(No Model.)

C. RUTULINI.

MACHINE FOR NEUTRALIZING THE EFFECTS OF RAILWAY COLLISIONS.

No. 246,422. Patented Aug. 30, 1881.

Fig. 6

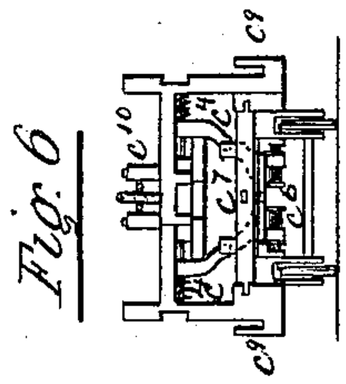

Fig. 4

Fig. 5

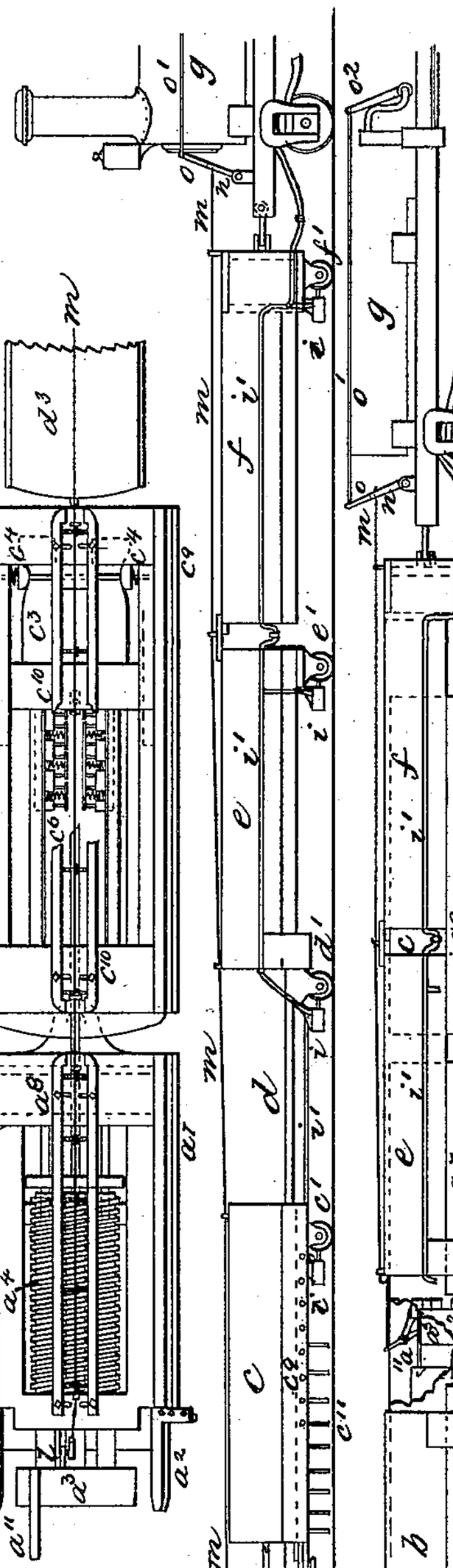

Fig. 1

Fig. 2

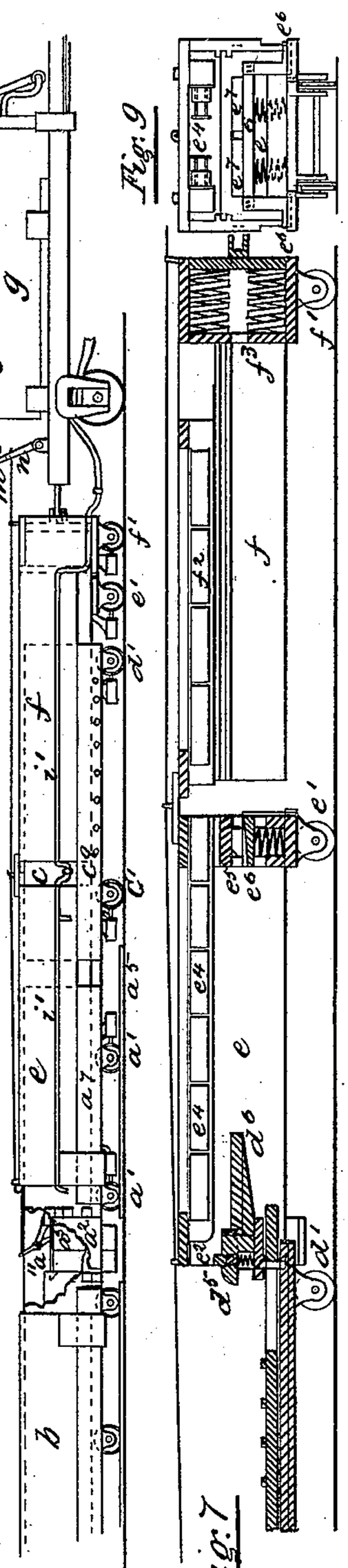

Fig. 9

Fig. 7

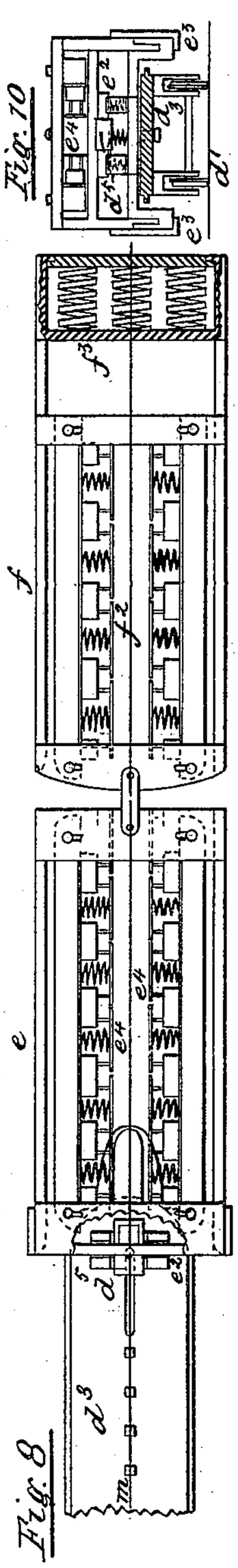

Fig. 10

Fig. 8

Fig. 3

Witnesses.
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UNITED STATES PATENT OFFICE.

CORRADO RUTULINI, OF NEW YORK, N. Y.

MACHINE FOR NEUTRALIZING THE EFFECTS OF RAILWAY COLLISIONS.

SPECIFICATION forming part of Letters Patent No. 246,422, dated August 30, 1881.

Application filed January 15, 1881. (No model.)

To all whom it may concern:

B it known that I, CORRADO RUTULINI, of the city of New York, county and State of New York, have invented certain new and useful Improvements in Machines for Neutralizing the Effects of Collisions on Railroads, of which the following is a specification.

This invention has for its object to prevent accidents from collisions on railroads; and it consists of a series of trucks placed in front of the locomotive, connected together in such a manner, and provided with springs and resisting devices, so that when the forward one encounters an obstacle on the track or meets the forward one of another train the springs cushion the concussion, and the connecting devices of the several safety-trucks are successively disengaged, allowing the third truck to pass into the second one against the action of its resisting devices, and the fourth and fifth trucks to pass over the second and first trucks, also against the action of resisting devices, the resisting-power of the springs and resisting devices being such as to counteract all the force of momentum of the moving trains, so that they are gradually brought to a state of rest without receiving any sudden shock.

Figure 1 of the accompanying drawings represents a series of safety-trucks made according to my invention, in position in front of the locomotive to protect it and the cars of the train should a collision occur; and Fig. 2 represents the same after a collision, showing the manner in which they slide into and over one another. The first safety-car, *a*, is supposed to have come in contact with a similar safety-car, *b*, of an opposing train. The first safety-truck, *a*, has four wheels, a' a', and the rest of the safety-trucks, *c*, *d*, *e*, and *f*, have each only two wheels at their rear ends, marked respectively c', d', e', and f'. The positions assumed by the various safety-trucks given in Fig. 2 are the extreme limit of their movement in collapsing to oppose and counteract the momentum of the train, which positions it is designed they will never reach in practice, as the springs and resisting devices contained in them will be so powerful as to bring the heaviest train, when moving at its greatest speed, to a full stop before the resisting properties of the safety-trucks are fully exhausted, so that no severe shock will be imparted to the train.

To more clearly show the construction and operation of the various parts, I will now refer to the enlarged views, of which—

Fig. 3 is a front elevation of the first truck, *a*. Fig. 4 is a longitudinal sectional elevation of the trucks *a* and *c* and part of truck *d*. Fig. 5 is a plan view of the same. Fig. 6 is a rear-end elevation of the truck *c*. Fig. 7 is a longitudinal sectional elevation of part of truck *d* and trucks *e* and *f*. Fig. 8 is a plan view of the same, partly in section. Fig. 9 is a rear-end view of truck *e*, and Fig. 10 is a front-end view of the same.

The forward end of the first truck, *a*, has two side guards, a^2, which are fitted by dovetails or grooves to the front of the body of truck *d*, enabling them to be set to and from the center line of the truck, the object being to set them wide apart on the safety-trucks of all trains going in one direction, as shown in Figs. 1, 2, 3, 4, and 5, and close enough together in those of trains going in the other direction, as shown in truck *b*, Fig. 2, so that the guards of truck *b* may enter between the guards a^2 of truck *a*. All these guards are beveled at their ends, to cause them to meet one another properly, and each of these has an inside groove and an outside projection, the outside projections of the contracted guards sliding into the inside grooves of the expanded guards when the trucks meet, to hold them firmly in all directions. As soon as these guards interlock in each other, then the buffer-plate a^3 and a similar buffer-plate on truck *b* meet, and the springs surrounding the guide-rods a^4 are extended, offering the first resistance to the moving train. These springs are very powerful, and they may be made to act by compression instead of by tension. The first movement of the buffer-plate a^3 disconnects the frame a^5, suspended by hooks under the truck, and allows it to fall on the rails, and as this frame surrounds the wheels a' the truck is prevented from moving off the rails sidewise. The wheels a' are carried by a frame fitted to slide longitudinally under the truck *a*, the frame being opposed in such movement by springs, so that no sudden shocks are imparted to these wheels when a collision occurs.

By the time the springs on the guide-rod have expanded about one-half the range of the movement the resisting device contained in the second truck, *c*, is brought into action as follows: The end of the rod a^6, which fits loosely in a hole in the upper spring guide-rod, a^4, comes in contact with the bottom of the hole, and is pushed longitudinally backward, and carries with it the rod c^2, which is pivoted to the rod a^6 directly over the pivoted connection of the front of the truck *c* to the car *a*. This rod c^2 has on its rear end the wedge c^3, which disengages the catches c^4 from the frame c^5, fitted to slide in grooves formed in the inside of the side frames of truck *c*. This frame c^5 has connected to it by means of a link the bar d^2, attached to the under part of the platform of the truck *d* in such a manner as to be free to move forward a certain distance before the platform d^3 moves, and it is caused to move forward by the fourth truck, *e*, the device which connects the truck *d* to truck *e* being fastened to this bar d^2 and not to the platform d^3. The bar d^2 in moving forward pushes the frame c^5 before it and enters its beveled end between the central friction-plates of the transversely-arranged springs c^6, thereby compressing said springs and causing friction-plates on the outer ends of them to bear hard against the frame c^7, which carries the wheels c' of the truck *c*, pressing this frame c^7 tight against the sides of the truck *c*, thus offering great resistance to the moving forward of the frame c^7 and wheels c', as this frame is fitted to slide to the front end of the truck *c*, which it is caused to do by the platform d^3 now pushing it ahead of it, the platform itself being caused to enter grooves in the truck *c* by the projection d^4 on the bar d^2 coming in contact with the front bearing, which connects the bar to the platform, so that the frame d^5, bar d^2, wheel-frame c^7, and platform d^3 all move forward in the truck *c* together, being so caused to act by the momentum of the trucks *c* and *f* and the locomotive *g* and train drawn thereby. This bar d^2 compresses the springs c^6 firmly against the frame of the wheels c' all the time these parts are so moving forward in the truck *c*, so that the resistance offered by the friction-plates of the spring c^6 to the bar d^2 and frame c^7 has in a great measure retarded the speed of the train and partly or wholly overcome its momentum. If the train is not stopped by the time the platform of the truck *d* is within the body of the truck *c*, then the end of the catch d^5, which connects the forward end of the truck *e* to the rear end of the bar d^2, is depressed by coming in contact with the cam c^8 on the rear end of the truck *c*, thereby freeing the bar e^2 from the catch d^5 and allowing the body of the truck *e* to slide over the outside of the truck *c*, the truck *c* being provided with channeled ribs c^9 as guides therefor, and the truck *e* with flanges e^3 to hold the truck *e* down onto the truck *c*. Considerable resistance is offered to this action of the truck *e* by the friction-plates of the springs e^4, located in its upper part, being caused to bear against the inside of the upper parts of the side frames of the truck *c* by reason of the inside friction-plates of these springs e^4 riding over the taper-pointed bar c^{10}, secured in the upper part of the truck *c*. The wheels e' of the truck *e* come in close proximity to the rear of the truck *c* if the momentum of the train has not by this time been counteracted by the springs and resisting devices before described, and the wedge d^6, projecting rearwardly from the connecting device of the truck *d*, passes into the opening made therefor in the frame e^5 and depresses the spring-piece e^6 and pushes its bent ends clear of the rear lower ends of the side frames of the truck *e*, and the wedge at the same time unlocks the pivoted bars e^7 from horizontal notches in the body of the truck *e*, thereby freeing the sides of the truck from the frame e^5, leaving the frame e^5 and the wheels e' stationary, allowing the body of the truck *e* to be pushed farther over onto the truck *c* by the body of the truck *f*, which follows it onto the truck *c*, the body *e* passing off truck *c* onto truck *a*, also provided with channeled ribs a^7 to receive it, and a taper-pointed bar, a^8, to cause the friction-plates of the springs e^4 to bear against the upper parts of the frame *a*.

The truck *f* is provided with a resisting device consisting of the springs f^2 and friction-plates similar to the springs e^4 and their friction-plates, to be acted on by the taper-pointed bar c^{10} of the truck *c* as the truck *f* passes on the channeled ribs c^9.

The resistance offered by these devices will be sufficiently great to prevent the train ever causing them to assume the position they are shown as occupying in Fig. 2; but to guard against all contingencies, should any of the parts become weakened and allow them to collapse to this extent, I provide a box at the rear end of the truck *f*, with a number of powerful buffer-springs, f^3, to the cover of which the front of the locomotive *g* is connected. Buffer-springs a^9 are placed at the rear end of the car *a*, and all the connections between the cars are such that they are free to swivel one to the other to admit of their easily passing around curves; and I call attention, where I have not specially done so in the preceding description, to the fact that all parts which are designed to slide into or over other parts are considerably beveled to insure their proper working.

When the safety-trucks have, due to a collision, been closed upon one another, as shown at Fig. 2, the hook a^{10} locks the buffer-plates a^3 to prevent the rebound of the springs on the rods a^4, and the two buffer-plates of the opposing leading trucks are firmly locked together by the hook a^{11}. The object of this locking of the buffer-plates together is to allow of the various trucks being drawn apart into their original positions by backing down the locomotives, the resistance-springs c^6 being first released by unscrewing their bearing-sockets, which is done through holes in the

sides of the truck *c*, or by operating them from underneath the truck, and by releasing the springs e^4 and f^2 by means of the right-and-left-handed bolts, operated to draw the two bearing-surfaces of the bars c^{10} and a^8 together. The bar d^2 may also be constructed in this manner.

Should the collision occur with other object than an opposing safety-truck, then I propose to use a suitable anchor to hold the first truck against the backward pull of the locomotive; or a suitable windlass and chain may be attached to the trucks to draw them apart.

I provide the following means to make the machine operative to stop the train should a broken bridge or a washed-away track be encountered. In such case the first truck, *a*, would fall down off the track, thereby letting the front end of the truck *c* descend. The spikes c^{11} would then catch into the framing of the broken bridge or enter the ground and be immediately stopped. The falling truck *a* would pull on the bar c^2 and cause the reverse taper end of the wedge c^3, which is made double for this purpose, to release the catches c^4, and so let the other parts of the machine operate as before described.

The brakes adapted to be used with this machine are any of the well-known kind capable of being operated from the locomotive. A separate brake attachment, *i*, would be applied to each pair of wheels, and these attachments would be connected together by the fixed pipes i' i', secured on the sides of the trucks *e* and *f* and located beneath the other truck, the ends of the pipes from truck to truck and from the last truck to the locomotive being joined by the ordinary flexible couplings, thus enabling the brakes to be applied as desired under all ordinary running circumstances; and the invention further embraces means for automatically applying the brakes to these safety-trucks and also the brakes of the train, and at the same time reversing the engine the instant the buffer-plate a^3 meets an obstacle or the first truck falls through a broken bridge, &c.; and it consists simply of the lever *l*, pivoted to the frame of the truck *a*, located so that its lower end is moved by the buffer-plate a^3 when it is pushed backward, the upper end of lever *l* being connected by the cord or wire *m* to the lever *n* on the locomotive *g*. The upper end of the lever *o*, on the same shaft as *n* is fastened, is connected by the rod o' to the lever o^2, which operates the brakes and the reversing-gear of the engine when the cord or wire *m* is pulled, so that the brakes are applied and the engine reversed either by the action of the buffer-plate on the lever *l* or by the first truck, *a*, leaving the truck *c*.

It is obvious that the several parts of this machine may be considerably modified without departing from the nature of my invention—as, for instance, the springs and friction-plates e^4 and f^2 in trucks *e* and *f* may be dispensed with, the friction of the bodies of these trucks on the channeled ribs c^9 and a^7 being alone depended on for resistance, the channel-ribs being constructed as spring-bars, to be released by screws when the trucks are being separated; and it is also obvious that some of the safety-trucks composing the machine may be used without others, and that it may be applied to both ends of the train, if desired, and that the size of the trucks and strength of the springs and resisting devices may be varied according to circumstances; so I do not wish to confine myself to the particular construction and arrangement of the various parts shown; but

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

1. A machine for neutralizing the effects of collisions on railroads, consisting of a series of trucks provided with springs and resisting devices, and adapted to slide over and into one another against the action of the springs and resisting devices, substantially as hereinbefore set forth.

2. The combination, with the first truck of a machine for neutralizing the effects of collisions on railroads, of side guards adapted to be moved to and from each other, substantially as and for the purpose hereinbefore set forth.

3. The first truck, *a*, provided with the buffer-plate a^3 and springs and guide-rods a^4, and a rod, a^5, in combination with the truck *c*, provided with the rod c^2 and wedge c^3 and locking device to hold the wheels c' and their connections in position at the rear end of the truck *c*, substantially as and for the purpose hereinbefore set forth.

4. In combination with the first truck of a machine for neutralizing the effects of collisions on railroads, a series of trucks provided each with only one pair of wheels at their rear ends, whereby they are free to slide into and over one another, substantially as and for the purpose hereinbefore set forth.

5. As a device for offering resistance in a safety-truck adapted to slide into or over another truck, the combination of a spreading bar with a series of springs provided with friction-plates, whereby pressure is applied to the sliding parts of the trucks, substantially as hereinbefore set forth.

6. The front operating device or truck of a machine for neutralizing the effects of collisions on railroads and a connecting cord or wire and a lever, constructed and arranged to operate the reversing-gear of the locomotive and the brakes, in combination, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 12th day of January, A. D. 1881.

CORRADO RUTULINI.

Witnesses:
FELIX AUCAIGNE,
H. D. WILLIAMS.