EUROPEAN QUALIFYING EXAMINATION 2008

PAPER A
ELECTRICITY / MECHANICS

This paper comprises:

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Client´s letter

[001] Dear Ms Yupie,

[002] Firstly I would like to introduce myself to you. My name is Patrick Frank O'Boll and I am a postman. I have a rural letter delivery round in Farnorth. It includes several isolated farms and the mansion of the enchanting Lady Turntax. The nearest post office is almost an hour's drive away from most of the farms. As part of my service, I also collect letters from my clients and deliver them to the post office for sending.

[003] In Farnorth the cost of sending a letter, i.e. the postage rate, depends on the weight of the letter. The following table shows the postage rates applied in Farnorth:

Letter weight	**Postage rate**
up to 20g	50 cents
up to 50g	90 cents
up to 100g	130 cents

[004] To determine how much money my clients owe me for their letters, I carry with me a letter-weighing device on my delivery round. My clients' kitchen scales are usually not accurate enough for weights under 50g. Conventional letter balances are able to accurately weigh letters, but they are too fragile to be transported along the bumpy country lanes of Farnorth.

[005] Fig. 1 shows in a cross-sectional view the simple letter-weighing device I currently use on my delivery round. Another sample of this letter-weighing device is available to the clients at the post office. They use it frequently to check the weight of a letter before sending it. This letter-weighing device comprises a body 1 with feet 2, whereby only one of the feet 2 can be seen in Fig. 1. The feet 2 are located on two opposite sides of the lower surface of the body 1. The body 1 can tilt about the feet 2 on a table top 5. Therefore, the feet 2 function as a fulcrum, i.e. as a support about which the body 1 can tilt.

[006] A first part 1a of the body 1 has a resilient clip 3a in which a letter can be inserted and securely held. The resilient clip 3a is fixed on the first part 1a at a certain distance from the feet 2. A second part 1b of the body 1 is configured to act as a counter-weight for letters weighing up to 20g. When the weight of a letter inserted in the clip 3a is greater than 20g, the body 1 tilts in the direction of arrow A. The second part 1b has a recess 3b for receiving an additional counter-weight 4. For checking whether the weight of the letter exceeds 50g, I have to place a counter-weight of 30g in the recess 3b. For checking whether the weight of the letter exceeds 100g, I use a counter-weight of 80g. This means that I have to carry at least two counter-weights with me for determining postage rates.

[007] Lady Turntax always knows beforehand which postage rate is applicable. Last week, when she noted my curiosity, she was kind enough to show me her elegant letter-weighing device, which she had bought through the Internet. As shown in Figs. 2A and 2B, Lady Turntax's letter-weighing device is L-shaped: a first leg 6 rests on a table top 5 and a second leg 7 vertically extends from the first leg 6 via a curved part 8. The second leg 7 has a slit 7a for receiving a letter B. As shown in the side view of Fig. 2B, if the weight of the letter is greater than a threshold value, the letter-weighing device starts tilting about the curved part 8 in the direction of the arrow A. Therefore, in this letter-weighing device the curved part 8 acts as the fulcrum.

[008] The leg 6 further comprises a counter-weight 9. The distance between the fulcrum and the counter-weight 9 along the leg 6 defines a lever arm. The counter-weight 9 can be shifted continuously in a slot 6a along the leg 6 in the directions of arrows C. Hence the lever arm is adjustable. Each position of the counter-weight 9 corresponds to a different threshold value for the weight of the letter. If the weight of the letter held in the slit 7a is above the threshold value set by the position of the counter-weight 9, the letter-weighing device tilts. A scale on the leg 6 indicates the different threshold values. Lady Turntax's letter-weighing device has the advantage over that of Fig. 1 that different threshold values can be set without the need for separate counter-weights.

[009] Lady Turntax loves luxury objects. Although her letter-weighing device is very compact and would be ideal for taking on my delivery round, it is too expensive for me. Nevertheless, Lady Turntax's letter-weighing device prompted me to invent new letter-weighing devices, which are shown in Figs. 3 to 5.

[010] A first example 10 of my new letter-weighing devices is illustrated in Figs. 3A to 3C. As shown in Fig. 3A, the letter-weighing device 10 is formed by a hollow body with a triangular cross section. The body has a first part 10a and a second part 10b. The second part 10b comprises a lower surface 18. As shown in Fig. 3B, the lower surface 18 of the letter-weighing device 10 rests on a table top 5. A step 14 is formed between the first part 10a and the second part 10b, such that the first part 10a is spaced from the table top 5. The edge 14a of the step 14 acts as a fulcrum. The first part 10a comprises three slits 12a, 12b, 12c for receiving a letter.

[011] The different distances between the slits 12a, 12b,12c and the edge 14a along the first part 10a, corresponding to different lever arms, define different threshold values of the letter weight. The slit 12a furthest away from the step 14 corresponds to a threshold value of 20g. The slit 12c closest to the step 14 corresponds to a threshold value of 100g. The slit 12b between the two slits 12a and 12c corresponds to a threshold value of 50g.

[012] If a letter B inserted in the slit 12a causes the letter-weighing device 10 to tilt over to the position shown in Fig. 3C, the weight of the letter is more than 20g. In this case, the letter B must be inserted in the next slit 12b and then maybe in slit 12c. The letter-weighing device 10 tilts whenever the weight of a letter in a slit is greater than the threshold value corresponding to that slit.

[013] Figs. 3A to 3C show the first part 10a to be shorter than the second part 10b. However, equal lengths would also be possible. Other shapes of the cross section of the body would also be possible and the body is not necessarily hollow.

[014] Figs. 4A and 4B show a second example 20 of my new letter-weighing devic which is similar to that of Figs. 3A to 3C. Instead of a step, two lateral feet 24a are provided (of which only one can be seen in Figs. 4A and 4B) to support the body of the letter-weighing device 20. These feet 24a act as the fulcrum of the letter-weighing device 20. Further feet 24b (of which only one can be seen in Figs. 4A and 4B) keep the letter-weighing device 20 in the horizontal position. The remaining features and the function of this second new letter-weighing device 20 are the same as those of the first example 10.

[015] Fig. 5 shows a third example 30 of my new letter-weighing devices. The difference with respect to the previous two examples of Figs. 3 and 4 is that this letter-weighing device 30 is formed by two separate bodies 30a and 30b. The first body 30a can be slid in and out of the second body 30b as indicated by the arrows D. The first body 30a comprises a slit 32 for receiving a letter. The second body 30b is supported by feet 34a and 34b, the feet 34a acting as a fulcrum. By sliding the first body 30a relative to the second body 30b, the distance between the slit 32 and the fulcrum is altered. When the weight of a letter inserted in the slit 32 is higher than a threshold value, the letter-weighing device 30 tilts about the feet 34a. The further the distance of the slit 32 from the fulcrum, the lower the threshold value.

[016] A surface 31 of the first body 30a is provided with a scale 33. The edge 35 of the second body 30b indicates on the scale 33 the threshold value, e.g. 20g as shown in Fig. 5.

[017] This letter-weighing device 30 has the advantage of allowing continuous variation of the threshold value of the letter weight by varying the distance of the slit 32 from the feet 34a. Furthermore, as the first body 30a can be fully inserted into the second body 30b, this letter-weighing device 30 is more compact for transport.

[018] Each of the letter-weighing devices of Figs. 3 to 5 can be made from a cardb blank or from a blank of other foldable material. Cutting and folding lines correspondin to the outline and to the slits respectively the slit of one of my new letter-weighing devices are pre-formed on the cardboard blank, e.g. by printing, perforating or scoring. To make the letter-weighing device, the cardboard blank has to be cut and folded along these cutting and folding lines.

[019] Fig. 6 illustrates one of many different cardboard blanks suitable for making the letter-weighing device of Fig. 4. Likewise, the letter-weighing devices of Figs. 3 and 5 respectively can be made from differing blanks.

[020] I would like to sell these letter-weighing devices ready for use and in their blank form, e.g. via the Internet. For the likes of Lady Turntax I am thinking of a special luxury version made of thin sheet metal, e.g. stainless steel.

[021] I hope that I have provided you with all the information you need to draft a patent application covering all aspects of my invention.

With best regards

Patrick Frank O'Boll

Client's Drawings

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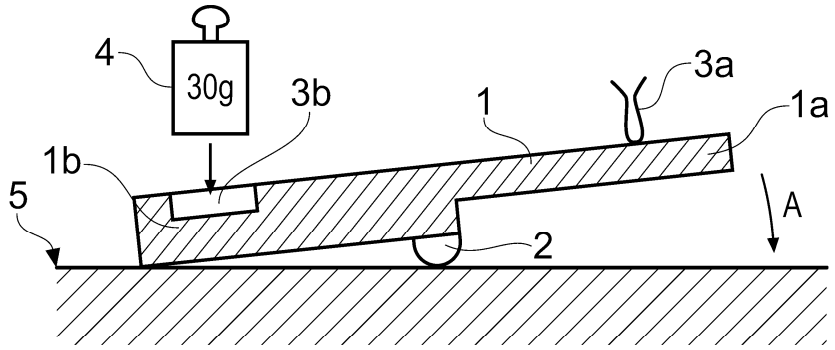

Fig. 1

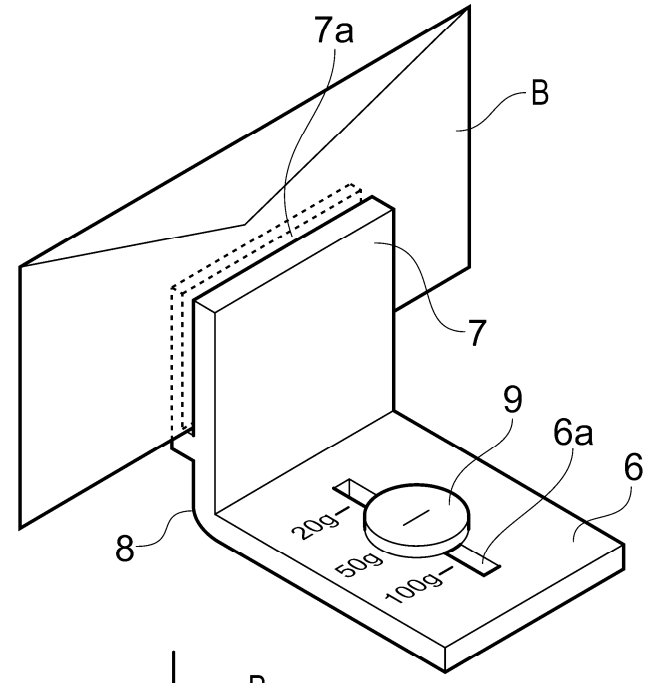

Fig. 2A

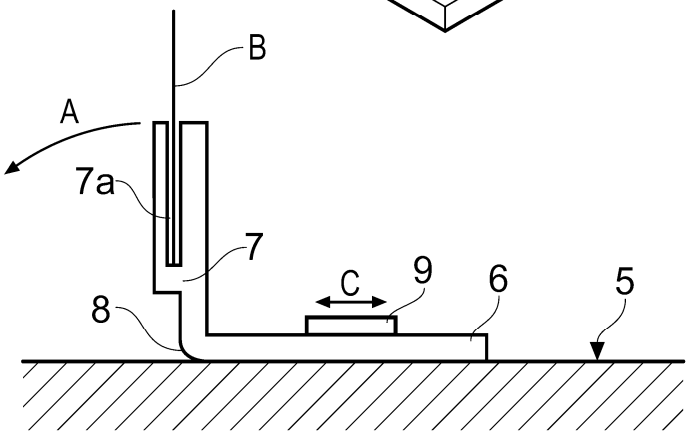

Fig. 2B

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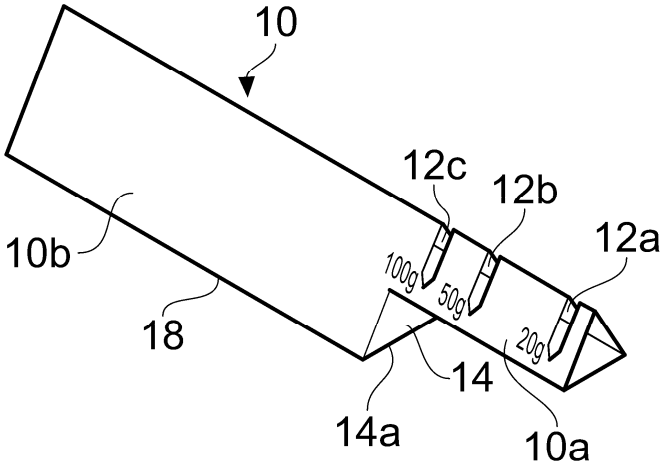

Fig. 3A

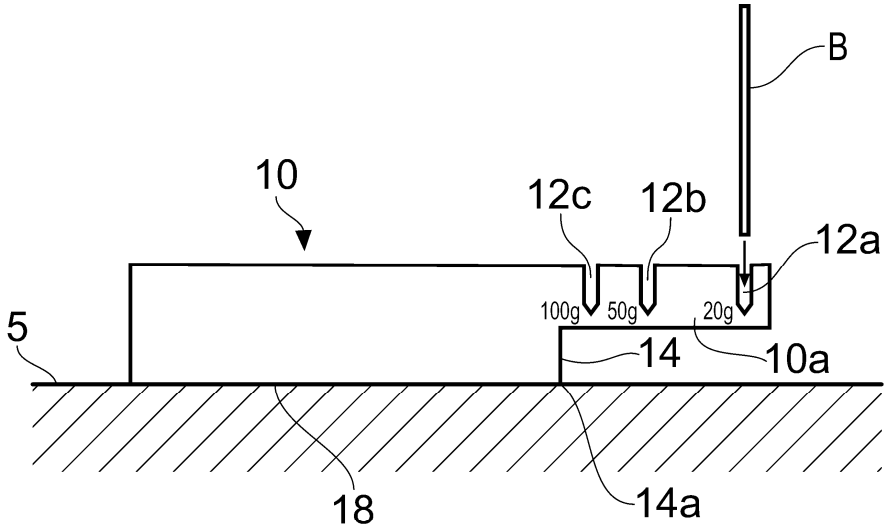

Fig. 3B

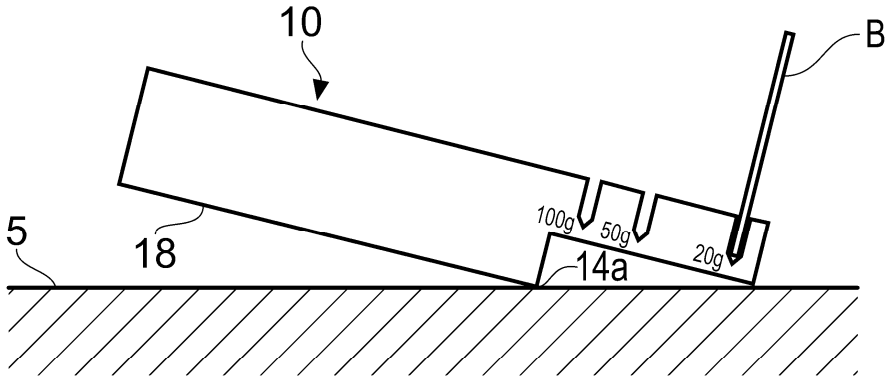

Fig. 3C

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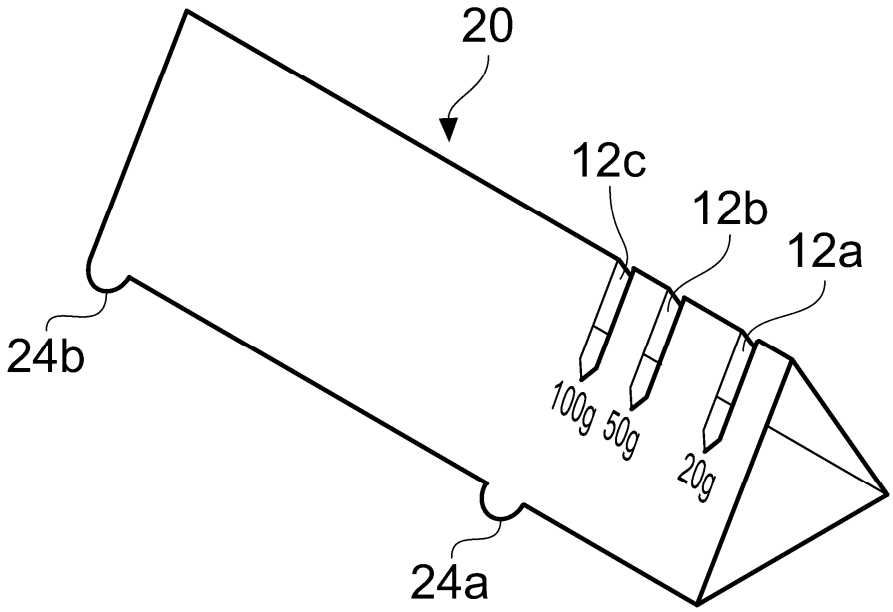

Fig. 4A

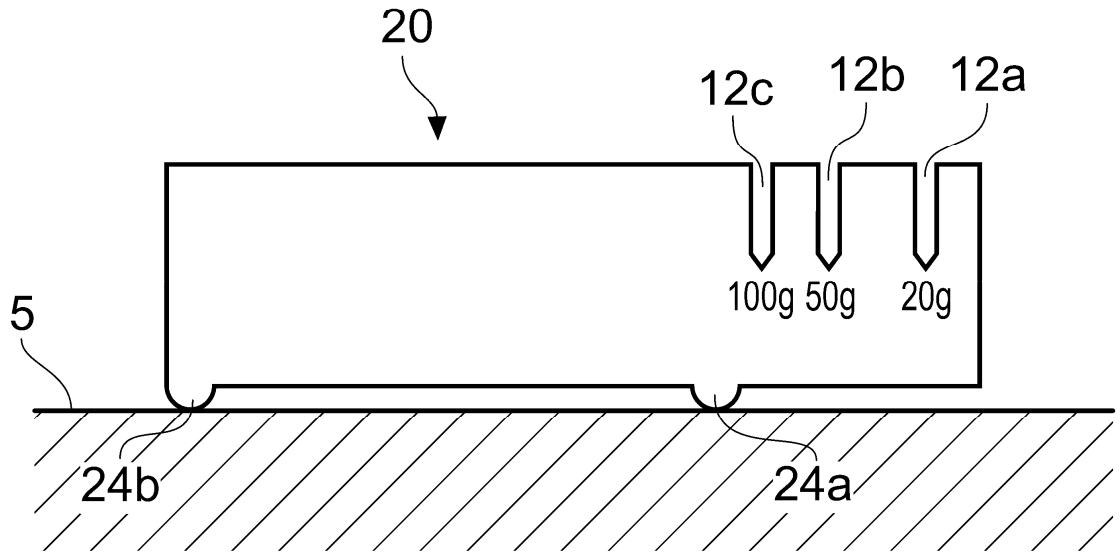

Fig. 4B

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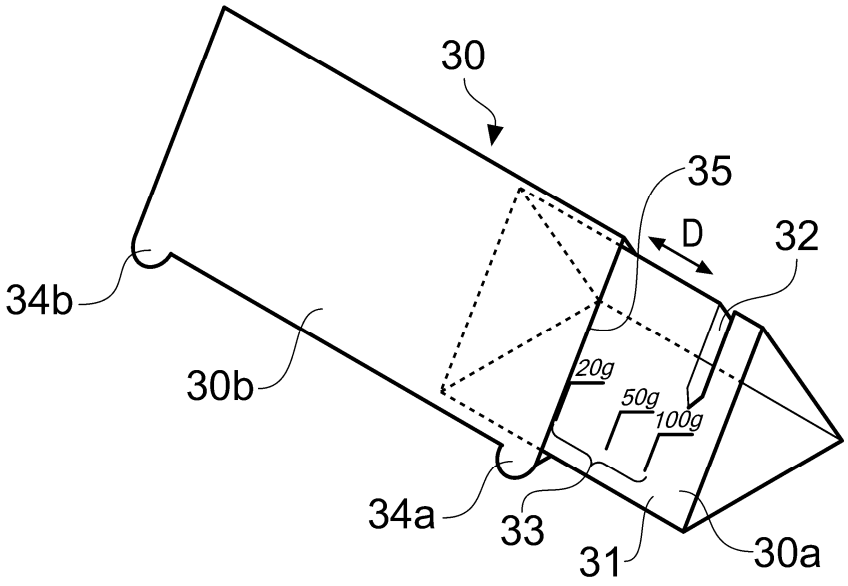

Fig. 5

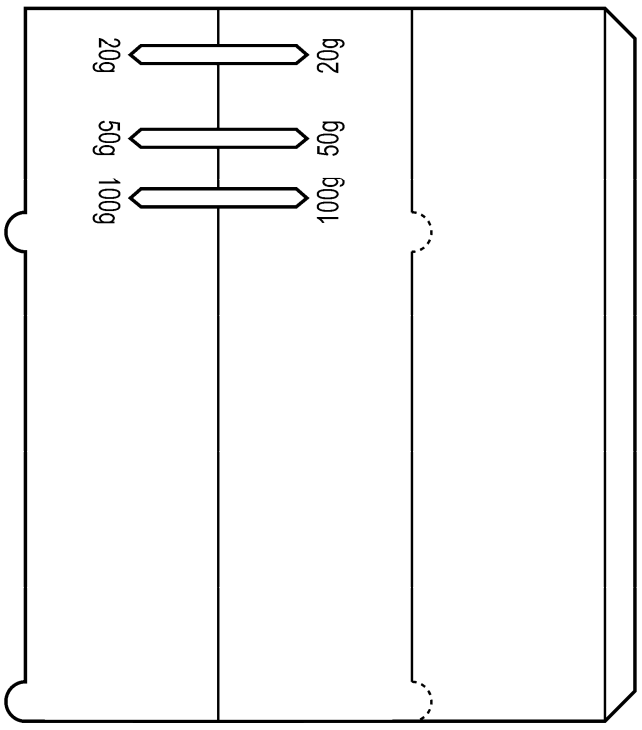

Fig. 6