moving by means of stays. The system is shown in the accompanying sketch.

The pairs of springs, consisting each of two crossed poles such as are used in the Scotch hay-cart adaptation, are first lashed together and placed vertically in the wagon, with the lower ends of the two pairs of poles forming the springs pressed into the four corners of the wagon. Another cross, consisting of shorter spars lashed together near their centres, is placed transversely in the centre of the wagon in such a way that the lower ends of the poles press against the angle formed by the sides and floor of the wagon, and their upper limbs engage with the under side of the crossing of the pairs of poles forming the springs. They are securely lashed in this position, and ropes are tied from this point and passed over the sides of the wagon, pulled tight, and secured to the wagon frame. The other adjustments are the same as in the hay-cart improvisation. Square lashings are used, except in the case of the transverse cross, where a diagonal lashing is required.

A METHOD OF PREPARING A COVERED GOODS RAILWAY VAN FOR THE CARRIAGE OF WOUNDED ON STRETCHERS BY EXTEMPOORIZED MEANS.

By Lieutenant-Colonel H. E. R. James, C.B.
(Retired Pay.)

The materials required for fitting one set for six stretchers are:—8 notched blocks of wood 18 in. by 9 in. by 2½ in. to 3 in.; 4 wedges 9 in. by 2 in. by 2½ in. tapering to nothing; 4 poles of light scaffolding, diameter 3½ in. to 2½ in., of a length to fit inside the vehicle transversely; 12 lengths of ½-in. diameter rope of 20 ft. each; 14 pieces of tarred rope yarn 3 ft. in length; 24 pieces of lanyard 2 ft. in length; 6 pieces of small
Clinical and other Notes

cord \( \frac{3}{4} \) in. diameter, 12 ft. in length; 6 pieces of small cord \( \frac{1}{4} \) in. diameter, 6 ft. in length; 16 6-in. wire nails, 24 2-in. wire nails.

Tools.—A rip saw (common hand saw, not tenon saw), a gimlet \( \frac{1}{4} \) in by 7 in., a claw hammer, a knife.

The principle of the extemporization is suspension by ropes whose ends are looped from transverse poles supported in notches in blocks which are nailed to the walls of the van, the ropes passing over the upper pair of poles and taking their fixture from two lower poles, a double spring being thus obtained.

In a method previously described heavy ropes were used, and ring bolts fixed to the floor of the van through which they were rove. The disadvantages of this plan were that ring bolts could not be easily obtained; the piercing of the ropes for stops to receive the stretcher handles took some time, and people not used to handling ropes found some difficulty in opening the strands. The ropes required were of rather exceptional size.
The plan now to be described involves no difficulty in obtaining the necessary materials, and its only disadvantage is that double the number of blocks and poles are required.

The advantages are: It takes less time to prepare. It is easier to carry out with unskilled hands. It is more springy than the former, for the spring is given by two poles instead of one only.

The details of construction are to be seen in the accompanying sketch. The Method of Fitting and Loading, and Steps in its Accomplishment. — Each set will carry six stretchers arranged in two tiers of three series.

(1) The poles, which should be 8 ft. 6 in. long when procured, must be cut to the length of the transverse diameter of the van. The internal transverse diameter of the van varies from 7 ft. to 8 ft., and sometimes a little over in certain vehicles. The poles should be cut square at the ends, and be ½ in. shorter than the internal diameter of the van.

(2) The blocks, if not already prepared, must be cut, and notches, 4½ in. wide at the top, and 3½ in. deep measured from the top edge of the block, must also be cut — this is done with the saw. Two holes must be bored in each block for nails (see sketch). The blocks are nailed as follows to the walls of the van with the 6-in. nails:

In the usual 17-ft. by 7-ft. covered goods van with 5-ft. sliding doors, only one set can be used. In this case four blocks are nailed with notches upwards at 6 ft. distance longitudinally, two on each side of the van flanking the door-opening, and opposite to one another in pairs to receive the top poles, 6 ft. apart longitudinally from notch to notch; 3½ in. should be left for the introduction of the poles between the eaves of van and the top of the block. Four other blocks, one vertically below each of the upper blocks, and with the notches looking downwards, are nailed to the wall, the lower ends being 3½ in. above the floor.

(3) The four poles are placed with their ends in the notches of the blocks, and the lower two are wedged into the notches with the wedges, so as to keep the poles in position and raise them from the floor.

(4) One piece of the larger rope is now taken, and folded in two, in such a way that one end is 2 ft. 6 in. shorter than the other. The loop formed by the folding is passed under the lower pole, and the two free ends are passed through it and pulled tight. The free ends are then brought over the upper pole in opposite directions and allowed to hang down. Loops of 6 in. in diameter are tied by a common knot so that the one on the longer end is 18 in. above the lower pole, and that on the other 48 in. above the lower pole. The centre of the loops made by the doubling of the rope at the lower pole is marked with chalk or charcoal, or string tied round, and the rope is taken off; the eleven other ropes are measured by it, and loops tied at their ends of exactly the same length. All the ropes are now fixed to the lower poles, six on each, and the ends brought up over the upper poles, the ropes at the far ends of the poles being 6 in. from the wall, and the next ropes 23 in. from them; the two centre ropes are
fixed (in the case of a 7-ft. van) close to the last three, a series of 23-in. spaces being thus formed. The longer ropes are passed in a direction from the centre of the van over the upper pole towards the ends of the van, the shorter from the end towards the centre.

(5) The lengths of tarred rope-yarn are bound round the poles and fixed with the small nails close up to and outside (not including the ropes), so as to stop them from slipping sideways.

The apparatus is now ready to receive the stretchers, which must be loaded as follows: The first into the upper loops of the far side from the door through which they are introduced into the van, the handles of the stretcher being passed into the loops. Next the lower loops of that series. Next the upper of the centre series. Next the lower, and so on. The lanyards are tied round the rackets and the supporting ropes, the handles of the stretchers being between the suspension ropes.

As each series is completed the longer small ropes are tied from the handle at the head end of the stretcher to the further lower pole, diagonally, to check longitudinal oscillation.

When all are loaded the handles of the adjacent stretchers may be tied together with the shorter small rope to consolidate the series.

It will be seen that the spring of the lower pole as well as that of the upper is brought into play—as the upper pole acts as a pulley as well as a spring. This method was tried on a short run, and its only fault was that the spring was rather excessive. But in this trial the vehicle was the last one of the train, and the piece of line traversed had sharp curves, and was rather rough. In normal circumstances I consider that it would be very comfortable.