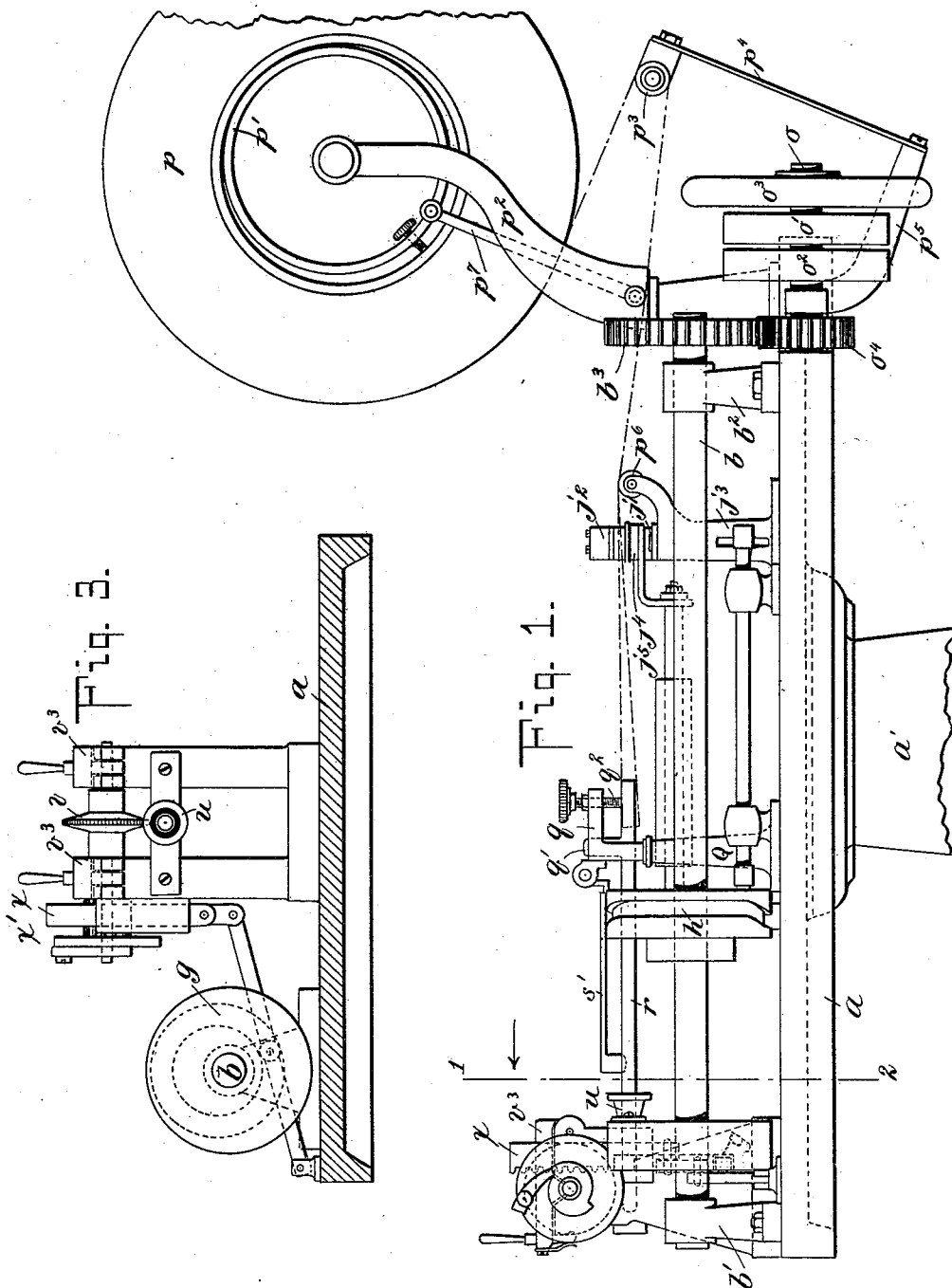


(No Model.)

4 Sheets—Sheet 1.

A. E. DECOUFLÉ.
MACHINERY FOR THE MANUFACTURE OF NON-PASTED PAPER TUBES.
No. 508,505. Patented Nov. 14, 1893.



WITNESSES:

Charles E. Smith
Fred. E. Morse

INVENTOR

Anatole E. Decoufle,
BY Briesen Knautz
his ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

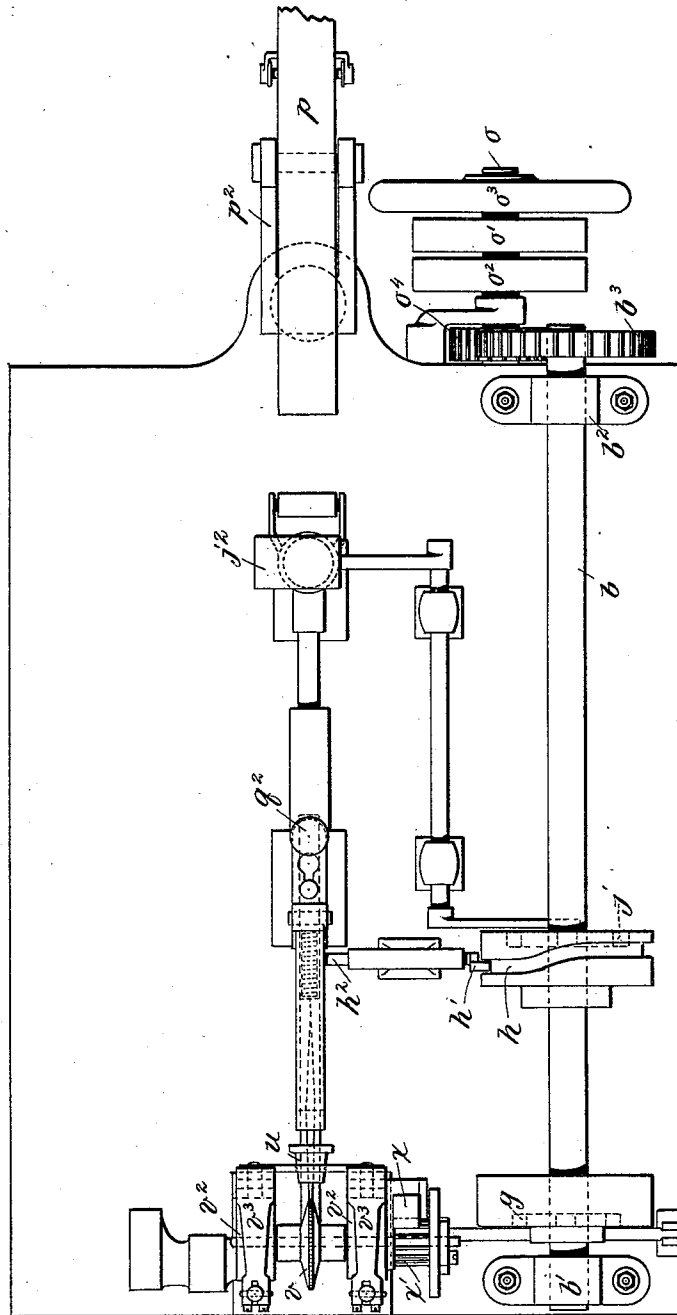
A. E. DECOUFLÉ.

MACHINERY FOR THE MANUFACTURE OF NON-PASTED PAPER TUBES.

No. 508,505.

Patented Nov. 14, 1893.

Fig. 2.



WITNESSES:

Charles E. Smith
Geo. E. Morse

INVENTOR

Anatole E. Decoufle,
BY *Briesen Thwaitz*
his ATTORNEYS.

(No Model.)

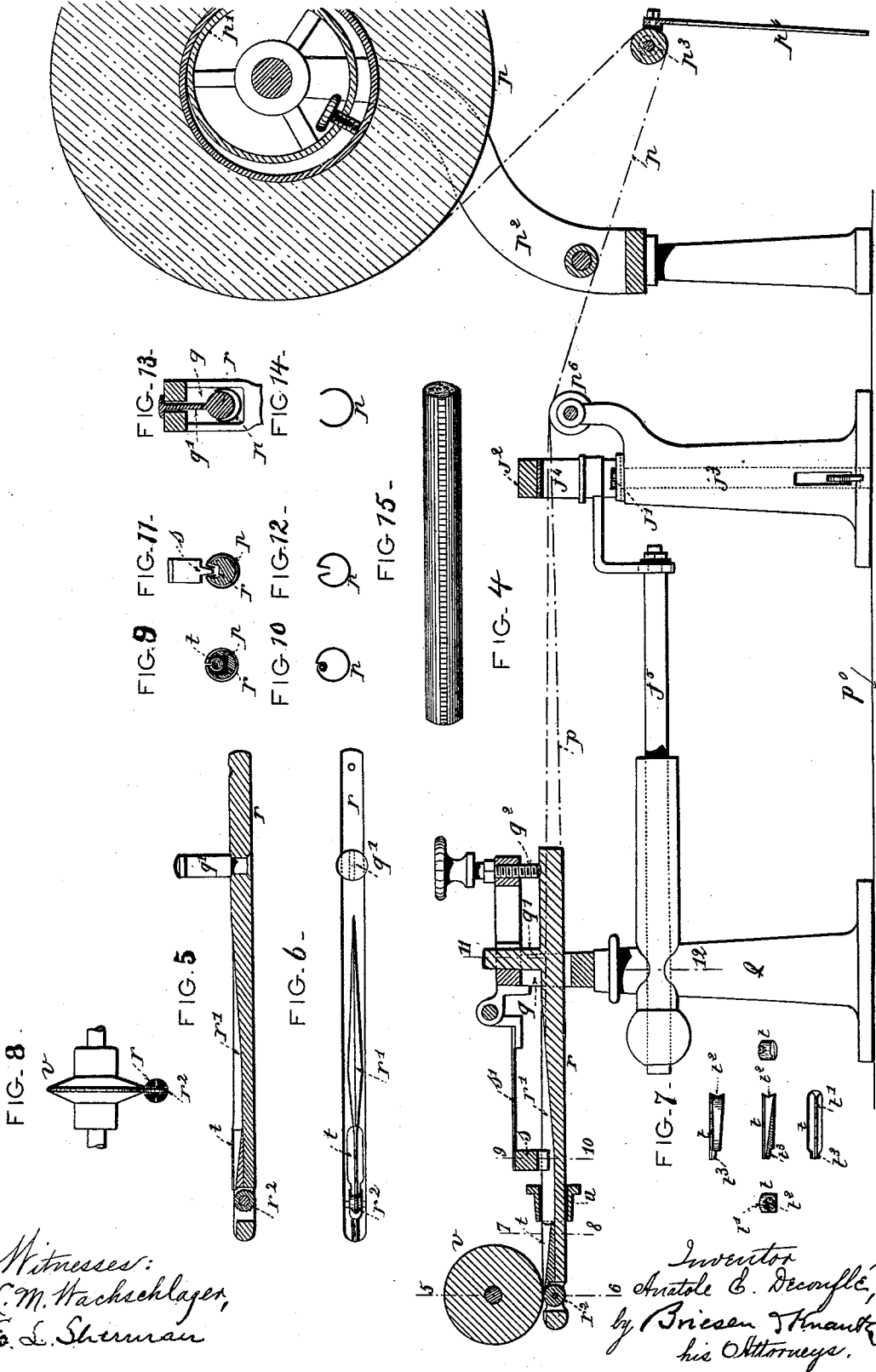
4 Sheets—Sheet 3.

A. E. DECOUFLÉ.

MACHINERY FOR THE MANUFACTURE OF NON-PASTED PAPER TUBES.

No. 508,505.

Patented Nov. 14, 1893.



Witnesses:
L. M. Wachschrager,
E. L. Sherman

Inventor
= Anatole C. Deconflé,
by Briesen & Knautz
his Attorneys.

(No Model.)

4 Sheets—Sheet 4.

A. E. DECOUFLÉ.

MACHINERY FOR THE MANUFACTURE OF NON-PASTED PAPER TUBES.

No. 508,505.

Patented Nov. 14, 1893.

FIG. 16

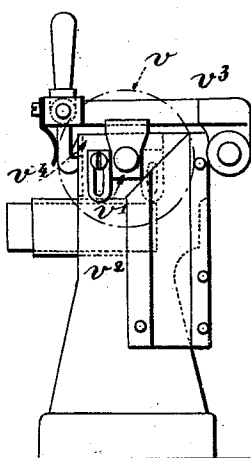


FIG. 17

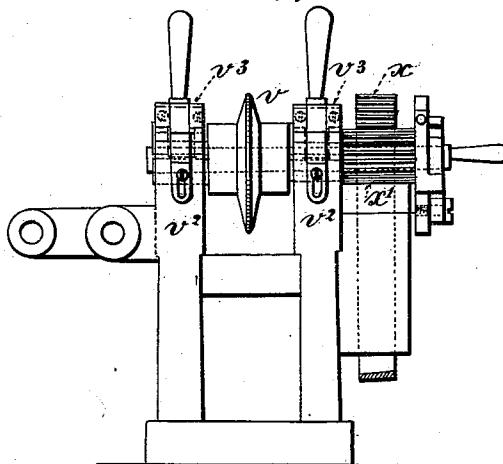
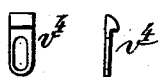


FIG. 18



FIG. 19



Witnesses:
L. M. Hackenschlager,
E. L. Sherman

Inventor
Anatole E. Decouflé,
by Briesen & Knautz
his Attorneys.

UNITED STATES PATENT OFFICE.

ANATOLE EDOUARD DECOUFLÉ, OF NICE, FRANCE.

MACHINERY FOR THE MANUFACTURE OF NON-PASTED PAPER TUBES.

SPECIFICATION forming part of Letters Patent No. 508,505, dated November 14, 1893.

Application filed May 24, 1892. Serial No. 434,145. (No model.) Patented in England July 19, 1886, No. 9,368, and October 20, 1891 No. 17,991; in Germany July 25, 1886, No. 38,766; in Canada April 16, 1888, No. 28,917, and in Switzerland, 1889, No. 386.

To all whom it may concern:

Be it known that I, ANATOLE EDOUARD DECOUFLÉ, mechanical engineer, of Nice, in the Republic of France, have invented certain new and useful Improvements in Machinery for the Manufacture of Non-Pasted Paper Tubes for Cigarettes, (for which I have obtained Letters Patent in Great Britain, No. 17,991, bearing date October 20, 1891;) and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates more especially to certain modifications and improvements in the principal parts of the machine for manufacturing paper tubes for cigarettes, the longitudinal edges of which are not pasted or gummed together but are folded and interlocked one in the other, for which machinery patents were granted to me in Great Britain, No. 9,368, bearing date July 19, 1886; in Germany, No. 38,766, bearing date July 25, 1886; in Switzerland, No. 386, of 1889, and in Canada, April 16, 1888, No. 28,917.

Figure 1 of the drawings is a front elevation of a machine constructed in accordance with my invention. Fig. 2 is a corresponding plan. Fig. 3 is a vertical transverse section taken on the line 1—2 of Fig. 2. Fig. 4 is a sectional elevation, of the part of the machine for the manufacture of the non-pasted tubes. Figs. 5 and 6 are separate views of the tube forming spindle, the former in partial sectional elevation, and the latter in plan. Fig. 7 shows the interlocking folder of the edges of the paper. Fig. 8 is a sectional elevation taken on the line 5—6 of Fig. 4 of the paper feeding mechanism. Fig. 9 is a section taken on the line 7—8 of Fig. 4, showing the tube interlocked at its edges as shown separately in Fig. 10. Fig. 11 is a section taken on the line 9—10 of Fig. 4, showing the tube in course of formation, its edges being bent down as shown separately in Fig. 12. Fig. 13 is a section taken at line 11—12 of Fig. 4, showing the tube in course of formation as shown separately in Fig. 14. Fig. 15 shows a completed tube cut off to length. Fig. 16 is a side view of one of the bearings supporting the axis of the roller for feeding forward the paper. Fig. 17 is a side elevation, being a projection of

Fig. 16. Fig. 18 shows, in elevation and plan, one of the lower bearings of the axis of the feed roller for the paper. Fig. 19 shows, in front and side elevation, the movable piece for fixing the cap of the bearings shown in Figs. 16 and 17.

The general arrangement of the machine is as follows, similar letters relating to like parts in all the figures of the drawings.

a is a table supported by the standard *a'*. This table carries the parts composing the machine.

The driving shaft *o*, which carries the pulleys *o'* *o''* and the fly-wheel *o'''*, drives, by means of a pinion *o''''*, the spur wheel *b'''* keyed on the shaft *b*. The cam shaft *b* is placed above the table and turns in bearings *b'* *b''*; the following cams are fixed on it; the cam *g* for feeding the paper, the cam *h* for operating the device *h'* for pushing the empty tube onto the filling funnel, and the cam *j* for operating the printing stamp.

Manufacture of the paper tubes.—At the end of the table *a* is placed a support *p''* which is forked at its upper end and carries the axis of the loose pulley *p'* on which is placed the bobbin of paper *p*. The paper is unrolled by passing round the roller *p'''* mounted on the end of a tightening spring *p''''* fixed to the end of a rigid arm *p''''''*; from the roller *p'''* the paper goes to another guide roller *p''''*, from which it passes directly over the printing stamp *j'*. A brake *p''''''* with a pressure screw enables a suitable resistance to the unrolling of the paper to be produced. The paper on leaving the guide roller *p''''* passes through an opening in the support *p'''* of the counterpart *j''* of the stamp; thence it passes to the heel of the long cylindrical spindle *r*. This spindle is suspended by the attachment *q'* in a kind of frame *q* carried on a support *Q* fixed on the table *a*; a screw *p''* holds it securely, and with more or less pressure against the feed roller *v*. The upper side of the spindle *r* for a great part of its length after issuing from the frame *q* is hollowed out into a groove *r'* which, commencing at or near the attachment *q'*, gradually widens out and deepens, until at a distance of about three centimeters from the folder *t* it remains uniform at the bottom, but

the sides converge and come fair at their ends with those of the slit t' of the folder t . The acting surface of a presser s bears in this groove by the action of its spring supports s' , the pressure of which may be adjusted at pleasure. The groove r' ends at the folder t which is let into the spindle r and consists of a piece of hard, close and fine grained metal; this piece t is perforated throughout its length with a conical hole t^2 , the axis of which is inclined to that of the spindle r as shown. The metal at the top of this hole is slit through from end to end as shown at t' . The hole t^2 and the slit t' end in a projecting beak t^3 intended to conduct the folds of the paper right up to the small roller r^2 . In my above-mentioned earlier machine this beak was not present and there was consequently a certain space left between the end of the folder and the roller r^2 in which space the folds of the paper became deformed and the effect of the pressing of goffering rollers v r^2 upon such folds was rendered imperfect. The special shape of the groove r' as shown, is extremely useful in order to cause the edges of the paper (Fig. 12) to turn inward. By the edges of the groove r' coming fair with the slit t' the abnormal separation of the folded edges of the paper at their entrance into the slit t' is avoided. Without this arrangement crumpling up and deformation of these edges of the paper at the entrance of the folder t frequently occur. Finally, as shown the spindle r carries a slot formed therein immediately in front of the folder t ; the small roller r^2 is free to revolve on its spindle in this slot and immediately behind the said folder, and between it and the presser s is threaded freely on to the spindle r the shaper ring or former u . This latter device determines with rigorous exactitude the external diameter of the non-pasted paper tube. Immediately over the roller r^2 is mounted the feed roller v , the axis of which rests in the special bearings v' of two plumber blocks v^2 . (See Figs. 16, 17, 18 and 19.) The bearings v' are fixed to the plumber blocks by bolts passing through long slots which allow of raising or lowering these bearings to suit the diameter of the feed roller v . In order to raise and lower equally the caps v^3 of the plumber blocks, these caps are pivoted and hooked to nose pieces v^4 which can be fixed adjustably on the plumber blocks. This simple and practical arrangement facilitates the change of the feed roller v whereby the feed can be altered so as to produce longer or shorter tubes. The paper passes through the tube former and is drawn forward by the rotation of the feeding roller v which presses on the loose roller r^2 . The rotation of the roller v is intermittent and is effected by a pinion x' acted on by the rack x which is moved up and down vertically by a lever operated by the cam g ; the pinion x transforms these up and down movements, by ratchet and pawl gear into an intermittent rotation in one

direction of the roller v . The amplitude of these rotations of the roller v correspond either to the total length that the cigarette is intended to have or preferably to half that length. It will now be understood that when the paper arrives at the heel of the spindle r it has already received a certain concavity of form which transforms it more or less into a complete cylinder in the frame g , see Fig. 14. Then the edges of the paper are brought together from the outside inward by the pressure of the presser s . The tube then assumes the internal diameter of the shaper ring u and afterward the edges engaging in the folder t are locked, folded, or rolled one in the other. On leaving the beak t^3 of the folder t the longitudinal joint of the tube is closed, but the opposing pressure of the rollers v and r^2 , (one or both of which may be milled on the edge or not as may be preferred) completes the closing down of the folds. The non-pasted tube is thus completed. By altering the diameter of the loose shaper ring u the diameter of the tube may be varied.

Figs. 1, 2 and 4 show that the heel of the spindle r is some distance from the guide roller p^6 ; this is to enable the paper to receive the impression of the printing or other stamp j placed in the support j^3 . The stamp j' is raised and lowered by the cam j placed on the shaft b . When the stamp descends, an inker j^4 placed at the end of a supporting rod j^5 comes forward and inks the said stamp and then retires to allow of the ascent of this stamp. The rod j^5 is moved horizontally to and fro by the action of the tube pusher h^2 which is itself actuated by the cam h .

For the sake of clearness some of the parts and arrangements described in the specification of the above mentioned patents are herein described, but I desire to have it understood that I make no claim in this present specification to anything except improvements in the mechanism for forming the non-pasted tubes.

Having now described my invention, what I claim is—

1. In a machine for making non-pasted paper tubes, the combination with a tube-forming spindle r provided with longitudinal groove r' having diverging and converging sides, of a spring-actuated presser s adapted to bear on the paper above said groove, substantially as described and for the purposes set forth.

2. In a machine for making non-pasted paper tubes, the combination with the forming spindle r provided with longitudinal groove r' having diverging and converging sides of a folding device t arranged in the groove of said spindle, and provided with a slit t' , and an inclined conical hole t^2 of a beak t^3 and the feed rollers v and r^2 , all substantially as described and for the purposes set forth.

3. In a machine for making non-pasted pa-

per tubes, the combination of a tube-forming
spindle r , provided with longitudinal groove
 r' having diverging and converging edges, of
a folding device t arranged in the groove of
5 said spindle and provided with a slit t' , and
an inclined conical hole l^2 , of a beak l^3 , of a
loose shaper u on said spindle and of the feed

rollers v and r^2 , all substantially as described
and for the purposes set forth.

ANATOLE EDOUARD DECOUFLÉ.

Witnesses:

SPEGERS VELCKER,
LUEIE DEVEZE.