upholstered plug, J, for filling the hole is employed. This plug is long enough to be passed up into the hole from beneath the bed, A, and extend to the upper part of the mattrass, E, and make an even surface. To the lower end of the plug is secured on a strong screw rol a horizontal bar, k, which can be turned after the plug is introduced so as to lock the opposite ends into the grooves in the rails h, h, and thus secure the plug in place. By turning the screw rol shown, the plug can be properly regulated in case any depression occurs from the weight of the patient's body.

To the foot of the bed is secured by means of screws two parallel boxes, L L, so that their rear ends will project beyond the foot of the bed. Each of these boxes has a sliding top, m, and a roller, n, is placed across the rear end of each, its journals bearing in the opposite sides of the box. A strap, o, has one end secured to the rear end of each sliding cover and passes over the roller, while a tin bucket, P, is attached to a spring balance on the opposite or hanging end of the strap. Upon each sliding top, m, are placed two studs, r r, one directly in advance of the other. For convenience a roller is placed on each stud, the roller of the front stud, r, being smaller than the one in the rear stud, r, for the purpose hereinafter explained.

When the patient is placed upon the bed, the first thing to do is to place him or her in the proper position, and by extending the well limb, determine accurately the amount of extension to be applied to the fractured one. This is necessary, as hereafter explained, otherwise the fractured limb is liable to be too short when the fracture heals.

In order to adjust the patient properly for the purpose of obtaining a correct extension, the inventor uses a measuring bar, S, (Fig. 2), which is supported at each end by a standard, T, at the middle of each end of the bed, so that the bar, S, will pass longitudinally above the middle of the bed and the patient. The standards, T, are made of two parallel pieces of wood, between which the ends of the bar, S, are placed and adjusted to any desired height. A link, u, at the top of the standard, is then used to draw the two parts together to keep the bar in place. Upon the bar, S, is placed a transverse sliding bar, V, the arms of which project upon each side of the bar, S. A set screw to fix this transverse bar in place.

of which project upon each side of the bar, S. A set screw to fix this transverse bar in place. Upon cach arm of this bar, V, is placed a downward projecting sliding finger, W, and these sliding fingers are connected with a sliding block, X, by links, Y, so that by moving the block, X, back or forth along the bar, the fingers, W, will be moved toward or from each other along the arms of the bar, S; a sliding finger, Z, is also placed upon the bar, S, at the head of the bed. When the patient is placed in the bed, the finger, Z, is moved against the top of his head, and secured in place by a set screw. The transverse sliding bar, V, is then moved opposite his shoulders, and his body adjusted until the fingers, W, press equally upon both shoulders. The same operation is repeated with the hips, thus bringing the body of the patient in a perfectly straight line. At the foot of the bed, bars, b, are arranged to slide hori-

At the foot of the bed, bars, b b, are arranged to since nonzontally in a socket formed between two of the boxes, L L, one upon each side of the bar, T. To the outer end of these sliding bars is secured, by a bolt, an upright bar, d, the upper end of which is curved over toward the middle of the bed, so as to provide a fender, which will prevent the weight of the bed clothes from falling upon the feet of the patient. Near the lower end of this bar is a horizontal arm, 1, which projects toward the middle of the bed, and upon the extremity of this arm is formed a heel pad, 2, as shown. A sliding arm, 3, is arranged to move up and down along the bar, d, between the arm, i, and the upper curved end of the bar, d, and to the outer end of this arm is fixed a swivel block, 4, to which a toe strap is secured. This arm can be fixed at the desired position by a set screw, e. When the body of the patient has been adjusted in the bed, the sliding har h is drawn out until the head of the foot rest

When the body of the patient has been adjusted in the bed, the sliding bar, b, is drawn out until the heel of the foot rests against the heel pad. The sliding arm, 3, is then moved to the proper place, to allow the ball of the toe to rest upon the block, 4, and the strap is drawn around the foot and buckled, thus keeping the foot in proper position to prevent eversion without any rigid fastenings. The bar, b, will slide easily into its socket, in line with the leg of the patient, so that it can be moved longitudinally, but be prevented from moving laterally.

At the foot end of the prevented from moving laterally. At the foot end of the measuring bar is constructed a drop bar, 7, which is parallel with the bar S, and attached rigidly to it at each end. The drop bar will come midway between the feet of the patient. A try-square is then used for determining whether the feet are in proper position or not, by placing one arm of the square upon the drop bar, 7—first upon one side and then upon the other—so that the opposite arm will stand at right angles to the bar, and thus give the exact measurement.

When the patient has been thus adjusted and his position fixed, if the fracture is of a leg bone, the well leg is attached by means of bandages, with one of the studs, r, on the sliding top, m, of the box, L, which is in line with the foot. Weights of any kind are then placed in the bucket, P, of the box, until the leg is extended to its utmost. The square is then employed for the purpose of measuring the extension. The well leg is then released and the fractured limb is connected with the sliding top of its proper box, and the bucket of this box is weighted so as to extend the fractured limb until it is equal in length to the greatest extension of the well limb.

The counter extension is obtained by the foot of the bed being elevated so as to cause the weight of the patient to counterbalance the weight in the bucket. To do this, feet, f, are screwed into legs, B, of the bed, so that by turning the screws the proper inclination can be given to the bed.

If the bandage on the limb becomes irksome, its position can be shifted by securing a second bandage in another place, and connecting it with the rear stud, r, which is made larger than the front one, to permit of the bandage being attached to it without interfering with the front stud. This is a very important point, as when the second bandage is properly adjusted, the first one can be removed, thus changing the location of the bandage to the relief of the patient, but without in the slightest degree disturbing the extension of the limb.

In summing up the special advantages of this apparatus, we can do no better than to quote the words of Dr. G. W. Dutton, of Toniales, who has used it in his practice, and writes a letter to the inventor, from which we make the following extracts : "I have no hesitation in saying that it is the only thing of its kind that has a *perfect* adaptation to the treatment of fracture of the femur, according to the advanced principles which should be applied in the treatment of this lesion. These advanced principles are:

"1st. Extension by weight and pulley; for the reason that the weight is always ready to take advantage of any stretching of the material intervening between the weight and injured limb, and of any relaxation of muscles which may have been in a spasmodic condition at the so-called "setting" of the limb. "2nd. Counter extension by the weight of the patient's body,

"2nd. Counter extension by the weight of the patient's body, applied by means of raising the foot of the bed; for the reason that the continuous use of the "perineal band" (as in the ordinary method of treating these fractures), when tight enough to be of any use, produces pain and excortation. "3rd. The extension of the sound limb for a criterion in mea-

srd. The extension of the sound limb for a criterion in measurement; for the reason that in making the extension of the broken limb, the ligaments of the knee and hip joints stretch before the muscles, in a spasmodic condition, allowing the broken bone to extend to its proper place; and if the broken limb is drawn out no farther than until it measures exactly what the sound limb does, without extension, there will yet remain a lapping of the fragments of broken bone. "4th. Measurement with an instrument by which the body of

"4th. Measurement with an instrument by which the body of the patient is accurately straightened, and the same point on both sides of the pelvis placed equi-distant from the messial line; for, in measuring with the tape (now the ordinary way), the surgeon guesses at the straightness of the patient's body and the squareness of the pelvis, and he is very likely to be incorrect. "Your arrangement for supporting the foot, and thereby insome measure preventing eversion, and for sustaining the weight of the distribution of the supervision of the supervision of the supervision."

Your arrangement for supporting the foot, and thereby insome measure preventing eversion, and for sustaining the weight of the clothes, and your arrangement for the evacuation of the bowels without soiling the mattrass, are, it would seem, perfect. "I also notice with admiration your ingenious method of chang-

"I also notice with admiration your ingenious method of changing the point of attachment of the extension on the injured limb, by which, during the time of such changing, the steady, even, continuous extension is preserved. This novel device will be of use in every ordinary case, in applying the adhesive strips and bandages.

"The ease with which your bed can be transported, on account of its compactness, and of its fitting inside the carriage box of a spring wagon, is of great advantage."

To DRILL INTO HARD STEEL.—Make your drill oval in form, instead of the usual pointed shape, and temper as hard as it will bear without breaking; then roughen the surface where you desire to drill with a little diluted muriatic acid, and, instead of oil, use turpentine or kerosene, in which a little gum camphor has been dissolved, with your drill. In operating, keep the pressure on your drill firm and steady; and if the bottom of the hole should chance to become burnished, so that the drill will not act, as sometimes happens, again roughen with diluted acid as before; then clean out the hole carefully, and proceed again.