



Fig. 1.

SPANNER WRITES ABOUT A NOVEL PAPER PERFORATING MACHINE

THE rather sketchy-looking model shown in Figs. 1 and 2 is, in fact, a most interesting machine designed for perforating successive rows of holes in paper strips. It is the action of the machine that makes the construction worth while, and as it takes comparatively little time to build it makes a good subject of unusual nature for the more advanced constructor, who has little leisure time at his disposal.

For the framework of the model two rectangles are built with two $18\frac{1}{2}$ " and two $5\frac{1}{2}$ " Angle Girders 1 and 2, supported with Corner Gussets. These are joined together with three $5\frac{1}{2}$ " Angle Girders, one $5\frac{1}{2}$ " Strip and a $7\frac{1}{2}$ " Angle Girder 3. A pair of $18\frac{1}{2}$ " Angle Girders 4, are bolted to the Angle Girders 3 and 5. The $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flat Plates 6 are placed in position with a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate between them, and two 3" Angle Girders 7, which form the guide for the paper. Two pairs of $5\frac{1}{2}$ " Strips 8, spaced apart with one Washer are bolted to the

$5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flat Plates 6 as shown. A $7\frac{1}{2}$ " Angle Girder 9 is attached to the Flat Plates by two 4" Rods and four Rod Sockets. A $1\frac{1}{2}$ " Angle Girder 43 supports the $18\frac{1}{2}$ " Angle Girders on one side only.

Travelling Carriage

Two $7\frac{1}{2}$ " Angle Girders 10 are joined together with a $1\frac{1}{2}$ " Strip 11, a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 12, and a $1\frac{1}{2}$ " Flat Girder 13. Four 1" Triangular Plates are bolted to the Angle Girders forming the bearings for the $2\frac{1}{2}$ " Rods and $\frac{3}{4}$ " Flanged

Wheels. A $5\frac{1}{2}$ " Strip 14, with a Double Bracket and a $1\frac{1}{2}$ " Angle Girder attached, is pivoted on a 2" Rod held in the Double Angle Strip 12 by Spring Clips. A 2" Rod 15 is placed through the $5\frac{1}{2}$ " Strip and the $1\frac{1}{2}$ " Flat Girder, with a Collar underneath and a Collar and Compression Spring on the top, adjusted so as to grip the paper.

Eight Angle Brackets are bolted to one of the $7\frac{1}{2}$ " Angle Girders. Two 6" Driving Bands are attached to the $1\frac{1}{2}$ " Strip 11 and to a Small Loaded Hook fixed to the bottom of the framework as shown in Fig. 2. A $2\frac{1}{2}$ " \times 1" Double Angle Strip 16, carrying a 3" Rod and Collars, is bolted to the $5\frac{1}{2}$ " Angle Girder 5 by a $\frac{3}{4}$ " Bolt that also holds a $12\frac{1}{2}$ " Strip 17 spaced from the Double Angle Strip by a Collar and three Washers. This Strip passes over the axles of the carriage and is bolted to the framework, but it is spaced from it by a Collar and Washers. The Strip is also bolted to two $3\frac{1}{2}$ " Strips 18.

Release Mechanism

A $2\frac{1}{2}$ " Strip is attached to the underside of a $2\frac{1}{2}$ " Flat Girder 19 by a Rod Socket 20. Two $\frac{1}{2}$ " Reversed Angle Brackets 21 are bolted to the front of the $2\frac{1}{2}$ " Flat Girders. Two Fishplates 22 are fixed at the rear and also a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 23, which is spaced from the Flat Girder by one Washer. On a $2\frac{1}{2}$ " Rod 24, spring loaded with two Compression Springs and a Collar, a Double Arm Crank 25 is fixed. The bolt holding one of the $\frac{1}{2}$ " Reversed Angle Brackets has two Washers on its shank to prevent the nut from catching the Double Arm Crank. A 4" Rod carrying a Bush Wheel 26 is secured in the Rod Socket 20. Two 3" Rods 27 anchored in Cranks attached to the Angle Girders 1 support the release mechanism, which has two Compression Springs on the Rods next to the framework, and on one of these Rods, a Compression Spring above the $\frac{1}{2}$ " Reversed Angle Bracket. Collars are placed on the ends of the Rods. The Bolt 28 holds a $\frac{1}{2}$ " Corner Angle Bracket (Right Hand) that engages the Angle Brackets bolted on the carriage. When the Bush Wheel 26 is depressed by operating the treadle the Corner Angle Bracket moves below the Angle Brackets. The carriage now moves the Double Arm Crank in line with the Corner Angle Bracket so that when the release mechanism reverts to its original position the Corner Angle Bracket is between the next pair of Angle Brackets.

Perforating Mechanism

A compound $4\frac{1}{2}$ " \times $1\frac{1}{2}$ " flat plate 29 has five Double Brackets 30 bolted to it. Each of these Brackets supports a 2" Rod on which is placed a Collar, a Compression Spring and three Washers. Another Collar (not shown) is fastened $\frac{1}{8}$ " from the

other end of each Rod. Two $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips 31 are secured to the Flat Plates and they support a $4\frac{1}{2}$ " Strip and a $4\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 32. Five $1\frac{1}{2}$ " Rods, each with a Collar, are placed in position as shown. Two $6\frac{1}{2}$ " Rods 33 are fastened to the Flat Plates by Rod Sockets. These are free to move in the $5\frac{1}{2}$ " Strips 8 and in a $5\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 34 that is attached to the framework by Corner Gussets. A Fishplate, placed between two Collars on a $2\frac{1}{2}$ " Rod 35, is lock-nutted between two $12\frac{1}{2}$ " Strips that are pivoted on a Single Bent Strip 36. These form the operating treadle.

The Rod 35 is secured to the $6\frac{1}{2}$ " Rods 33 with Couplings. Two Angle Brackets are bolted to the end of the $12\frac{1}{2}$ " Strips. A Spring attached to the Angle Girder 3 is secured to the $12\frac{1}{2}$ " Strips by a Fishplate. At the other end of the $12\frac{1}{2}$ " Strips two 3" Strips 37 are lock-nutted, and these in turn are lock-nutted to two Cranks 38 fixed on a $6\frac{1}{2}$ " Rod 39. A Crank 40 fixed on Rod 39 is adjusted so that it operates the release mechanism when the $12\frac{1}{2}$ " Strip is depressed to cut the holes in the paper with the $1\frac{1}{2}$ " Rods 41. The holes to be punched are selected by pressing one or more of the Rods 42.

Operating the Model

To operate the mechanism a strip of paper $2\frac{1}{2}$ " wide should be placed between the $5\frac{1}{2}$ " Strips 8 and gripped by the $1\frac{1}{2}$ " Angle Girder and Flat Girder 13. The carriage is then moved towards the cutters by lifting the Bush Wheel 28 so that the Corner Angle Bracket is clear

above the Angle Brackets. When the machine is adjusted correctly each depression of the $12\frac{1}{2}$ " Strips forming the treadle will cause the carriage to move half an inch.

Parts List

Parts required to build the Paper Perforating Machine: 3 of No. 1; 8 of No. 2; 3 of No. 2a; 2 of No. 3; 2 of No. 4; 1 of No. 5; 1 of No. 6a; 6 of No. 7a; 4 of No. 8b; 7 of No. 9; 2 of No. 9c; 2 of No. 9f; 5 of No. 10; 6 of No. 11; 10 of No. 12; 3 of No. 14; 3 of No. 15b; 4 of No. 16a; 3 of No. 16b; 7 of No. 17; 5 of No. 18a; 1 of No. 18b; 4 of No. 20b; 1 of No. 24; 2 of No. 35; 118 of No. 37a; 108 of No. 37b; 58 of No. 38; 1 of No. 43; 1 of No. 46; 4 of No. 48; 1 of No. 48c; 1 of No. 48d; 1 of No. 57c; 31 of No. 59; 5 of No. 62; 1 of No. 62b; 2 of No. 63; 2 of No. 70; 2 of No. 73; 4 of No. 77; 1 of No. 101; 1 of No. 103b; 1 of No. 103h; 6 of No. 108; 3 of No. 111; 7 of No. 111c; 13 of No. 120b; 2 of No. 125; 2 of No. 133; 1 of No. 154a; 7 of No. 179; 2 of No. 186b; 1 of No. 190a.

Fig. 2. This close-up view of parts of the Paper Perforating Machine shows the paper feed and spacing mechanism.

