 and 7 by means of the apparatus described above. If the cloth headings &c are of a dye solid to acids they will be faithfully preserved and the cloth will bear the appearance of having been dyed altogether in the wool. carry to the stocks for cleansing &c. — There are several other modifications of this process which will occur to the dyer and be useful to him in various cases. Cloths stuffs &c dyed in prussiate of iron blue may be dyed in fancy colours by the ordinary process and dye stuffs as when dyed in indigo blue for which it is necessary in order to obtain evenness and uniformity of colour to distribute the liquid equally after bath No 4. & 5 by squeezing them with sticks. and if suspended by changing their position that is to say by turning the upper part down and vice versa as long as thought proper. Any other kind of woven cloths or skeins than woollen may do not require baths No 1. 2. 3. only silks require to be freed from the gum they contain by any of the ordinary

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process. The object of this improved process for which a Patent has been granted to me by the government of the United States on the 23d of April 1834 is to enable the manufacturer to produce a much finer article of Potash than those generally found in the market and therefore more available in the dyeing &c business and also to produce it in much larger quantities at the same time with comparatively much less expense and trouble to himself, and inconvenience to the neighbourhood

Witnesses
Richd Davis
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(Drawing)

(2800 Words)

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