

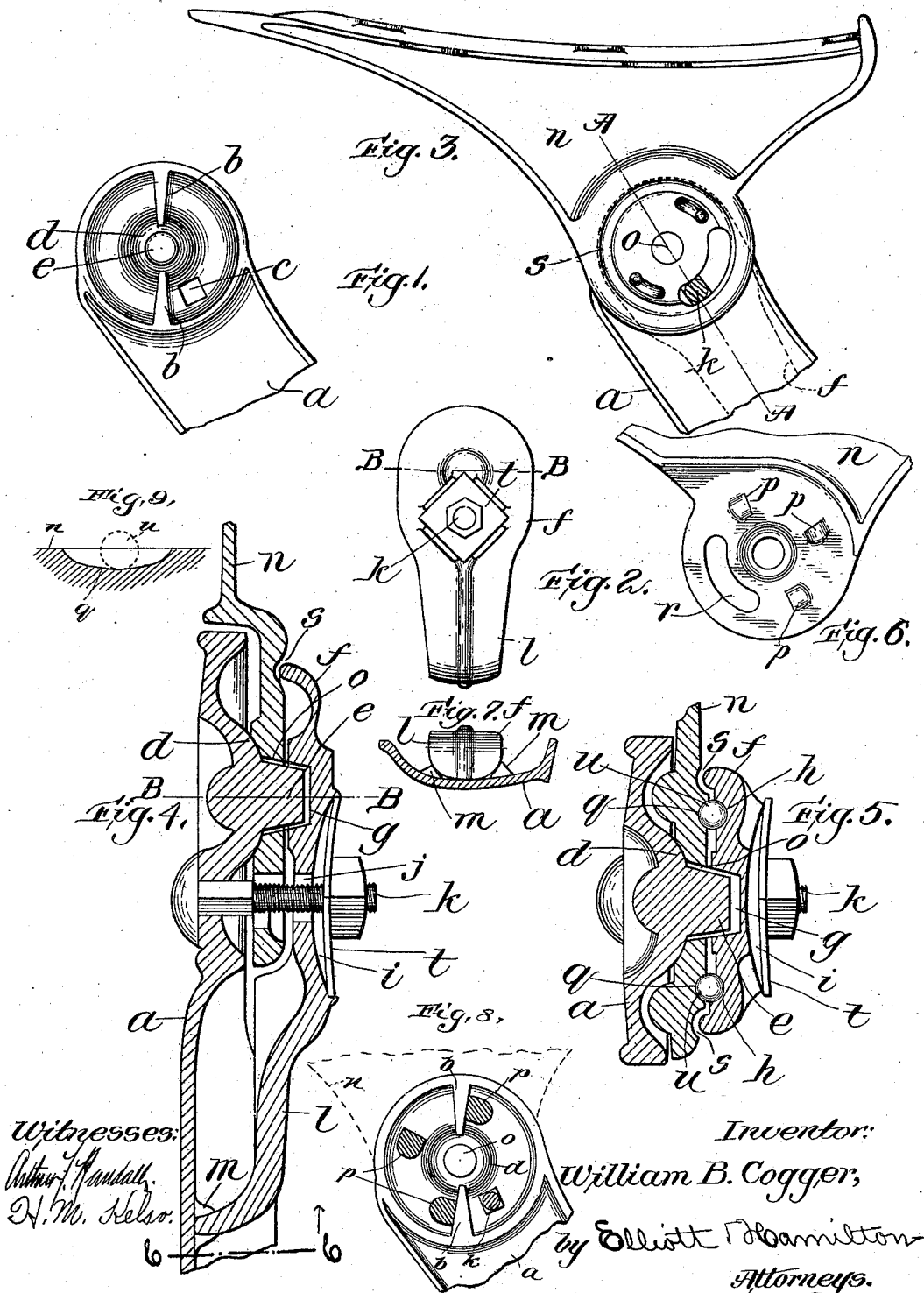
No. 683,439.

Patented Oct. 1, 1901.

W. B. COGGER.
HINGE JOINT.

(Application filed July 5, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

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HINGE-JOINT.

SPECIFICATION forming part of Letters Patent No. 683,439, dated October 1, 1901.

Application filed July 5, 1900. Serial No. 22,563. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. COGGER, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Hinge-Joints, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the upper end of the supporting-standard and shows the inner face thereof. Fig. 2 is a side elevation of the outer face of the cap, between which and the standard shown in Fig. 1 the seat-bracket rotates. Fig. 3 is a side elevation of the seat-bracket, the cap shown in Fig. 2 being removed for clearness in illustrating the inclined curved ball-races. The balls are shown in the position assumed by them when the seat is in use by the pupil. Fig. 4 is a sectional view on the line A A, Fig. 3, all of the parts being assembled in position. Fig. 5 is a sectional view on line B B of Figs. 4 and 2, all the parts being assembled in position. Fig. 6 is a view of that side of the seat-bracket which is next to the standard, and Fig. 7 is a sectional view on the line C C of Fig. 4 and shows the rounded end of the cap. Fig. 8 shows the relative position of the stops on the standard and cooperating stops on the bracket when the seat is down. Fig. 9 is a sectional view lengthwise through the middle of the ball-race and shows the inclined ends of the ball-race.

My invention relates to hinge-joints adapted for use in school-seats, opera-chairs, and like furniture.

The object of my invention is to provide a hinge-joint which while noiseless and readily moved shall be free from friction-inclines and bumpers.

A second object of my invention is to provide a hinge which will permit of an automatic adjustment of its parts.

Another object of my invention is to provide a three-point bearing for the inclosing cap, thereby retaining the balls in perfect harmony with each other.

A fourth object of my invention is to provide a ball-bearing hinge-joint from which

should any one remove the balls the hinge will nevertheless do good service. This is not accomplished by any ball-bearing heretofore made.

My invention consists in the hinge-joint hereinafter described and claimed.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, *a* is the standard, upon the inner face of the upper end of which are two stops *b b*. A square bolt-hole *c* is formed in its upper end for the reception of the retaining-bolt, which holds the parts together. The inner part of the upper end of the standard *a* is provided with a rounded part *d*, from which projects transversely a trunnion *e*. The cap *f* is provided on its inner face with a socket *g* for the reception of the free end of the trunnion *e*. It is also provided on its inner face with the two ball-races *h h*, which have inclined ends. The cap *f* is provided on its outer face with a depression *i*, in the center of which is the hole *j*, through which passes the thread end of the retaining-bolt *k*. The lower end of the cap *f* is provided with an arm *l*, the end of which is retained in position by the two lugs *m m* on the standard *a*. The seat-bracket *n* is provided with a hole *o* for the passage of the trunnion *e*. On the face which is adjacent to the standard *a* the walls of this hole are concaved, so as to form a socket for the reception of the rounded portion *d* of the upper end of the standard *a*. From this same face project three lugs *p p p*, which engage the stops *b* on the standard *a*. When the seat-bracket *n* is down, the outer two of the three lugs or stops *p* engage the stops *b* on the standard, one of the outer stops *p* engaging on one side of the upper stop *b* and the other outer stop *p* engaging the opposite side of the lower stop *b*. Thus the weight on and of the bracket *n* is supported by both stops *b* when the bracket *n* is in its lowered position. When the bracket *n* is in its raised position, the middle one of the three stops *p* engages the upper stop *b*. This relation of the stop *p* to the stop *b* will be clearly understood by referring to Fig. 8. On the opposite face—the face which is adjacent to

the cap *f*—the seat-bracket is provided with two ball-races *g g*, which have inclined ends. (See Fig. 9.) An elongated slot *r* permits the passage of the retaining-bolt *k*. A circular groove *s* is formed in the seat-bracket to receive the upper edges of the cap *f*. Within the depression *i* fits a spring-steel washer *t*, which is held in place by the retaining-bolt *k*. *u u* are the two balls which work in the ball-races formed in the seat-bracket and the cap.

The operation of my new hinge-joint will be readily understood. When the seat is raised or lowered, the seat-bracket rotates between the cap *f* and the standard *a*. The two balls *u u* move up the inclined portions of the ball-races. This movement of the balls up the inclined portion separates the cap and bracket from each other, and thereby compresses the spring-steel washer. This causes the movement to be noiseless, for the spring-steel washer acts as a buffer and does away with the necessity of having friction-inclines or bumpers. The position of the spring-steel washer below the center of rotation—*i. e.*, at a distance from center of rotation—makes only a small amount of movement on the part the spring necessary.

The advantages of my new hinge-joint are, first, the cap has three bearing-points, two of which are the balls and the third the arm *l*, the rounded end of which permits the cap *f* to rock on the standard *a*. If the parts spring or warp, the bracket *n* will move on the ball-and-socket joint between it and the standard *a*, while the cap *f* will rock on its rounded end. This keeps the balls in perfect harmony with each other. To permit this movement and automatic adjustment, the shank portion of the trunnion *e* is somewhat smaller in diameter than the hole *o* in the bracket *n* and than the socket *g* in the cap *f*—that is, the bracket *n* and cap *f* fit loosely on the shank portion of the trunnion *e*. This construction is clearly shown in Fig. 4 and is a feature of my invention. The trunnion entering the counterbore in the seat-bracket produces a hinge which permits a ready automatic adjustment of the parts and also gives a good serviceable hinge even though the balls should be removed through accident, mischief, or malice. In this construction even though the iron parts should be sprung or the wood of the seat should warp the parts would remain in perfect adjustment and harmony with each other. The cap *f* would rock on the lower bearing-point between the lugs *m m* on the standard, and the ball-and-socket joint between the standard and the bracket and the concavity on the inner face of the upper end of the bracket outside of the rounded portion would permit the seat-bracket and cap to conform to any warping action without the binding of the parts, as in hinges heretofore made.

What I claim is—

1. A ball-bearing hinge-joint made up of a standard member, a bracket member, and a

cap member; the standard member being formed with stops and a trunnion, said stops cooperating with stops upon the bracket member, said trunnion passing through the bracket member and engaging said cap member, thereby forming the axis of rotation of said bracket member; said bracket member formed on one side with stops which cooperate with stops on the standard member and formed on the opposite side with ball-races having inclines at their ends; balls in said ball-races; said cap member formed on one side with ball-races which cooperate with the ball-races in said bracket member and with a socket for the reception of said trunnion and formed on the other side with a depression to receive a spring-washer; said spring-washer; and an assembling bolt and nut which clamp the standard, bracket, cap and washer together, said bolt being non-axial with the trunnion about which the bracket rotates.

2. A ball-bearing hinge-joint made up of a standard member, a bracket member, and a cap member; the standard member being formed with stops and a trunnion, said stops cooperating with stops upon the bracket member, said trunnion passing through the bracket member and engaging said cap member, thereby forming the axis of rotation of said bracket member; said bracket member formed on one side with stops which cooperate with stops on the standard member and formed on the opposite side with ball-races having inclines at their ends; balls in said ball-races; said cap member formed on one side with ball-races which cooperate with the ball-races in said bracket member and with a socket for the reception of said trunnion and formed on the other side with a depression to receive a spring-washer, the lower end of said cap member being rounded to permit said cap member to rock upon the standard; said spring-washer; and an assembling bolt and nut which clamp the standard, bracket, cap and washer together, said bolt being non-axial with the trunnion about which the bracket rotates.

3. A ball-bearing hinge-joint made up of a standard member, a bracket member, and a cap member; the standard member being formed with stops and a trunnion, said stops cooperating with stops upon the bracket member, said trunnion passing through the bracket member, thereby forming the axis of rotation of said bracket member; said bracket member formed on one side with stops which cooperate with stops on the standard member and formed on the opposite side with ball-races; balls in said ball-races; said cap member formed on one side with ball-races which cooperate with the ball-races in said bracket member; the lower end of said cap member having a bearing on the standard; and means for securing the standard, bracket and cap together.

4. A ball-bearing hinge-joint made up of a

standard member, a bracket member, and a cap member; the standard member being formed with stops and a trunnion; said trunnion being rounded and fitting in a socket in the bracket member to form a ball-and-socket joint; said bracket member formed on one side with a socket adapted to receive the rounded part of said trunnion and with stops adapted to engage stops on the standard member; and formed on the other side with ball-races which coöperate with ball-races in said cap member; said cap member formed with ball-races which coöperate with ball-races in said bracket member; balls in said ball-races; and means for clamping said standard, bracket and cap together when assembled.

5. A hinge-joint made up of a standard member, a bracket member, and a cap member; the standard member being formed with stops and a trunnion, the base portion of said trunnion being rounded and the shank portion of said trunnion passing through an aperture in the bracket member into a socket in the cap member and having a diameter substantially less than said aperture and said socket, said bracket member formed with

stops adapted to engage the stops on the standard member and with an aperture for the passage of the shank portion of said trunnion; said cap member formed with a socket for the reception of the free end of said trunnion; and a yielding clamping means non-axial with said trunnion.

6. A hinge-joint made up of a standard member, a bracket member, and a cap member; the standard member being formed with a trunnion which projects through the bracket member into the cap member and forms the axis of rotation of the bracket member; said bracket member formed with an aperture for the passage of said trunnion and with an elongated slot for the passage of the clamping-bolt; said cap member; and clamping means non-axial with said trunnion for clamping the said members together.

In testimony whereof I have set my hand this 29th day of June, 1900.

WILLIAM B. COGGER.

Witnesses:

A. B. BLACK,
J. C. RUTTER, Jr.