

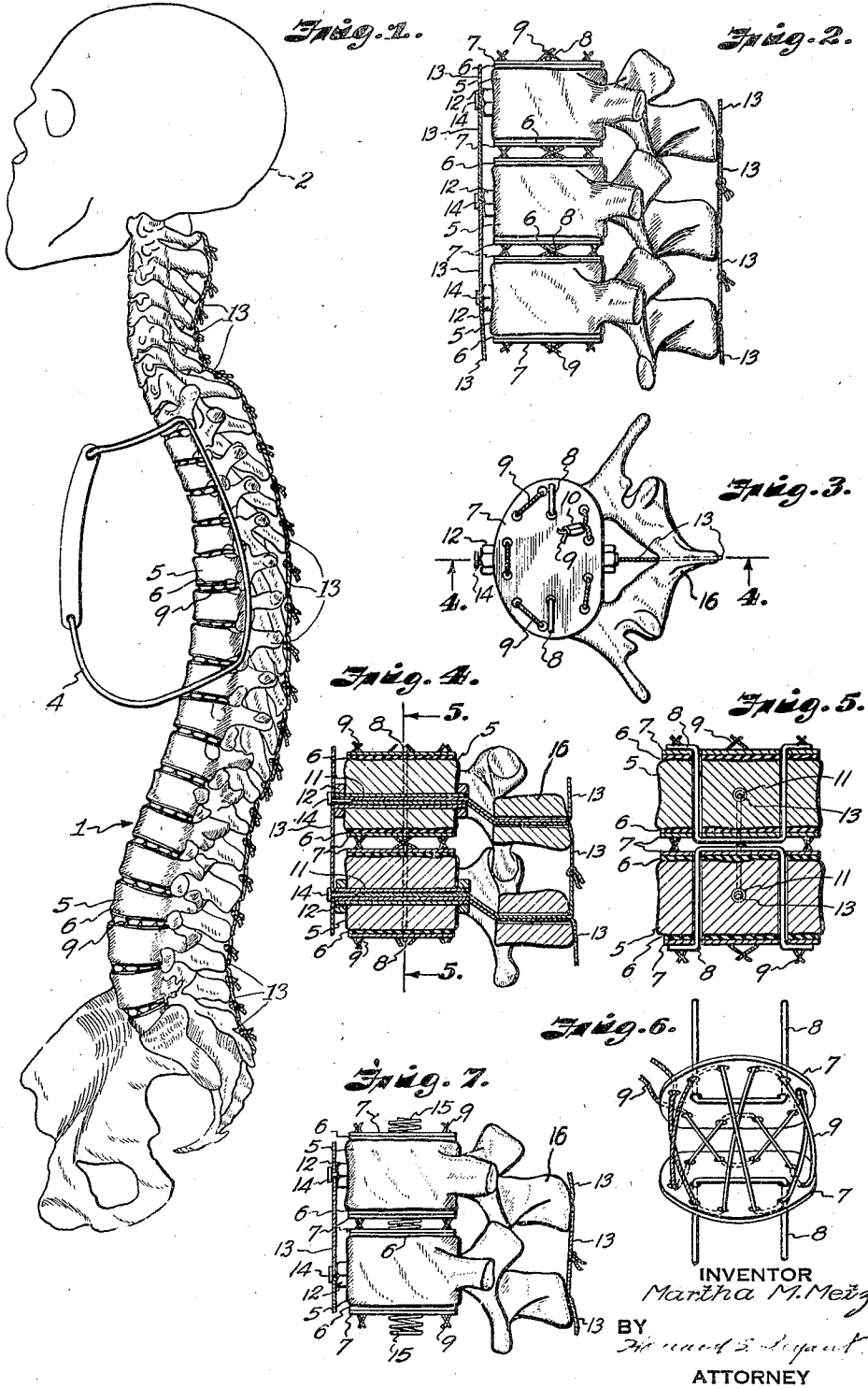
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ANATOMICAL SKELETON

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ANATOMICAL SKELETON

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This invention relates to anatomical skeletons, and the means for mounting the various bones thereof, particularly the vertebrae.

It is one of the objects of the present invention to mount the bones in such a manner that the effects of the tissues which normally connect and limit the movements of the vertebrae may be more naturally and scientifically demonstrated in an anatomical skeleton.

It is a further object of the present invention to provide an anatomical skeleton which may be used to demonstrate the permanent or chronic changes present in the non-elastic tissues, when the bones are in abnormal relationship to each other.

It is a still further object of the present invention so to mount the vertebrae of the skeleton as to permit angular movement thereof in a manner akin to the movement which takes place in the normal body, and to permit locking of the vertebrae in any adjusted position.

It is a further object of the present invention to provide a simple and expedient means for mounting the vertebrae, or other bones of an anatomical skeleton, in such a manner as to permit substantially independent adjustment of the various bones, and to provide an arrangement wherein a pull on one side of the bone, for the purpose of adjusting its angular position, is accompanied by a "give" of the connecting parts on the other side of the bones, in a manner somewhat akin to action in the normal body.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a lateral view of the vertebral column.

Figure 2 is an enlarged side view of a portion of the vertical column showing my improved means for connecting the vertebrae.

Figure 3 is a plan view of a vertebra and some of the connecting means.

Figure 4 is a sectional detail view taken on the line 4—4 of Figure 3, and looking in the direction of the arrows.

Figure 5 is a sectional detail view taken on the line 5—5 of Figure 4, and also looking in the direction of the arrows.

Figure 6 is a detail view illustrating certain of the connector elements.

Figure 7 is a fragmentary view illustrating a modified form of mounting for the vertebrae.

Referring now more particularly to the draw-

ing, I have shown a portion of an anatomical skeleton, at 1, a skull being indicated at 2 and a pelvic bone at 3, and, between the skull and pelvic bone, the spinal column. 4 illustrates a wire frame for supporting the thoracic vertebrae in position. Various vertebrae are indicated at 5. On opposite sides of each vertebra are located strips 6, of rubber or resilient material, which are intended primarily as brakes to prevent the cords, hereafter mentioned, from slipping too easily. By reason of the braking action of the rubber on the cords the cords, hereafter mentioned, may be loosened by removing the plugs, and then the position of the spinal column may be altered without fear that the entire structure will collapse, as would be the case upon loosening the cords if they were not held in place by friction.

Plates 7, of metal or other suitable material, are secured on opposite sides of the body part of each vertebra, in the manner to be presently described. Adjacent plates 7 of adjacent vertebrae are laced together by a cord 9, in the manner illustrated more clearly in Figure 6. The ends of the cord 9 are held in place by a removable fastener 10. The fastener may be of any desired construction, preferably one through which the two ends of the cords may be passed and which can readily be moved on the cords in one direction but grips the cords when an attempt is made to move the fastener on the cords in the opposite direction. By this arrangement the cord ends may be passed through the fastener which is then pushed along the cords to bring the plates close together, with the fastener between the plates, and then the ends of the cord may be clipped off. The plates 7 are then secured on the opposite side of the body of a vertebra by means of a U-shaped wire clip 8, in the manner illustrated more clearly in Figure 5. The plates thus serve as securing means for securing adjacent vertebrae together and by means of the cords, without the necessity for forming a large number of holes through the respective vertebrae corresponding to the number of holes in the respective plates 7.

Tubes 11, of metal or the like, are inserted transversely through the body of each vertebra. The opposite ends of the tubes are threaded for receiving nuts 12, which secure the transverse tubes in place. A cord 13, in the form of an endless loop, connects two adjacent vertebrae, said cord extending through the tube of one vertebra, through the spinous process 16 of that vertebra, through the spinous process of the adjacent vertebra, and then through the transverse tube 11 of that adjacent vertebra. Thus the cord 13 is in

the form of an endless loop. Through each transverse tube 11 there are two loops 13 extending, one loop connecting that vertebra with the lower adjacent vertebra, and the other loop connecting that vertebra with the upper adjacent vertebra. This is illustrated more clearly in Figure 2. When the cords or loops 16 are loose through the vertebra, the vertebra may be tilted angularly with respect to one another. When they are tilted to their desired relative angular positions, the loops 13 are secured to each of the two vertebrae through which each loop extends. This is accomplished by means of plugs or pins 14 that are extended into the tubes 11, and serve as wedges to hold the loops locked with respect to the respective vertebrae.

The modification illustrated in Figure 7 differs from that previously described only that here there are provided, in addition, springs 15 for holding the vertebrae in spaced relationship.

From the above description it is apparent that any vertebra may be adjusted angularly, laterally or transversely with respect to its adjacent vertebrae, for the purpose of illustrating normal or abnormal changes in the relationship of the vertebrae. Also, that as the portion of the loop 13 between the body portions of adjacent vertebrae is shortened, the corresponding portion of the loop, on the opposite sides of the vertebrae, is lengthened. Also, in the modification shown in Figure 7, the springs 15 are made of such a length as to illustrate the cartilage, where there is sufficient cartilage between adjacent vertebrae to make this practicable. For this purpose the springs 15 may be of graded lengths as required for the illustration of the normal spacing between adjacent vertebrae.

In compliance with the requirements of the patent statutes, I have here shown and described a preferred embodiment of my invention. It is, however, to be understood that the invention is not limited to the precise arrangement here shown, the same being merely illustrative of the principles of said invention. What I consider new, and desire to secure by Letters Patent, is:

1. Means for mounting the vertebrae of an anatomical skeleton, comprising plates respectively on the upper and lower sides of each vertebra, cords interlacing adjacent plates of adjacent vertebra but permitting relative movement of the plates, and means for securing the plates to the respective vertebrae.

2. Means for mounting the vertebrae of an anatomical skeleton, comprising plates respectively on the upper and lower sides of each vertebra, cords interlacing adjacent plates of adjacent vertebra but permitting relative movement of the plates, means for securing the plates to the respective vertebrae, and means for holding the vertebrae in their relative angularly adjusted positions comprising cords interlacing adjacent vertebrae, and means for locking the last mentioned cords in adjustment with respect to the vertebrae.

3. An anatomical skeleton provided with cords extending through holes in the bones and adjustable therein and means for wedging the cords in the holes for holding them in adjusted positions.

4. An anatomical skeleton provided with cords in the form of loops extending through adjacent bones that are movable with respect to each other, and means individual to each loop for wedging each loop in adjusted position, said means being removable to release the loops for adjustment.

5. An anatomical skeleton provided with cords in the form of loops extending through adjacent bones that are movable with respect to each other, and means individual to each loop for wedging each loop in adjusted position, said means being removable to release the loops for adjustment, said bones having tubes therein through which the loops extend, and said wedging means comprising pegs insertable into the tubes for clamping the loops in place.

6. Means for mounting the vertebrae of an anatomical skeleton comprising a series of loops extending through the body and spinous process of adjacent vertebrae, and means associated with each loop for locking it in position with respect to both vertebrae through which it extends.

7. Means for mounting the vertebrae of an anatomical skeleton comprising a series of loops extending through the body and spinous process of adjacent vertebrae, and means associated with each loop for locking it in position with respect to both vertebrae through which it extends, said means comprising a removable wedging peg associated with each vertebra and holding the vertebra and the loop in relatively adjusted positions.

8. Means for mounting the vertebrae of an anatomical skeleton comprising plates on respective opposite sides of each vertebra, cords interlacing adjacent plates of adjacent vertebra but permitting relative movement of the plates with respect to one another and with respect to the cords, rubberized material between the respective plates and their associated vertebrae and means for securing the plates to the respective vertebrae.

9. Means for mounting the vertebrae of an anatomical skeleton comprising plates on respective opposite sides of each vertebra, cords interlacing adjacent plates of adjacent vertebra but permitting relative movement of the plates with respect to one another and with respect to the cords, springs between adjacent plates of adjacent vertebrae for separating them while permitting compressive movement between them, and means for securing the plates to the respective vertebrae.

10. Means for mounting the vertebrae of an anatomical skeleton, comprising plates on respective opposite sides of each vertebra, cords interlacing adjacent plates of adjacent vertebrae but permitting relative movement of the plates, means for securing the plates to the respective vertebrae, a series of loops each extending through the body and spinous process of adjacent vertebrae, and means including separate wedging pegs associated with each vertebra for adjustably locking the vertebra and the associated loop together.

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