It now follows that for any region u, $v(u)$, the set of all points seen by u, or the visibility polygon of u, is the same as $v(q_u)$, for every $q_u \in u$. Let $N(u)$ denote the set of sources with points in $v(u)$. The following two lemmata from [5] together imply that the minimum set of sinks, $U' \subseteq U$, of P that together see all the sources correspond to a minimum star cover of P. The star polygons that constitute this minimum cover are exactly the visibility polygons of the sinks in U'.

Lemma 2. If β is a set of maximal star polygons that includes every source of P, then β covers every region of P.

Lemma 3. Let $\bigcup_{u \in U'} N(u) = V$. Then, $\{v(u) : u \in U'\}$ is a minimum star cover for P.

Thus, the covering problem has been formulated as the problem of finding the smallest set of sinks that together see every source, which is a set covering problem. Unfortunately, the set covering problem is NP-hard [7], and does not solve the problem for us immediately. However, the geometry of the problem imposes enough structure for it to be solved in polynomial time, as shown in the following sections. Moreover, the advantage of this formulation is that instead of dealing with the visibility of points, we need only consider the visibility of sources and sinks. There are at most $O(n)$ sources and sinks in an OP with three or less dent orientations, and $O(n^2)$ sources and sinks in any simple OP [5].

3. The Star Graph

In order to exploit the geometric structure of the problem, we formulate the set covering problem of the previous section as the problem of finding a minimum clique cover of a graph defined below, called the star graph. Of course, the minimum clique cover problem for general graphs is also NP-hard [7]. However, it turns out that the star graph belongs to a special class of graphs, and this enables us to solve the problem efficiently.

The *star graph* $H = (V, E)$ is defined as follows. The vertices of H are the sources of P. Two vertices, v_1 and v_2 are adjacent in H if there is a sink u that sees both of them, that is, edge $<v_1, v_2> \in E$ if and only if there exists $u \in U$ such that $v_1 \equiv u$ and $v_2 \equiv u$.

For two points p_1, p_2 in P, $p_1 \wedge p_2$ (read as p_1 indirectly sees p_2) if there exists $p \in P$, such that $p_1 \equiv p$ and $p_2 \equiv p$. Let p_1 and p_2 belong to regions r_1 and r_2. We then say that $r_1 \wedge r_2$. We refer to the concatenation of the staircase paths $p_1 p$ and $p\, p_2$ as a *1-bend* path from p_1 to p_2, and p is called the *bend point*. If there does not exist any point p that sees both p_1 and p_2, we say that $p_1 \not\star p_2$ and $r_1 \not\star r_2$. As the following lemma shows [5], two vertices of the star graph are adjacent if and only if the corresponding sources indirectly