A GLASS GLOBE FROM WHICH THREE HUNDRED WATCH CRYSTALS WERE CUT.

Our illustration shows a hollow sphere of glass now in possession of L. Royer, in Paris. The diameter is not stated, but the size can be judged from the fact that three hundred watch crystals have been cut out of it. The cut is taken from Ackermann's *Gewerbe Zeitung*, and is from an actual photograph.

THE AUTOMATON CHESS PLAYER.

A few days ago the newspapers announced that the police of Bordeaux had forbidden the exhibition of the automaton Az Rah, one of the attractions of the Exhibition Theater, because it had been discovered that the manikin was set in motion, not by mechanical arrangements, but by a youth of eighteen years, inclosed within a cavity behind the wheelwork, and whose health was gravely compromised by this daily torture.

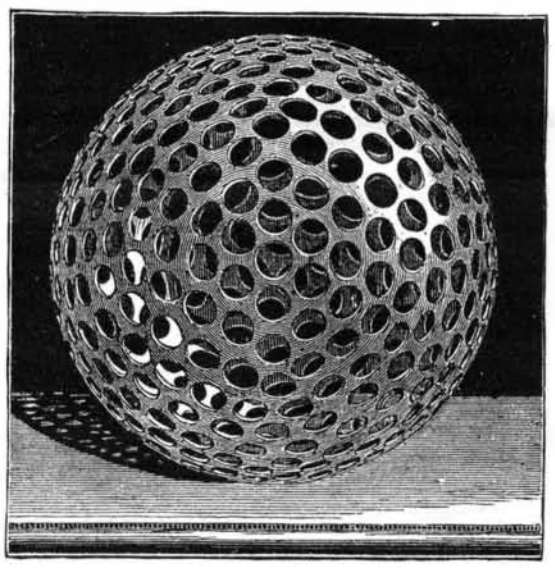
This automaton recalls the famous Turkish chess player that was constructed in Hungary by Baron Kempelen in 1769, and exhibited in Germany, Russia, France, England, and America, without the public succeeding in ascertaining its mechanism. In 1819 and '20 a man named Melzer showed it anew in England. Robert Houdin saw it in 1844 at the house of a mechanician of Belleville, named Cronior. Since then its fate has been unknown, and it is very probable the Az Rah of Bordeaux is nothing else than the Turk of Vienna. Our readers who have seen it at the exhibition will be enabled to decide the question after reading the description that we shall give. Baron Kempelen, a Hungarian nobleman and an Aulic Councilor of the royal chamber of the Domains of Hungary, being at Vienna, was called to the court to be present at a seance of magnetism that a Frenchman named Pelletier was to hold before the Empress. Kempelen was known as an ingenious amateur of mechanics, and the persons present having asked his opinion in regard to the experiments which he had witnessed, he happened to say that he believed that he could make a machine that would be much more astonishing than anything that he had just seen. The Empress took him at his word and expressed a desire that he should begin the work. M. De Kempelen returned to Presbourg, in his own country, and, in six months, produced an automaton which played a game of chess against any one who offered himself, and nearly always won it.

This automaton was a human figure of natural size, which was dressed in the Turkish style, seated on a chair, and placed behind a wooden chest on which was laid the chessboard. He took the pieces up with his hand in order to play them, turned his head to the right and left in order to see them better, and nodded his head three times when he checkmated the king, and twice on attacking the queen. If his adversary made a mistake, he shook his head, removed the wrongly played piece, deposited it outside of the chessboard, and played his own. The showman, who stood near the automaton, wound up the mechanism after every ten or twelve moves, and occasionally replaced certain wheels; and, at every motion of the Turk, were heard noises of moving wheelwork. To show that there was nothing within but mechanism, doors were opened in the chest and body. There was also a magnet lying on the table to make believe that magnetism, then in great vogue and as yet full of mystery, played a preponderating role in the affair. M. De Kempelen was accustomed to say: "The machine is very simple, and the mechanism appears wonderful only because all has been combined with great patience in order to produce the illusion."

Many hypotheses were put forth on the subject; and two books, one published in 1785, and the other in 1789, were devoted to a discussion of them. Those that appeared to be most likely were, on the one hand, that the Turk's body contained an extraordinarily small dwarf, and, on the other, that the showman acted upon the automaton from a distance by the aid of magnetic influences. These two explanations gave a very imperfect account of the facts, and it was not until some years ago that the trick was unveiled in an anonymous book.

The following is an exact description of the apparatus and the successive operations performed by the exhibitor:

The chest was 3½ feet long, 2 feet wide, and 2½ feet high, and was provided with doors and drawers whose use will presently be seen. The front part of the chair seat was affixed to the chest, and the back part rested on the floor by two legs which, as well as the four legs of the chest, were provided with casters. The right hand of the manikin was movable on the upper part of the chest that formed a table, and, at the beginning of operations, held a pipe, which was afterward removed, and it rested upon a cushion lying in a certain definite position. The chessboard in front of the player was 18 inches square. The exhibitor, provided with a light, begins by allowing the interior of the apparatus to be examined by the spectators. He opens the door A (Fig. 1), and allows to be seen a series of gearings that occupy the whole width of the chest. Then he passes behind and opens the door B (Figs. 2 and 8), opposite the door A, and introduces a light into the interior to show that it is empty. The spectators standing on the other side can, in fact, see the light shine through the different pieces of mechanism



A GLASS GLOBE FROM WHICH THREE HUNDRED WATCH CRYSTALS WERE CUT.

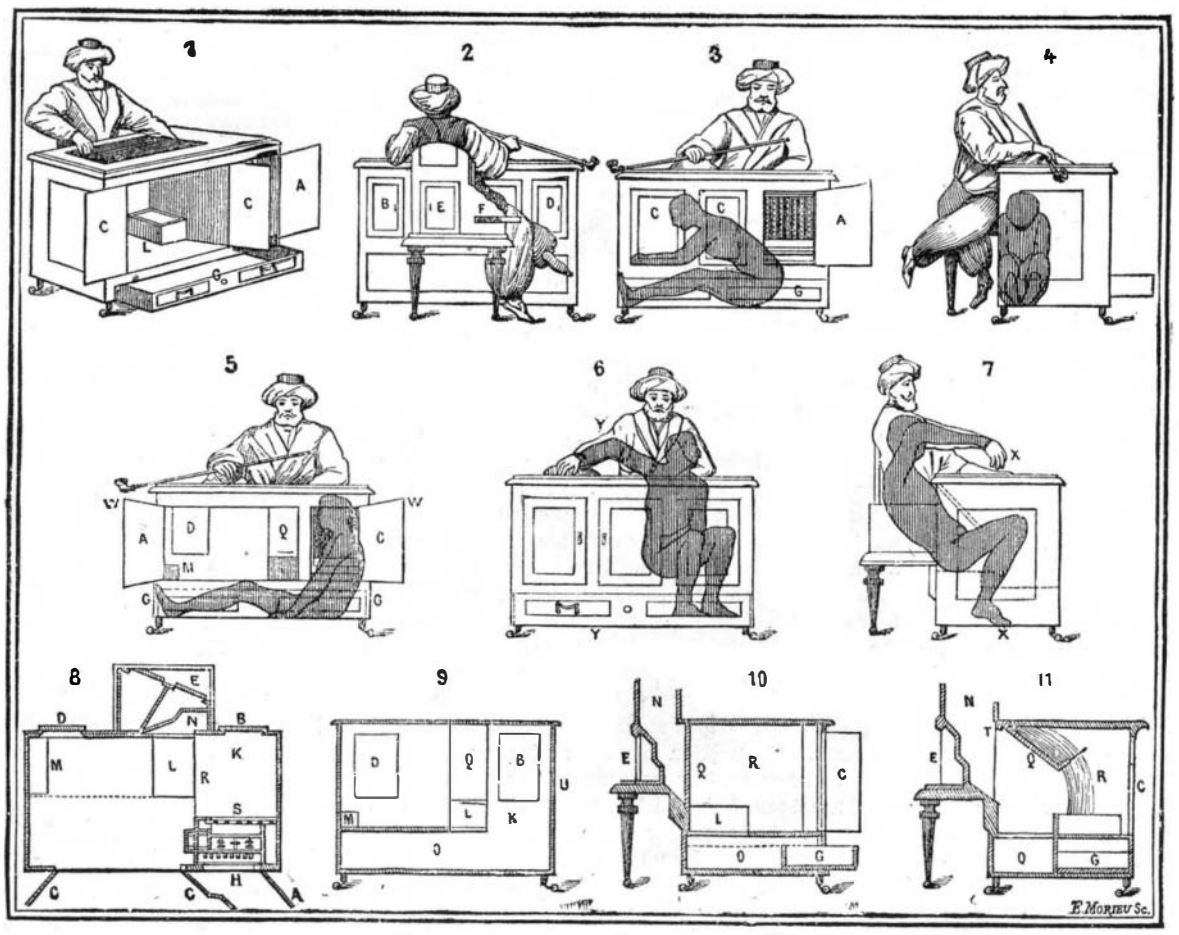
through the door A, that remains open. He afterward locks the door B, and comes in front of the chest and opens the drawer G, from which he removes the chessmen, and a cushion which he slides under the left arm of the automaton. This draw appears to serve no other purpose than the preservation of these objects. Finally, he opens the two doors, C C, in front of the chest, and shows a large closet lined at the sides with dark drapery, and containing two boxes, L and M, of unequal size, and a few belts and pulleys that seem to be designed for putting in motion the mechanism contained in the boxes. Passing behind again, he opens the door, D, and introduces a light into the interior of the chest to show that it has not a false bottom. Then he closes this door again, and also the doors A and C, by means of the same key. Next he turns the apparatus around so as to show the public the other side (shown in Fig. 2), and raises the clothing of the Turk, and opens the apertures, E and F, in the back and thigh to show that no one is hidden within. These doors remain constantly open afterward. Finally, the showman turns the Turk back to his former position facing the spectator, removes the cushion and pipe, and then the game may begin.

We shall explain as clearly as possible how the game was directed by a man who succeeded in hiding himself by a series of movements when the different doors of the apparatus were successively opened:

The drawer, G G, when closed, does not reach the back side of the chest, but leaves between it and its back an empty space, O, measuring 14 inches in breadth, 8 in height, and 2 feet 11 inches in length (Figs. 9, 10, and 11). This space is never shown to the spectator. The little closet extending from A to B is separated into two parts by a dark hanging, S (Fig. 8), which is raised when the door, B, is opened, and lowered when it is shut. The front part of the closet is entirely filled with the wheels that are thought to move the automaton. The back part is empty and is separated from the large closet that the doors, C, form by a thick curtain, R, which hangs freely, being only fixed at its upper part. A part, Q, of the bottom partition of the large closet, C C—the part in front of the Turk—is movable around a horizontal axis, and is provided with a weight toward the interior of the closet sufficient to cause it to fall always in a vertical position. The box, L, is movable and serves to hide an aperture in the floor of the closet; and the box, M, is stationary, but has no bottom, and covers likewise a corresponding hole in the lower floor over the space, O. The interior of the Turk is arranged as indicated in Figs. 8, 10, and 11. Finally, the end of the chest to the right of the Turk slides in horizontal grooves (properly hidden) in such a way as to give access to the space, K. It will now be seen that if a man of small stature introduces himself on this side into the chest, he will be able to thrust his legs into the empty space hidden behind the drawer, and to place the rest of his body in the space, K, as may be seen in Fig. 5, and by pushing the curtain before him and removing the movable box, L, he will be able to assume the position shown in Figs. 3 and 4. It is in such position that he awaits the beginning of the exhibition. The box, M, serves for receiving the extremity of his feet.

It will be remembered that the first operation of the exhibitor consists in opening the door, A, at which time the public sees only the mechanism, and, behind it, the dark curtain, S, whose distance cannot be estimated. The exhibitor next passes behind the chest, and, opening the door, B, introduces a light behind the mechanism, which is believed to occupy the whole width of it. The curtain, S, being raised, it is seen by the light that shines through the different pieces that they cannot serve to hide any one. He then closes and locks the door, B, and, returning to the front, opens the drawer and performs the operations already described, in order to give his confederate time to take the position shown in Fig. 5. The box, L, having been put back in place, as well as the curtain, R, the public sees only an empty space when the doors, C, are opened. The curtain, S, which has fallen, hides the back of the confederate, although the door, A, remains open; and it is then that on introducing the light through the door, D, the exhibitor shows that the large closet has not a double bottom. The doors, C, being again closed with the same key, so as to make believe that these different closings are due to the necessity of removing this key at every operation, the chest is turned around, the two doors, E and F, are opened before the public to show that the body of the Turk is empty, and finally the machine is wound up slowly, the wheelwork making considerable noise the while. During this time the confederate raises the movable partition, Q, takes his legs from behind the drawer, introduces the upper part of his body into a portion of the manikin, which is so arranged as to give his loins a convenient support, and seats himself on the box, L, as shown in Figs. 6 and 7. The game may then begin, the hidden player following his moves through the sufficiently transparent fabric that forms the Turk's clothing. In order that the confederate may easily introduce his arm into that of the manikin, it is necessary to give the latter a certain position, this being the reason for the addition of a pipe in the hand and a cushion under the elbow, both of which are removed when the game begins. A simple cord permits of moving one of the manikin's fingers so as to pick up or drop the chessmen. The left arm of the confederate, which remains in the machine, is employed in moving the head and in producing the noise of wheelwork at every motion.

In reality, in M. De Kempelen's automaton, it was the left arm that moved the pieces. It is said that this peculiarity was due to the fact that the chess player who operated the automaton was left handed. There has even been a touching romance related on this subject, to the effect that the



THE AUTOMATON CHESS PLAYER.