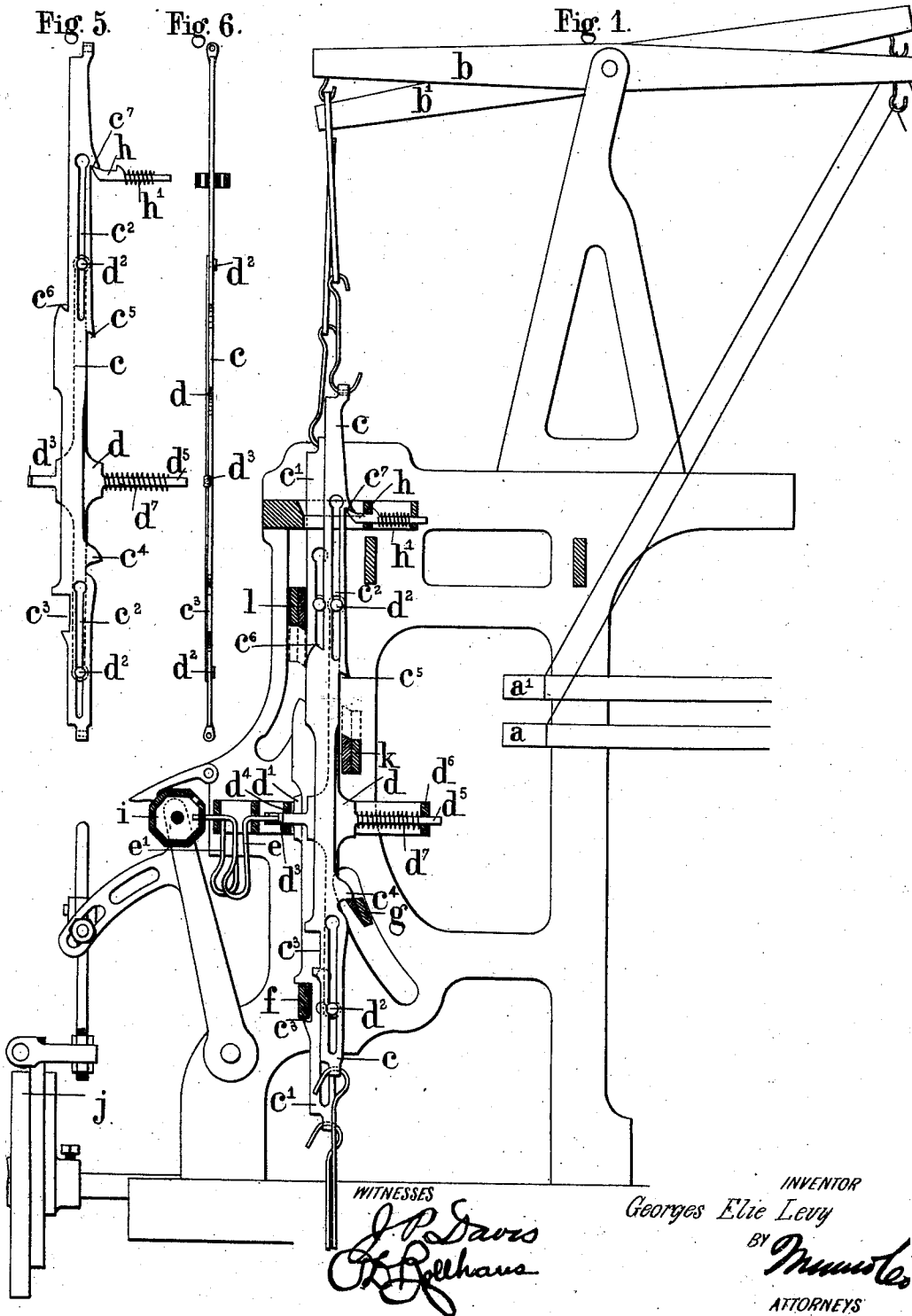


APPLICATION FILED FEB. 12, 1910.

987,086.

Patented Mar. 14, 1911.

3 SHEETS—SHEET 1.



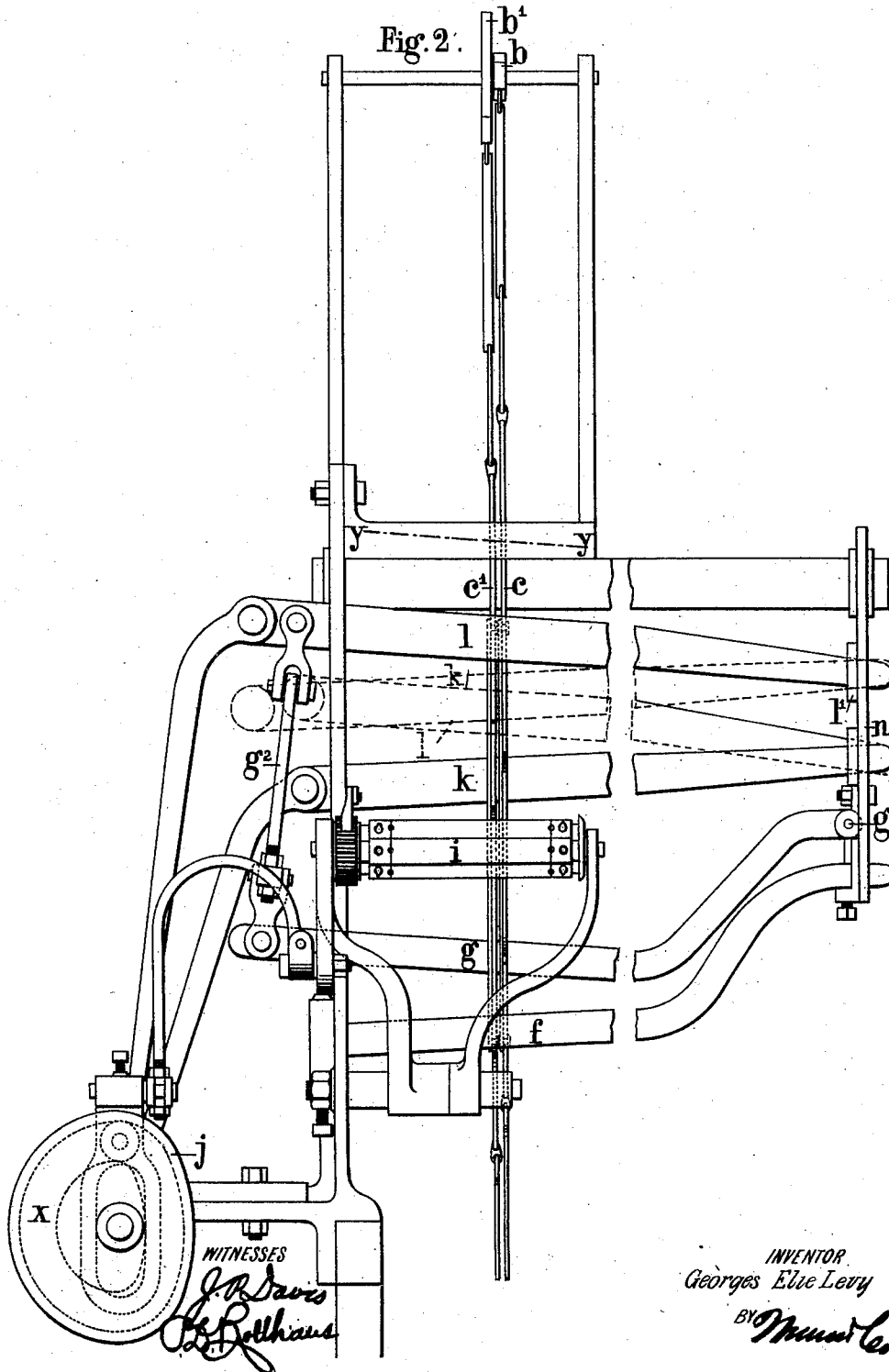
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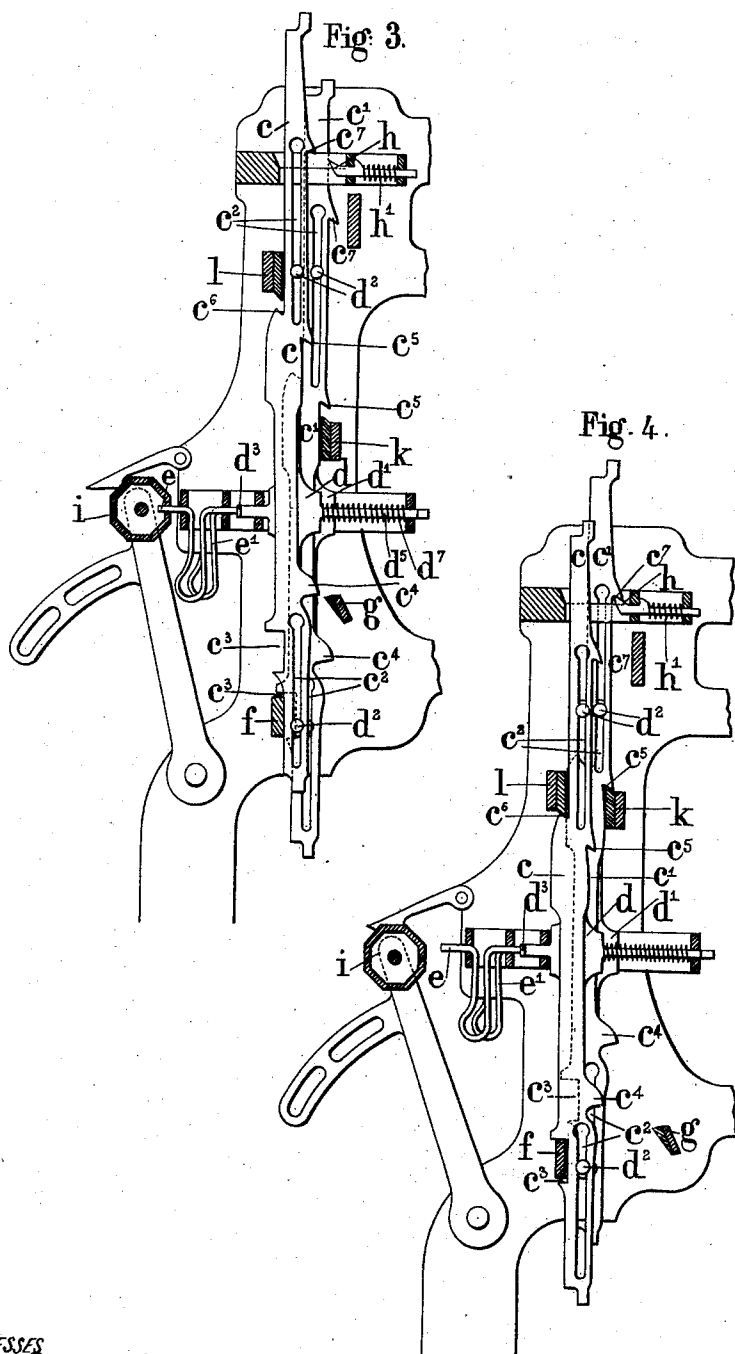


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3 SHEETS-SHEET 3.



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WEAVING-LOOM.

987,086.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGES ELIE LEVY, manufacturer, a citizen of the French Republic, and a resident of 27 Rue du Mail, Paris, France, have invented a certain new and useful Improvement in Weaving-Looms, of which the following is a full, clear, and exact specification.

This invention relates to a double shedding motion for weaving looms, with automatic maintenance of the open shed, by an automatic device for hooking and unhooking a simple heddle-operating shedding bar in the raised and lowered position, merely by the direct action of the card needle.

The shedding motions with automatic maintenance of the open shed hitherto employed, have either been applied to looms with only lifting heddles or single shedding, or comprised in general double hooking bars or shedding hooks and intermediate operating parts which required either a double needle or two holes in the needle-card etc. These arrangements entail a certain amount of complication and lead to irregularity in working and failures in hooking and unhooking, the movements lacking in simultaneity of the operation of the double heddles of the pawls.

According to the present invention the whole of the operating mechanism for each heddle comprises in principle a simple heddle-operating shedding-bar mounted so as to slide vertically upon an auxiliary or needle bar moved perpendicularly by the action of the cylinder upon the needle, against which the needle-bar is pressed by a spring. The heddle-operating shedding-bar is thereby caused to present its lifting or lowering notch to the respective knife in such a way that when it presents its notch to the lifting knife it at the same time presents a hook beneath a spring catch arranged freely in the upper guiding grate of the shedding bar. At the end of the lifting movement of the knife, the hook upon the shedding-bar overrides the spring catch and remains hooked thereon if the cylinder maintains the corresponding needle in the same lifting position at the next shed. Automatic unhooking is produced by a rule which at the desired moment engages upon a nose at the bottom of all the raised shedding-bars and slightly lifts them so as to release their hooks from the catches. Those which are not held up

by the needles are released at the back by the spring of the needle bar and they move to offer their lowering notches to the blade; the others are hooked again upon the catches. This is successively repeated so long as the cylinder maintains the needles in the position for lifting the shedding-bars. The shedding-bar has also at bottom a notch or groove for the purpose of engaging in the lowered position upon a fixed rule, upon which it remains engaged by the spring of the needle-bar until the action of the card-cylinder upon the corresponding needle releases it for lifting.

The cam which in the present shedding motions oscillates the card-cylinder regularly to and fro before the needles, comprises according to the present invention, a portion concentric with the axis of rotation for the purpose of holding the cylinder firmly against the needles during the period of unhooking and hooking of the shedding bars in the raised position, and up to the moment when the latter are caught between the two knives.

In order to explain more clearly the present invention, one form of construction is shown upon the annexed drawings as applied to any suitable weaving loom.

Figure 1 represents a front elevation section of the improved shedding motion, at the moment when the unhooking rule has slightly raised the hooked heddle-operating shedding-bar. Fig. 2 is a corresponding side view. Fig. 3 is a front view showing the parts at the moment when the unhooking rule releases the hooked shedding-bar and the needle returns it to the position for lowering by the knife while another shedding-bar is brought into position for raising by the other knife. Fig. 4 is a similar view at the moment when the knives have brought their respective shedding-bars one to the lowered hooked position, and the other to the raised hooked position, the cylinder being drawn back from the needles and the shedding-bar hooked in the raised position held between the two knives. Figs. 5 and 6 show separately in front and edge view the complete heddle-operating shedding-bar and its auxiliary or needle bar with returning spring, as well as the hooking catch or pawl with its returning spring.

To facilitate the reading of the drawing only two heddle-operating shedding-bars

have been represented, but of course the loom may comprise a larger number.

As has been stated in the above preamble, each heddle $a a'$, the whole of which constitutes the harness of the loom is connected by jack-levers $b b'$ to the top and bottom of a shedding-bar $c c'$ sliding by means of slots c^2 upon an auxiliary or needle bar $d d'$, having two studs d^2 engaged in these slots. The shedding bar receives thereby the movements communicated to the needle bar $d d'$ by the needle $e e'$ acting upon its nose d^3 sliding horizontally in a plate d^4 and guided on the other side by a shank d^5 in line with the nose d^3 and sliding in a plate d^6 ; a helical spring d^7 is wound upon the shank d^5 and bears upon the needle bar $d d'$ and the plate d^6 . In this way the nose d^3 is kept constantly pressed against the needle $e e'$.

The shedding bar $c c'$ comprises near its bottom a notch or groove c^3 intended to engage upon a fixed rule f and when thus hooked to maintain the shedding bar in the lower position; it has also an inclined beak c^4 upon which there acts a movable rule g to lift the hooked shedding bar $c c'$, and under cut notches, c^5 for the lifting blade, c^6 for the lowering blade, and c^7 for the engagement in the raised position. The shedding bars $c c'$ are guided, like the hooks or other devices at present in use, in a grate or frame in which there is arranged opposite each shedding bar a pawl h constantly pressed toward it by a coiled spring h' .

The card cylinder i acts in the usual manner upon the needles $e e'$, which are of the known form but with this difference that the cam j which produces the alternating motion of the cylinder against said needles, has a portion x concentric with its rotation and corresponding to the time when the cylinder is pressed against the needles (Figs. 1 and 3) and until the movement when the lifting and lowering knives $k l$ are in the position shown in dotted lines in Fig. 1, that is when the hooked shedding-bars begin to be engaged between the said knives, in such a way that the shedding bars which have to be or to remain hooked, may be always supported and guided by the knives or by the cylinder pressed against the needles.

The unhooking rule g is pivoted at one extremity to a bracket or eye g' adjustable upon a fixed support n ; its other extremity is connected by a linkage g^2 to the lowering knife l which is freely pivoted at its opposite extremity in a similarly adjustable eye l' upon the support n . This knife is controlled in the known manner by an eccentric not shown: the same applies to the lifting knife k which receives an opposite motion in the usual way.

It is to be noted that the hooking rule f is parallel to the knife l in the lower position

(shown dotted in Fig. 2), while the hooking pawls h have to be set off along an oblique line $y-y$ parallel to the knife k in its upper position (shown dotted in Fig. 2), in order that all the shedding bars lifted by this knife may be hooked up simultaneously. Similarly at the moment when the unhooking rule g comes into operation (the position shown in full lines in Fig. 2), it is parallel to the upper position of the knife k (dotted lines in Fig. 2) so that it will engage simultaneously all the beaks c^4 and release together all the shedding bars hooked upon the pawls.

The working of the improved shedding motion is as follows:—In Fig. 1, the card cylinder i is seen held against the needles $e e'$; the needle e is supposed to face a solid part of the card while the needle e' is in front of a perforation. The unhooking rule g has just finished its small lifting movement which has had for effect to raise the hooked shedding-bar c , but since the corresponding needle e is held in the raised position of the shedding bar, the latter has been unable to escape from its pawl h and has returned to rest in the hooked position, that is, engaged upon the pawl h . The shedding-bar c' of which the corresponding needle is held in the lowering position, likewise preserves its lower position, its notch c^3 being still engaged upon the fixed hooking rule f by the spring d^7 . At this moment the knife k lifts idly and also the knife l lowers idly; during this time and until the knives occupy the positions shown dotted in Fig. 1, the cylinder i is kept pressed against the needles so as to insure the position of the hooked heddles. This period corresponds to the time when the roller which produces the oscillating motion of the cylinder is engaged in the concentric part x of the cam j ; this holds the cylinder firm until the moment when the knives imprison between them the shedding-bars hooked in the raised position. The cylinder then retreats from the needles, and the card is changed as usual during the movement of the knives from the position shown in dotted lines in Fig. 1 to that shown in full lines in Fig. 4, and the return to the dotted position of Fig. 1. From this last position at the moment when the knives return to the full-line position of Figs. 1 and 3, the cylinder comes again to bear upon the needles (Fig. 3). The needle e for example meets a perforation in the card and engages itself therein under the action of the spring d^7 of the needle-bar d , while the needle e' meets the solid part of the card and is pressed forward together with the bar d' and its shedding-bar c' , the latter being thus brought into position for lifting by the knife k . The unhooking rule then comes to act upon the beak c^4 of the hooked shedding-bar c , the position of the

corresponding needle *e* in the card-perforation allowing the free action of the spring *d'* which tends to push back the needle-bar *d* and its shedding bar *c* into position for lowering by the knife *l*. The rule *g* then slightly raises the shedding-bar *c* which under the thrust of the spring *d'* escapes from the catch *h* and takes up the position of Fig. 3. At this moment the knife *h* lifts and the knife *l* falls, engaging in the notches *c'* and *c''* to effect their respective movements. The shedding-bar *c'* slides along the pawl *h* and the inclined face of the hook *c''* pushes it back and compresses its spring, because the shedding bar cannot yield at this moment since it is accurately guided in its rise between the knives *h* *l*. After the hook *c''* has passed the pawl, the latter returned by its spring *h'* engages beneath this hook and retains the shedding-bar raised as seen in Fig. 4. At the same time the shedding-bar *c* has been lowered by the knife *l* which has brought it to the position shown in which its notch *c'* is engaged upon the fixed hooking rule *f* and kept so engaged by the action of the spring *d'*; it cannot therefore rise until the corresponding needle compresses the spring *d'* and releases it from the rule *f*. The movements are repeated in this way, the lifting knife *h* operating the lowered shedding-bars which require raising and hooking them up, while the knife *l* operates and engages on the rule *f* those which require lowering. It will be understood that the shedding-bars remain hooked in the raised position as long as the corresponding heddles have to remain down, that is so long as the card presents its solid portion to the corresponding needles.

The principle of this improved shedding motion is applicable to jacquard mechanisms.

The method of construction shown is given merely by way of example and may be capable of modification in detail without affecting the general principle of the invention.

Having thus described my invention, what I claim as such and desire to secure by Letters Patent is:—

1. In a double shedding-motion with maintenance of the open shed for weaving looms, a shedding bar mounted to slide vertically, a needle bar upon which the shedding bar slides, provided with a spring pressed nose, a card cylinder, and a needle in engagement with the nose of the needle bar, whereby the forward and backward

movements of the needle will be communicated to the needle bar and shedding bar.

2. In a shedding-motion for card looms, a card cylinder, a needle, a needle bar provided with a spring pressed nose in engagement with the needle, a lifting knife, a lowering knife, a spring pressed pawl, a movable rule, a stationary rule, and a shedding bar mounted to slide vertically on the needle bar, said shedding bar being provided with a notch for engagement with the lifting knife, a notch for engagement with the lowering knife, a hook or projection for engagement with the pawl, a beak for engagement with the movable rule, and a groove for the reception of the stationary rule.

3. A shedding-motion for card looms comprising, shedding bars provided with beaks and notches, knives for lifting and lowering the shedding bars, an unhooking rule for engaging the beaks of the shedding bars, spring pressed pawls for engaging the notches of the shedding bars, needles, spring pressed needle bars, a card cylinder, and a cam for operating the card cylinder, said cam having an eccentric portion for holding the cylinder against the needles, whereby the unhooking of the shedding bars and the lifting and lowering of the said knives are insured.

4. A shedding motion for card-looms, comprising a card cylinder, means for oscillating and revolving said card cylinder, needles against which said card cylinder is oscillated, needle-bars slidable on horizontal guides, springs urging said needle-bars forward, shedding-bars slidable vertically upon said needle-bars, heddles connected to said shedding bars, said heddles effecting the shedding of the warp, lifting and lowering knives for said shedding bars, means for operating said knives, oppositely directed notches on opposite sides of said shedding-bars, said notches engageable by said knives, means for retaining said shedding-bars in raised or lowered position, and means for releasing said shedding-bars from said retaining means upon movement of the corresponding needles.

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

GEORGES ELIE LEVY.

Witnesses:

ADOLPHE VYUUVOR,
JACQUES LEJUNE.