

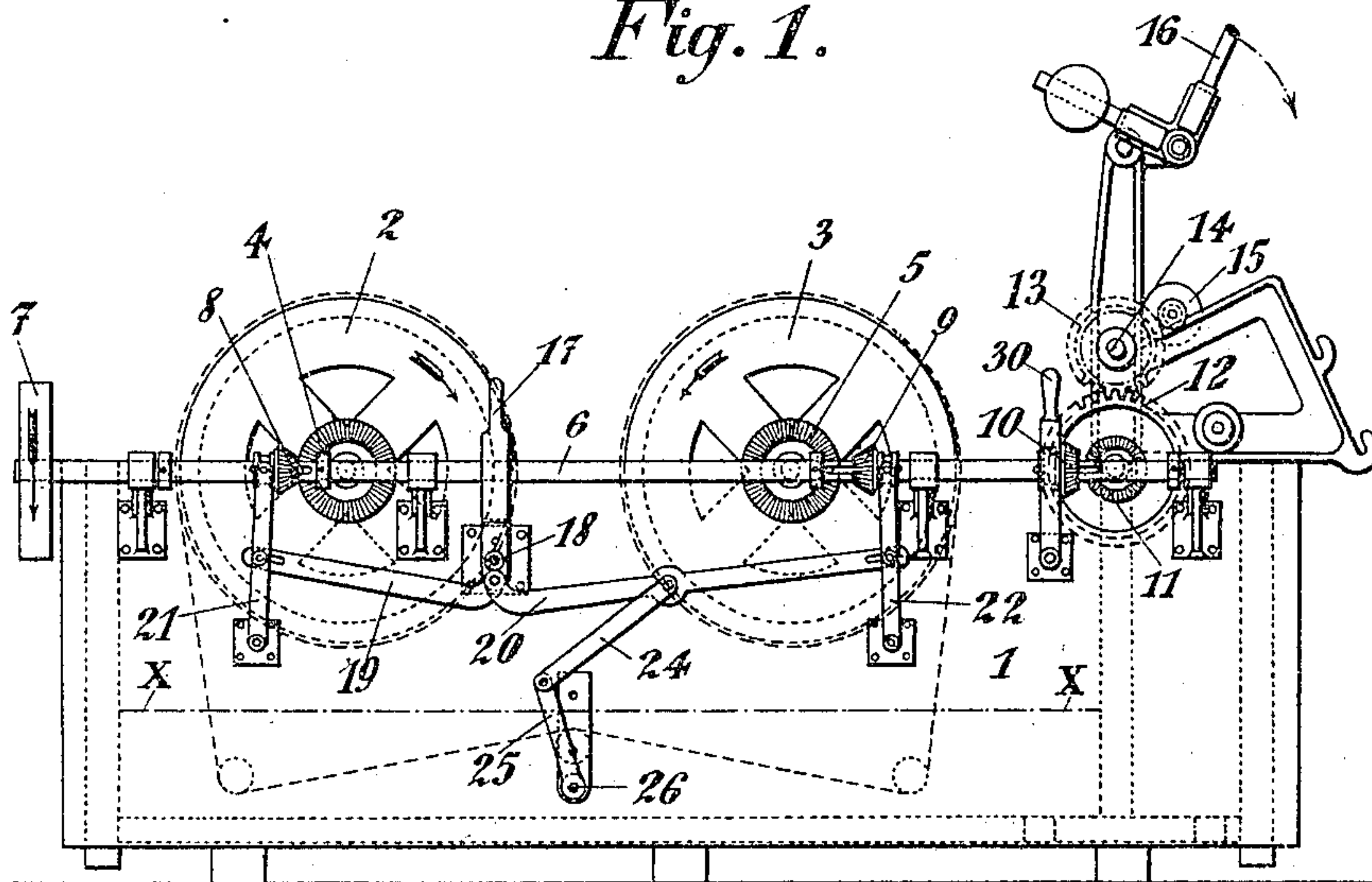
No. 808,007.

PATENTED DEC. 19, 1905.

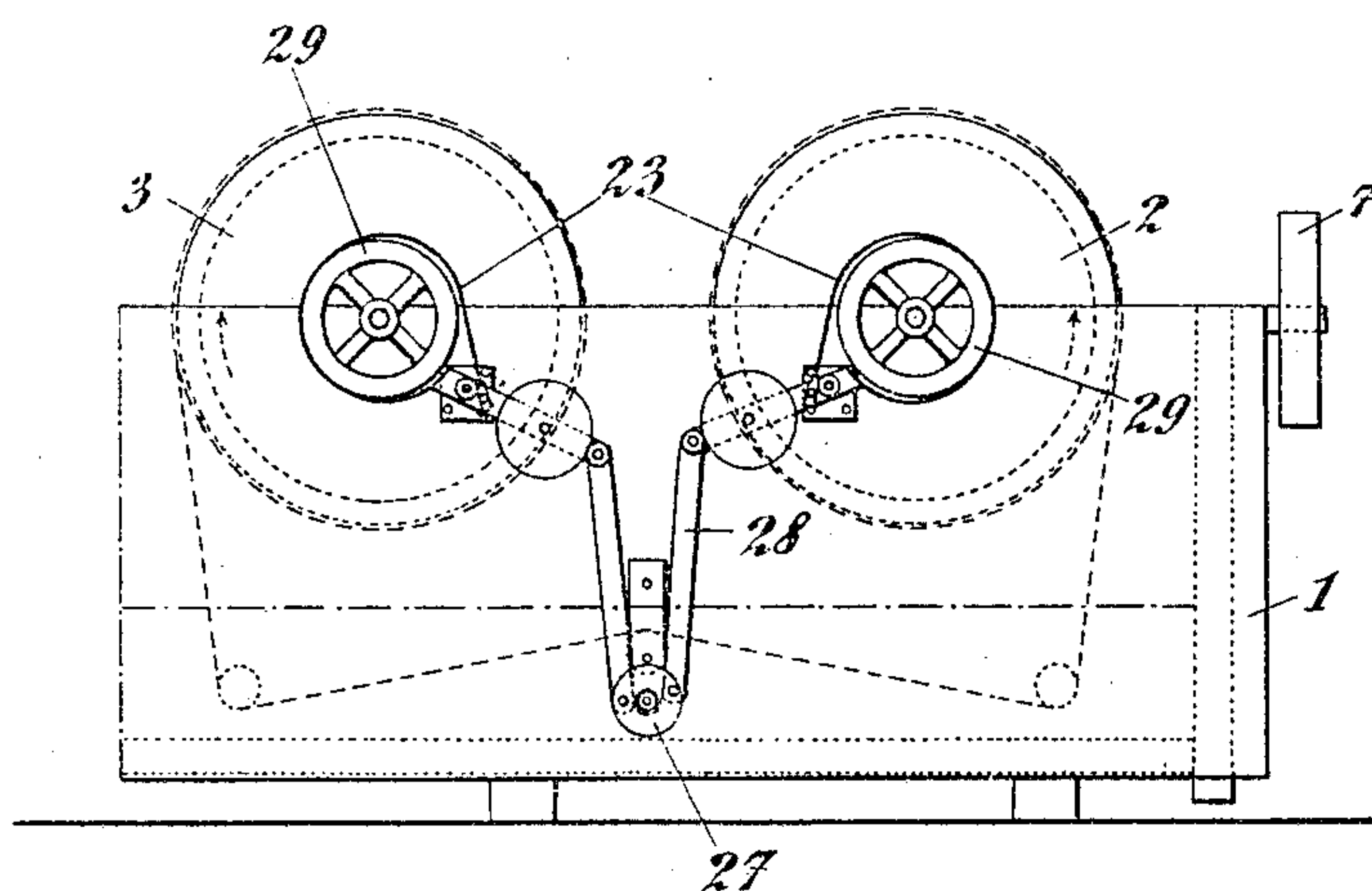
J. CADGÈNE.  
MACHINE FOR DYEING FABRICS.

APPLICATION FILED OCT. 24, 1904.

*Fig. 1.*



*Fig. 2.*



WITNESSES.

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# UNITED STATES PATENT OFFICE.

JACQUES CADGÈNE, OF ZURICH, SWITZERLAND.

## MACHINE FOR DYEING FABRICS.

No. 808,007.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed October 24, 1904. Serial No. 229,704.

*To all whom it may concern:*

Be it known that I, JACQUES CADGÈNE, a citizen of France, residing at Zurich, in the canton of Zurich, Republic of Switzerland, (whose post-office address is 39 Thalgarasse, Zurich,) have invented certain new and useful Improvements in Machinery Used in Dyeing Fabrics in the Piece; and I 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 appertains to make and use the same.

I have applied for patent in France on October 1, 1904; in Great Britain on October 5, 1904.

In the industry of dyeing in the piece there are numerous machines used; but all are more or less unsatisfactory. The old system, which consisted in passing the piece of material gut-like through a dye-vat by means of a hand-winch, now almost universally discarded, was apt to produce folds in the material which were practically irreparable.

The well-known Carron machine, in which the winch is driven mechanically, is an advance upon the hand-machine; but it has the defect that there is always a considerable length of material exposed outside the dye, which length carries a large quantity of dye, and thereby produces a cooling effect upon the bath as a whole and necessitates frequent reheatings, and consequently loss of steam. The well-known gigger or jigger dyeing-machine, now much in use, is a decided advance upon its predecessors; but even this machine has the defect that the passage of the material through the liquid is so short that the material is not always sufficiently impregnated with color, and thus necessitates too many passes or repasses. Again, during the passage folds or creases are apt to be produced, which it is not always possible to eliminate by subsequent dressing operations.

The most important objection to the jigger machine is that the web often bends in the middle of the piece, which is a grave defect, above all for umbrella materials. Jiggers are more particularly employed in establishments where pure cotton or zanella stuffs or materials are treated, because it is important that the textures treated in this apparatus should be sufficiently resisting. Attempts have been made to adopt jiggers for dyeing pure silk or half-silk by the piece, but without success, the abandonment being always due to the unfortunate folds or break-

ages, which, although of less consequence in cotton materials, are disastrous in silk.

Another system recently adopted necessitates the use of two tanks or vats at different levels, one being at a considerable height above the other. The upper vat communicates with the lower one by means of perforated tubes, which spray the material in proportion as it unwinds from rollers, it being important that the dye-bath prepared in the upper vat may have its strength carefully adjusted beforehand with accuracy, so that it requires no further attention when the work is once started. This entails great skill on the part of the operators. Apart from this defect and that of the cost there is the disadvantage that the temperature and pressure of the bath gradually decrease during working, the penetration of the material consequently decreasing in proportion, thus affecting the uniformity of the dyeing.

The object of the present invention is to provide a simple and comparatively inexpensive machine in which the above-mentioned defects are absent. This machine is of substantial construction to be able to dye various widths of materials—such as fabrics of pure cotton, wool, or zanella—but at the same time its parts have sufficient flexibility to be able to deal with all silk articles, from the most inferior up to the best quality. From practical experiment it has been conclusively proved that the dyeing obtained is uniform from one end to the other of the pieces, and in textures where the silk is undulating it does away with the doubling of the pieces, breakages, and bleachings, and the silk emerges with a maximum of shine or gloss.

Contrary to other systems for dyeing material in the piece, consisting in causing the stuff or material to circulate in the bath by the aid of small internal guide-rollers and of external delivery and receiving rollers of small diameter, the principle of the present system is to cause the stuff or material to travel by means of two cylinders of large diameter moving in the vat, but out of the bath or liquid. The stuff or material winding from and unwinding onto the cylinders during its passage takes up an approximately horizontal position in the bath.

To effect dyeing, short baths are formed, so that the pieces when they are wound on the cylinders may be always above the bath in order that the stuff makes contact with the dyeing-bath only when the latter in its



travel follows an almost horizontal line, and as in this position the stuff offers a great surface in the dyeing-bath the following effects are attained: first, rapid dyeing of great uniformity without the least trace of darker tone on the edges of the pieces; second, the material fully utilizes the whole of the coloring-matter and the thread of the stuff is always straight; third, a considerable length of material may be dyed without the accumulated material on the cylinders forming too great a thickness, (a very essential point;) fourth, much steam is saved in avoiding reheats.

When the pieces have been sufficiently impregnated with color, they may be washed and their colors heightened by filling the vat with water and causing the cylinders to move until complete rinsing is effected. These operations are the more active, as the cylinders work right in the washing or color-heightening water. When all the operations of dyeing are finished, the pieces are wound on an apparatus fixed to one end of the vat, such apparatus acting as a drier or wringer.

The accompanying drawings represent, by way of example, one form of the invention.

Figure 1 is a front view, and Fig. 2 a rear view.

The machine comprises a rectangular dyeing-vat 1, fitted with two large cylinders 2 and 3, which may be made of metal or of wood. The cylinders 2 and 3 are provided with toothed bevel-wheels 4 and 5, respectively.

6 is the driving-shaft, carrying a pulley 7 and three bevel-pinions 8, 9, and 10, capable of sliding longitudinally on the shaft 6. The pinions 8 and 9 are intended to engage with the wheels 4 and 5 and the pinion 10 with a bevel-wheel 11 in one with a toothed wheel 12. This wheel gears with a toothed wheel 13, fixed on the shaft of a roller 14, upon which the winding-roller 15 freely rests. Two weighted levers 16 rest upon the axle of the roller 15, so as to press the roller against the roller 14, but in such a manner as to allow the roller 15 to recede from the roller 14 correspondingly as the stuff or material winds on the latter.

A lever 17, mounted on a pivot 18, is connected by the medium of arms 19 and 20 to two levers 21 and 22, intended to axially displace the pinions 8 and 9. When the lever 17 is vertical, the cylinders do not turn; but if this lever is turned to the right the wheels 9 drive the cylinder 3, which carries with it the loose left-hand cylinder 2. To prevent this loose cylinder rotating too quickly, a brake-band 23 is applied at the same time that the right-hand cylinder 3 is engaged. The band-brake 23 is worked by the lever 17, arms 20 and 24, lever 25, shaft 26, disk 27, and arm 28. The brake bears upon a pulley 29 upon the shaft of the left-hand cylinder,

Fig. 1, which is thus retarded in order that the stuff or material under light tension may be wound on regularly and without folds. When the right-hand cylinder has received the whole of the piece of stuff, the lever 17 is thrown over to the left, so that the wheels 8 and 4 work the left-hand cylinder 2, which in turn rotates in a reverse direction, and so on until the shade is completely obtained. When the cylinder 2 is driven, a similar brake 23 acts upon a pulley 29, fixed on the shaft of the cylinder 3.

Suitable means are provided for attaching the extremities of the stuff to the cylinders 2 and 3.

When the work is finished, the pieces wind on the free roller 15, which rests against the fixed roller 14, which is driven by the wheels 10 and 11, one of which, 10, may be moved axially by means of the lever 30.

The two weighted levers 16 rest upon the axle of the free roller in such a manner that as the stuff winds onto the roller 15 it is wrung or preliminarily dried in order. It may be then carried either to the drier proper or subjected to any other manipulation, if necessary. This very simple apparatus acting as a wringer or preliminary drier is fixed to one end of the vat 1, where also the original roll of material to be dyed is placed or supported.

The workman only having to watch over the automatic movement from left to right, and vice versa, it will be seen that he can easily work two machines. The coloring materials are introduced into the bath in the ordinary manner. As this machine is extremely useful to obtain perfect bleachings by the use of peroxid of soda, it is obvious that when intended for this use all metal should be excluded and wooden cylinders be employed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a machine for dyeing material in the piece, the combination of a dye-vat, revolvable cylinders arranged in the vat, a driving element, a controller, a means, controlled by said controller, for connecting and disconnecting each of said cylinders with said driving element and simultaneously braking the cylinder which is disconnected, substantially as described.

2. In a machine for dyeing material in the piece, the combination of a dye-vat, a controller, revolvable cylinders arranged in the vat, a driving element, separate brakes for said cylinder, and means, comprising a system of levers and controlled by said controller, for connecting either of said cylinders with the driving element and applying the brake on the other cylinder, interchangeably, substantially as described.



3. In a machine for dyeing material in the piece, the combination of a dye-vat, revolvable cylinders arranged in the dye-vat with their axes substantially parallel and standing  
5 in substantially a horizontal plane, said cylinders having together a horizontal dimension transverse of their axes which approximates the dimension of the vat from one end wall to the opposite end wall thereof, means  
10 for driving the cylinders alternately, and means for guiding the material through the vat below the surface-level of the bath in a substantially straight and horizontal line and for a relatively long distance, substantially  
15 as described.

4. In a machine for dyeing material in the piece, the combination of a dye-vat, revolvable cylinders arranged in the dye-vat with their axes substantially parallel and standing

in substantially a horizontal plane approxi- 20  
mating the top of said vat, said cylinders having together a horizontal dimension transverse of their axes which approximates the dimension of the vat from one end wall to the  
25 opposite end wall thereof, means for driving the cylinders alternately, and means for guiding the material through the vat below the surface-level of the bath in a substantially straight and horizontal line for a relatively  
30 long distance, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACQUES CADGÈNE.

Witnesses:

HERMANN KIRCHHOFFER,  
A. LIEBERKNECHT.