Oct. 15, 1935. R. TAINE 2,017,357

METAL CARRIAGE FOR MULE MACHINES

Filed July 6, 1934 2 Sheets-Sheet 1

Fig. 1.

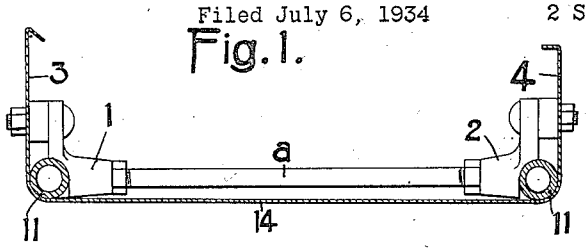


Fig. 2.

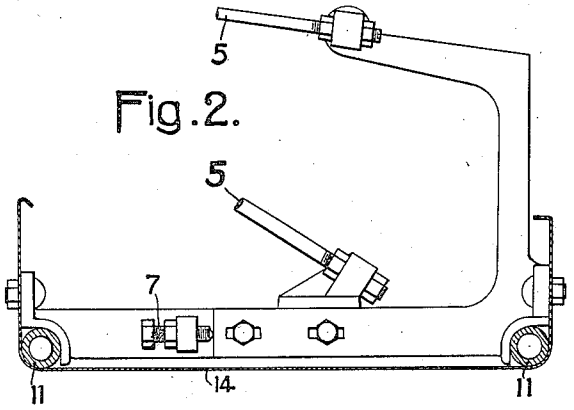


Fig. 3.

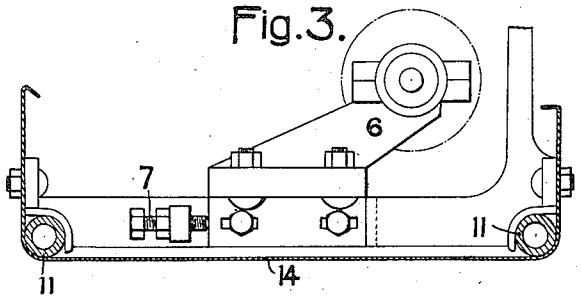


Fig. 4.

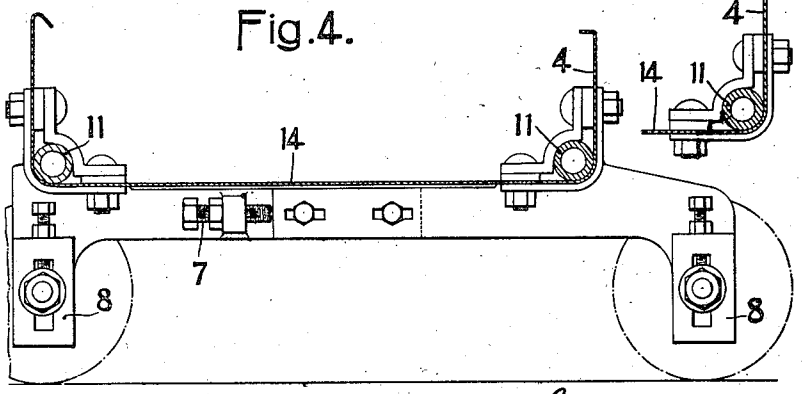


Fig. 5.

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Fig.6.

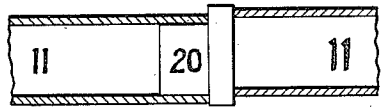


Fig.7.

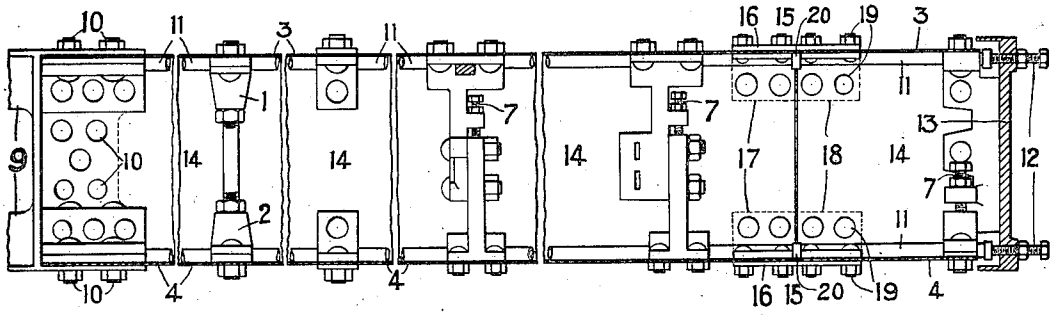


Fig.8.

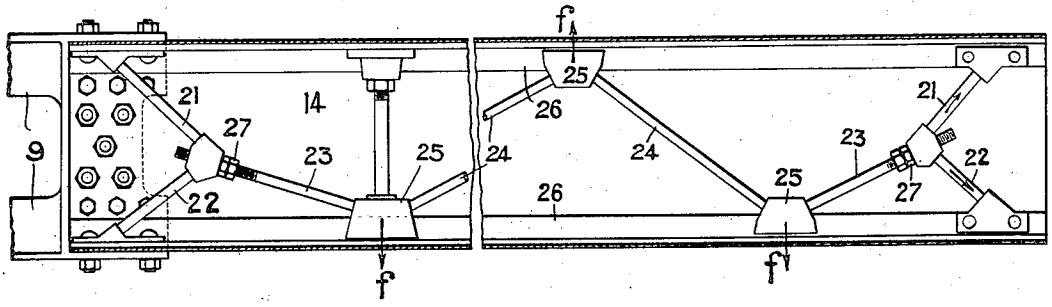


Fig.9.

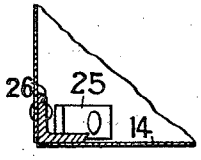


Fig.10.

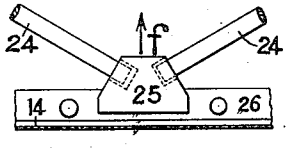
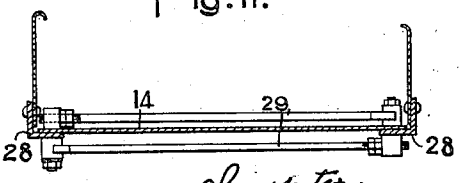


Fig.11.



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2,017,357

METAL CARRIAGE FOR MULE MACHINES

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Application July 6, 1934, Serial No. 734,059
In France July 29, 1933

3 Claims. (Cl. 118—30)

The present invention relates to the production of an exceedingly rigid metal carriage for mule machines (selfactors) by putting under tension after the manner of a drum membrane the base plates or metal sheets of the spindle supporting carriage of a mule machine with the object of increasing substantially the rigidity of the whole, which is ensured when the base plates or metal sheets are in a perfect horizontal plane. In this condition the modulus of deflection is greatest:

$$\frac{I}{V}=\frac{bh^2}{6}$$

b being the thickness of the sheet and h the breadth of the base.

The invention permits of utilizing thinner metal plates than usual, producing a saving in weight and of obtaining spinning and twisting machines of very great length, having great rigidity ensuring substantially parallel displacement of the carriage which is an essential condition in order that yarns may have equal tensions and break less easily.

The lineal extension of the metal plate causes all curves or hollows or projections to disappear; the resistance to flexure of the base plate fitted in the frame approaches as near as possible the perfect and theoretically greatest bending moment:

$$P=\frac{R}{L}\times\frac{I}{V}$$

P being the weight capable of being supported at the end, R the coefficient of resistance to tensile strain of the metal employed and L the total length of the base plate in question.

In a preferred form of the invention, the base plate of the sheet metal box constituting the body of the carriage is put under tension transversely as well as longitudinally, for example by means of longitudinal tubes arranged at the angles of the box near the bottom or base plate thereof and transverse extending members having a regulating device and cooperating with supports on said base plate.

For machines of short length an extension in transverse direction may be sufficient without the need for longitudinal extension.

The accompanying drawings illustrate by way of example different embodiments of the invention:

Figures 1, 2, 3, and 4 are cross sections through carriages of short length;

Figures 5 and 6 show details;

Figure 7 shows in plan view a carriage partly broken away and provided with extending means such as they are represented by preceding figures;

Figure 8 is a plan view of another carriage form with modified extending arrangements;

Figure 9 is an enlarged cross section of one of the angle parts of this carriage;

Figure 10 is a corresponding plan view;

Figure 11 shows a cross section of still another embodiment of the invention.

As shown in Figure 1 the carriage is formed by a longitudinal box of sheet metal strengthened at its angles near the bottom by longitudinal tubes 11 and provided with transverse extending means in the form of screw threaded tubes a having right and left hand screw threads, these tubes a being screwed into brackets 1 and 2 engaged over the tubes 11 and holding straight the edges 3 and 4 of the box which are secured thereto by bolts. These means cooperate together to put the bottom or base plate 14 of the carriage under tension so as to realize a very rigid, solid and unflexible structure for the carriage.

Figure 2 shows a box-like carriage of sheet metal in combination with transverse extending means of cast iron, formed of two sections interconnected by a regulating screw 7 and one of which has supports for the traction rods 5 of the spindle carrier, one of said supports serving moreover to carry the covering plates or sheets of the carriage.

Figure 3 shows the same transverse extending means as in Figure 2 combined with supporting brackets for the tin-rollers 6. Transverse extension is here also produced by the screws 7.

Figure 4 shows transverse extending means of a similar kind to those of Figures 2 and 3, but located beneath the bottom or base 14 of the carriage and provided with wheel supporting brackets 8.

Figure 5 shows a detail of an intermediate securing device for the longitudinal strengthening tubes 11, which consists of a bracket engaged over the tube 11 at the bent portion of the carriage box so as to hold at the same time the flange 4 thereof.

Figure 6 shows in detail a form of interconnecting means between the different sections of the longitudinal tubes 11 at their junction 15 in the construction of Figure 7. A plug 20 extends at one end into one section of the tube 11, the other side of the plug being flat and in free contact with the adjacent tube section, thus permitting slight deviation from alignment of the

tube sections which is unavoidable at their junction if the width of the various bent sheets is not exactly the same. In addition, if the carriage is slightly out of longitudinal alignment, such misalignment may be corrected by varying the thickness of the part **20** in fitting it.

Figure 7 shows in a plan view the above described tensioning and securing means assembled in a carriage according to this invention, wherein the sheet metal box constituting the body of the carriage is fastened by means of bolts **10** to the parts of a carrying frame **9**. The longitudinal tubes **11** are provided for three purposes. They distribute the lateral extensions as uniformly as possible, strengthen the carriage and permit very solid attachments, which is difficult on the sheet itself. They serve as abutting heads for longitudinal extending means, consisting of screws **12** carried by a support **13** fixed to the end of the sheet base of the carriage box, and cooperate also to ensure transverse extension by means of the screws **7**. At the end opposite to the screws **12** the tubes **11** abut on the respective part of the frame **9**. Thus it is possible to produce the longitudinal extension of the whole of the base **14** of the carriage by means of the screws **12**.

In Figure 7, there is represented at **15** the junction of the longitudinal box sheets and tubes of the carriage by fish plates **16**, **17** and bolts **18**, **19**, the latter having countersunk head in order to form a seating of large surface thereof within the sheet.

It will be seen that in the present arrangement of a carriage of sheet metal advantage has been taken of all the useful members (supports of tensioning members, tin-roller supports, wheel supports, etc.) in order that they will serve at the same time as extending and strengthening means, with the object of reducing the weight and the price of the whole.

All the preceding figures relate to independent transverse and longitudinal extension.

Figure 8 shows by way of example another system of transverse and longitudinal extension comprising triangulated extending tubular rods **21**, **22**, **23**, **24** connected together and by means of seating supports **25** to the body of the carriage. Figure 9 shows in section the assemblage of the sheets of the carriage body over an inner angle piece or corner **26** placed at the bent portion and the slidable arrangement of the seating supports **25** on the corner **26**.

Figure 10 is a plan view of Figure 9 and shows the fitting of two triangulated extending rods **24** in one of the seating supports **25** which latter are free to slide and to assume their position along the corner **26** while exerting the cross extension on the carriage body (see arrow *f*).

In order to obtain at the same time longitudinal and transverse extension it is sufficient to turn the nuts **27** mounted on threaded parts of the rods **23**, which determines the general push of the tubular rods **21**, **22**, **23**, **24** up to the ends of the unit.

Figure 11 shows as a modification a box-like carriage built up of sheets assembled at the angles by external corners **28**. Transverse extension of the carriage box is obtained by screw threaded rods **29** arranged inside and outside said box.

Various means other than those described may be employed for providing the desired tension without departure from the invention, for example levers, struts, supports, springs, eccentrics and so on.

What I claim is:—

1. A metal carriage for mule machines, comprising a body consisting of a box of one piece of sheet metal and in which the base plate thereof is provided with longitudinal tubes arranged at the angles of the box near the bottom or base plate thereof, longitudinal tensioning means in combination with said bottom or base plate to put same under longitudinal tension, bearing parts on said base plate associated to said longitudinal tubes, and transverse extending members having regulating means cooperating with said bearing parts to put the bottom or base plate under transverse tension.

2. A metal carriage for mule machines, comprising a body consisting of a box of one piece of sheet metal and in which the base plate thereof is provided with longitudinal tubes arranged at the angles of the box near the bottom or base plate thereof, longitudinal tensioning means in endwise engagement with the longitudinal tubes of said bottom or base plate to put same under longitudinal tension, angular bearing pieces fastened across the longitudinal tubes on said bottom or base plate and transverse extending members having regulating means cooperating with said bearing pieces to put the bottom or base plate under transverse tension.

3. A metal carriage for mule machines, comprising a body consisting of a box of one piece of sheet metal in its bottom and side walls, having longitudinal reinforcing members at the angles of the box near the bottom, longitudinal tensioning means in combination with said bottom to put same under longitudinal tension and transverse extending members having regulating means associated to said bottom to put same under transverse tension.

ROGER TAINE.