In [1]:
```
import cv2
from matplotlib import pyplot as plt
import numpy as np
import imutils
import easyocr
```

1. Read in Image, Grayscale

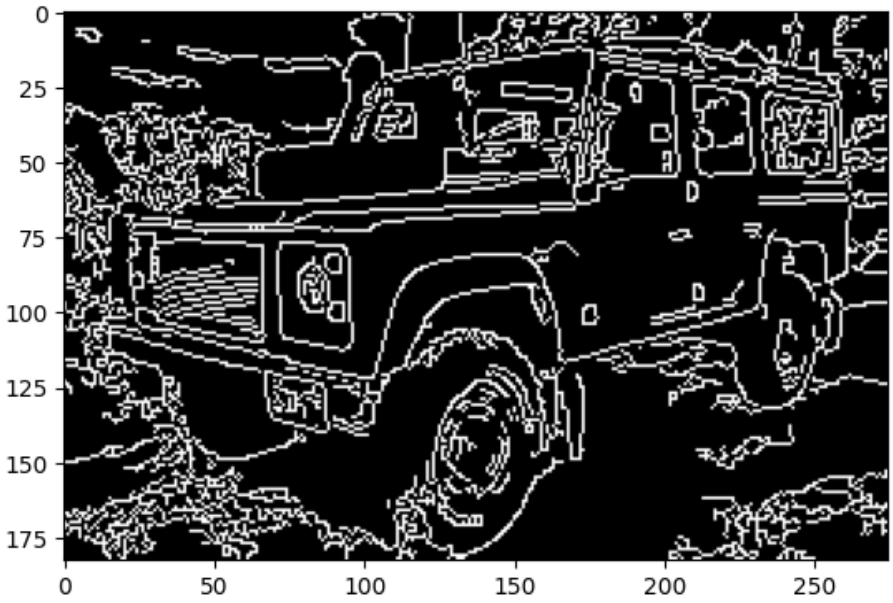
In [2]:
```
img = cv2.imread('../data/poor1.jpg')
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
plt.imshow(cv2.cvtColor(gray,cv2.COLOR_BGR2RGB))
```

Out[2]:
```
<matplotlib.image.AxesImage at 0x17561a720>
```

2. Apply filter and find edges for localization

In [3]:
```
bfilter = cv2.bilateralFilter(gray, 11, 17, 17) #Noise reduction
edged = cv2.Canny(bfilter, 10, 200) #Edge detection
plt.imshow(cv2.cvtColor(edged, cv2.COLOR_BGR2RGB))
```

Out[3]:
```
<matplotlib.image.AxesImage at 0x29cdd1790>
```



3. Find contours and apply masks

In [4]:
```
keypoints = cv2.findContours(edged.copy(), cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)
contours = imutils.grab_contours(keypoints)
contours = sorted(contours, key=cv2.contourArea, reverse=True)[:10]
```

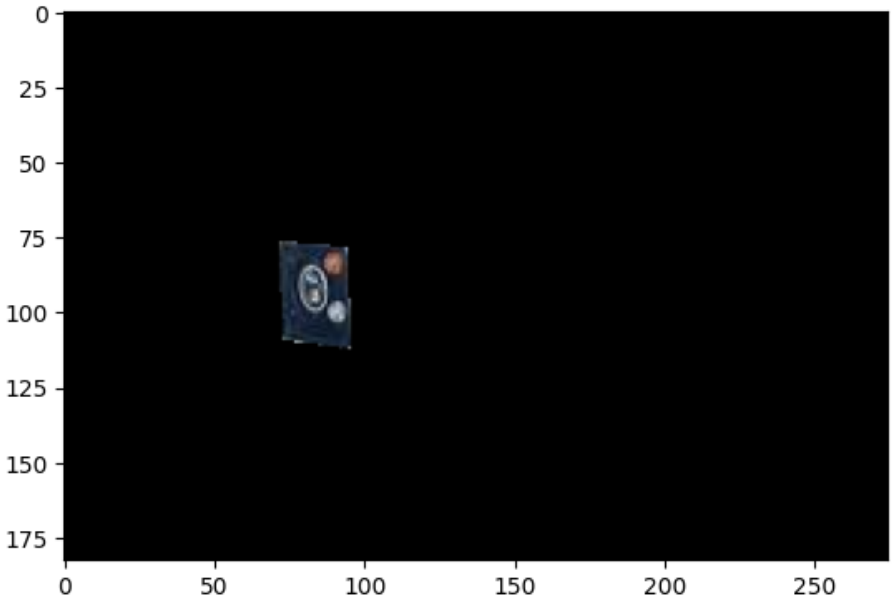
In [5]:
```
location = None
for contour in contours:
    approx = cv2.approxPolyDP(contour, 10, True)
    if len(approx) == 4:
        location = approx
        break
```

In [6]:
```
location
```

Out[6]:
```
array([[[ 72,  77]],

       [[ 73, 109]],

       [[ 95, 112]],

       [[ 94,  79]]], dtype=int32)
```

In [7]:
```
mask = np.zeros(gray.shape, np.uint8)
new_image = cv2.drawContours(mask, [location], 0, 255, -1)
new_image = cv2.bitwise_and(img, img, mask=mask)

plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_BGR2RGB))
```

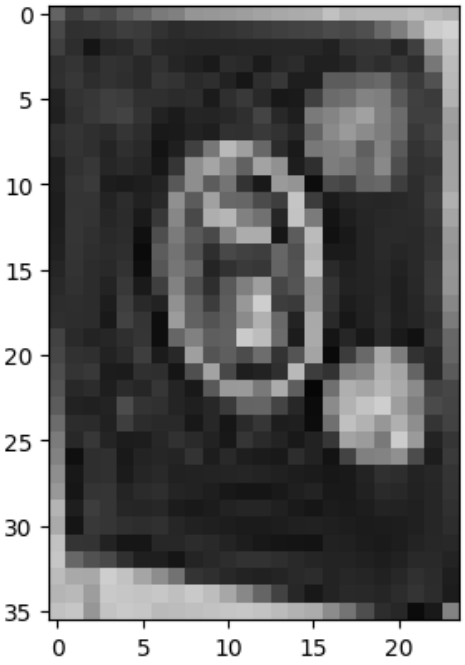
Out[7]:
```
<matplotlib.image.AxesImage at 0x29cdb3bc0>
```



In [8]:
```
(x,y) = np.where(mask==255)
(x1, y1) = (np.min(x), np.min(y))
(x2, y2) = (np.max(x), np.max(y))
cropped_image = gray[x1:x2+1, y1:y2+1]
```

In [9]:
```
plt.imshow(cv2.cvtColor(cropped_image, cv2.COLOR_BGR2RGB))
```

Out[9]:
```
<matplotlib.image.AxesImage at 0x29e283da0>
```



4. Use Easy OCR to Read Text

In [10]:
```
reader = easyocr.Reader(['en'])
result = reader.readtext(cropped_image)
result
```

Out[10]:
```
[]
```

5. Render Result

In [11]:
```
text = result[0][-2]
font = cv2.FONT_HERSHEY_SIMPLEX
res = cv2.putText(img, text=text, org=(approx[0][0][0], approx[1][0][1]+60), fontFace=font, fontSc
res = cv2.rectangle(img, tuple(approx[0][0]), tuple(approx[2][0]), (0,255,0),3)
plt.imshow(cv2.cvtColor(res, cv2.COLOR_BGR2RGB))
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
Cell In[11], line 1
----> 1 text = result[0][-2]
      2 font = cv2.FONT_HERSHEY_SIMPLEX
      3 res = cv2.putText(img, text=text, org=(approx[0][0][0], approx[1][0][1]+60), fontFace=fon
t, fontScale=1, color=(0,255,0), thickness=2, lineType=cv2.LINE_AA)

IndexError: list index out of range
```